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2011 CATALOG

MORSE CUTTING TOOLS

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CATALOG NO. 2005

TERMS & CONDITIONS

I. PAYMENT TERMS
Unless otherwise agreed to in writing, upon approved credit, terms of payment shall be 1% — 15 days Net 30. Past due invoices are subject to a service charge of 1½% per month (18% per annum, or the maximum legal rate) from invoice date until paid. Returned checks are subject to a $15.00 charge.

II. TRANSPORTATION ALLOWANCE
F.O.B. Madison Heights, Michigan with transportation allowed on orders for $350.00 or more at net cost. The total cost of premium transportation will be invoiced without allowance for normal transportation.

III. PRICING
Pricing shall be Morse's list price set forth in our published catalog(s), less applicable discounts, in effect on the date of our acceptance of the order and subject to our terms. Morse reserves the right to change prices and discounts without notice.

IV. RETURNED GOODS POLICY
Customer must obtain a Returned Goods Authorization ("RGA") Number prior to returning goods. Unless we have erred in filling your order, all returns must be prepaid. No merchandise will be accepted for return which is made up special or which has been held for over 30 days. We reserve the right to determine if the Buyer has abused the item in question. If it cannot be returned to stock, credit will not be given. All returns must be accompanied by original shipper or invoice. Orders returned due to customer error must be prepaid and are subject to a restocking charge. No merchandise will be accepted without an "RGA Number."

V. STANDARD PACKAGE QUANTITIES
Orders received will be shipped in standard package quantities as shown in this catalog. Orders for less than standard package quantities will be increased to a standard package or assessed a 5% discount reduction to the applicable distributor discount.

VI. HANDLING CHARGES
A $2.50 handling charge will apply to all orders under $100.00 net at distributor cost.

MFR'S CODE
698006

WARNING

Any cutting tool may break or shatter under improper use. Government regulations require use of safety glasses and other appropriate safety equipment at all times in the vicinity of use.

Grinding of this product may produce dusts containing chemical elements which are identified as potentially hazardous. Use adequate ventilation and read the applicable material safety data sheets.

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Morse Cutting Tools does not give any warranty on its products.

Morse Cutting Tools warrants to original equipment manufacturers, distributors and industrial and commercial use of its products that each new product which it manufacturers or supplies is free from defects in material and workmanship. Its sole obligation under this warranty is limited to furnishing, without additional charge, a replacement for, or, at its options, repairing or issuing credit for any such product which shall, within one year from the date of sale by Morse Cutting Tools, be returned freight prepaid to the facility designated by a Morse Cutting Tool representative and which, upon inspection, is determined by Morse Cutting Tools to be defective in materials or workmanship. The provisions of this warranty shall not apply to any product which has been subjected to misuse, improper operating conditions, machine setup or which has been repaired or altered, if such would adversely affect performance of the product. Complete written information with respect to all such matters must be furnished to Morse Cutting Tools, as a prerequisite to its consideration of any claim or complaint under this warranty. The repair, replacement or issuance of credit for parts provided for in this warranty constitutes the Buyer's EXCLUSIVE REMEDY.

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Revision #6 — February 1, 2005

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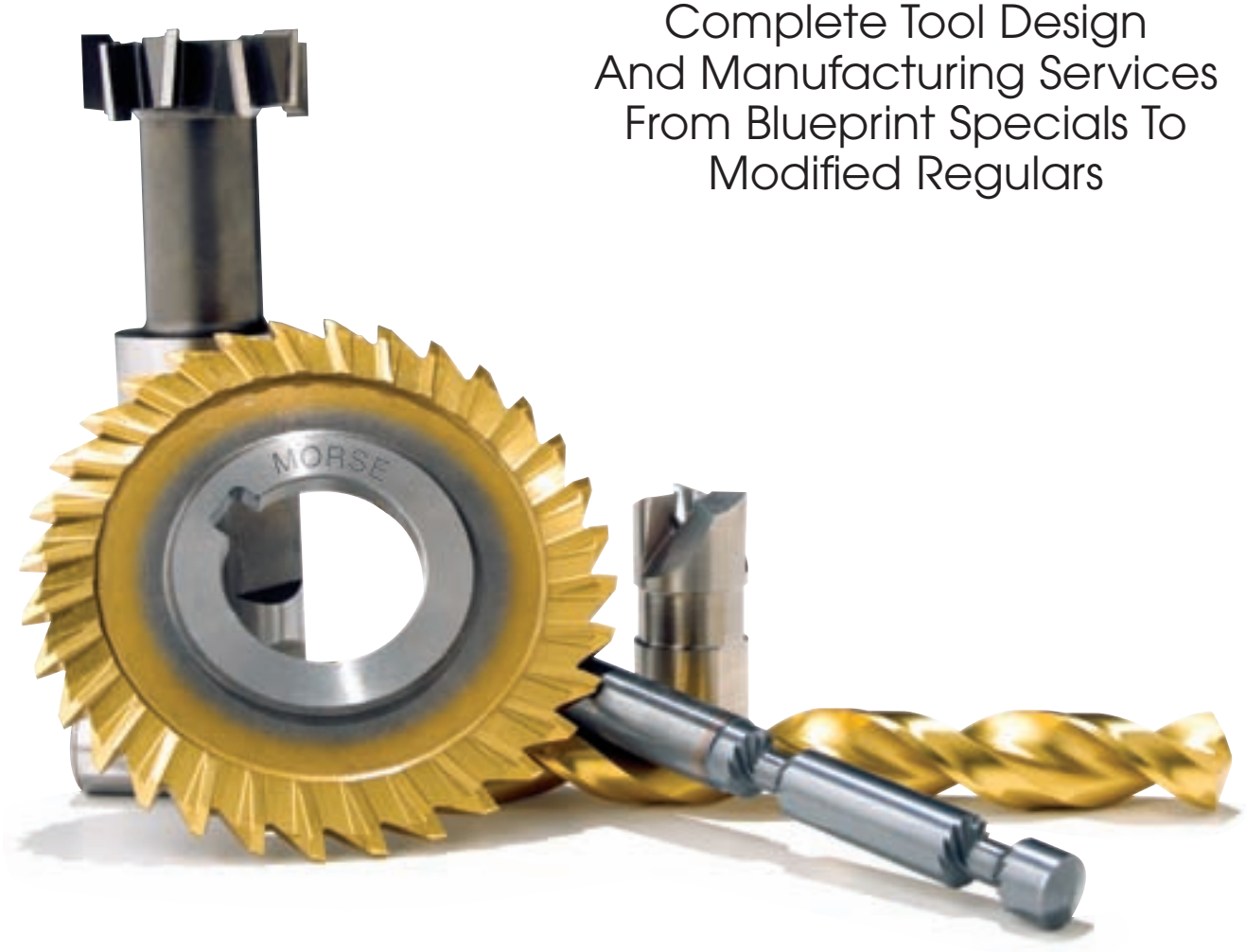

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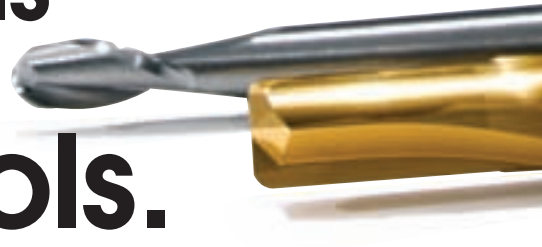

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Center Drills
Chamfer Tools
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Combination Tools
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Countersinks
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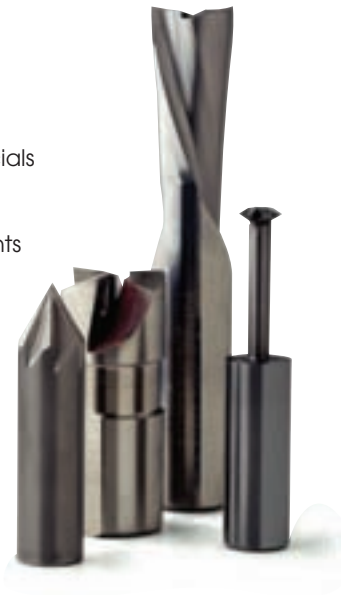
Engineered Specials
Key Cutters
Surface Treatments
Tool Bits
Tool Coatings



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TAPER SHANK DRILLS

MISCELLANEOUS

SETS 77-80

TECHNICAL DATA

HPC COBALT HIGH PERFORMANCE WIDE LAND PARABOLIC FLUTE DRILLS

130° Self-Centering Point • 38° Helix Angle
Special Web Thinning • Heavy-Duty Web

AVAILABLE IN:
M35 Premium Cobalt Steel
TiN — Titanium Nitride Coated
TiALN — Titanium Aluminum Nitride Coated

PARABOLIC FLUTE DRILLS

Feature a unique flute design that greatly enhances chip flow, coolant flow to the drill point and heat dissipation. Recommended for Deep Hole Drilling greater than three diameters deep without the need to reduce feed rate or withdraw the drill to clear chips (a constant heavy feed rate is recommended).

WIDE LAND PARABOLIC FLUTE DRILLS

The next generation in parabolic flute design, are effective in a wider range of materials and applications than standard parabolic flute drills. An Enhanced Flute Design with reinforced web provides increased drill strength and rigidity, straighter closer tolerance holes, improved chip formation and evacuation, improved coolant flow to the drill point and higher speeds and feeds for increased productivity.

PREMIUM M35 COBALT STEEL

Offers increased hardness, toughness, wear resistance and heat resistance. Highly recommended for drilling tough, high tensile strength materials up to 35 Rc hardness and materials that generate higher cutting temperatures. Applications include high alloy steels, ferrous castings, titanium, inconel, stainless steels and other difficult-to-drill materials. Specify coated tools for drilling materials over 35 Rc hardness.

TiN — TITANIUM NITRIDE COATING

An excellent all around coating, offers increased hardness and wear resistance, improved heat resistance, high lubricity, reduced edge build-up, improved surface finish and higher speeds and feeds. Increase productivity and tool life.

TiALN — TITANIUM ALUMINUM NITRIDE COATING

Is especially recommended for high thermal stress applications including dry machining, abrasive materials and hard-to-machine materials which generate higher cutting temperatures. TiALN actually forms a hard aluminum oxide layer in hot dry machining applications which reflects heat back into the chip and away from the tool while allowing higher speeds and feeds. High productivity with increased tool life.

Screw Machine Length HPC Cobalt High Performance Wide Land Parabolic Flute Drills

List No. 1360 M35 Premium Cobalt Steel
List No. 1360G TiN — Titanium Nitride Coated
List No. 1360T TiALN — Titanium Aluminum Nitride Coated

Short flute length and short overall length for maximum rigidity

Speeds & Feeds: Page 22

Size				Dec.	Flute Length	OAL	List No. 1360 Bright Finish		List No. 1360G TiN Coated		List No. 1360T TiALN Coated	
Fract.	Wire	Letter	Metric	Equiv.	MM	MM	EDP No.	List Price	EDP No.	List Price	EDP No.	List Price
5/64	—	—	—	0.0780	12	38	12185	$3.25	91500	$4.20	60000	$4.55
—	47	—	—	0.0783	12	38	12186	3.25	91501	4.20	60001	4.55
—	—	—	2.00	0.0787	12	38	12187	3.25	91502	4.20	60002	4.55
—	46	—	—	0.0810	12	38	12188	3.25	91503	4.20	60003	4.50
—	45	—	—	0.0820	12	38	12189	3.25	91504	4.20	60004	4.50
—	—	—	2.10	0.0827	12	38	12190	3.25	91505	4.20	60005	4.50
—	44	—	—	0.0860	13	40	12191	3.25	91506	4.20	60006	4.55
—	—	—	2.20	0.0866	13	40	12192	3.25	91507	4.20	60007	4.55
—	43	—	—	0.0890	13	40	12193	3.25	91508	4.20	60008	4.55
—	—	—	2.30	0.0906	13	40	12194	3.25	91509	4.20	60009	4.55
—	42	—	—	0.0935	14	43	12195	3.55	91510	4.55	60010	4.90
3/32	—	—	—	0.0938	14	43	12196	3.55	91511	4.55	60011	4.90
—	—	—	2.40	0.0945	14	43	12197	3.55	91512	4.55	60012	4.90
—	41	—	—	0.0960	14	43	12198	3.55	91513	4.55	60013	4.90
—	40	—	—	0.0980	14	43	12199	3.55	91514	4.55	60014	4.90
—	—	—	2.50	0.0984	14	43	12200	3.55	91515	4.55	60015	4.90
—	39	—	—	0.0995	14	43	12201	3.55	91516	4.55	60016	4.90
—	38	—	—	0.1015	14	43	12202	3.55	91517	4.55	60017	4.90
—	—	—	2.60	0.1024	14	43	12203	3.55	91518	4.55	60018	4.90
—	37	—	—	0.1040	14	43	12204	3.60	91519	4.60	60019	4.95
—	—	—	2.70	0.1063	16	46	12205	3.60	91520	4.60	60020	4.95
—	36	—	—	0.1067	16	46	12206	3.60	91521	4.60	60021	4.95
7/64	—	—	—	0.1094	16	46	12207	3.60	91522	4.60	60022	4.95
—	35	—	—	0.1100	16	46	12208	3.60	91523	4.60	60023	4.95
—	—	—	2.80	0.1102	16	46	12209	3.60	91524	4.60	60024	4.95
—	34	—	—	0.1110	16	46	12210	3.60	91525	4.60	60025	4.95
—	33	—	—	0.1130	16	46	12211	3.60	91526	4.60	60026	4.95
—	—	—	2.90	0.1142	16	46	12212	3.60	91527	4.60	60027	4.95
—	32	—	—	0.1160	16	46	12213	3.60	91528	4.60	60028	4.95
—	—	—	3.00	0.1181	16	46	12214	3.60	91529	4.60	60029	4.95
—	31	—	—	0.1200	18	49	12215	3.60	91530	4.60	60030	4.95
—	—	—	3.10	0.1220	18	49	12216	3.65	91531	4.65	60031	5.00
1/8	—	—	—	0.1250	18	49	12217	3.65	91532	4.65	60032	5.00
—	—	—	3.20	0.1260	18	49	12218	3.65	91533	5.10	60033	5.65
—	30	—	—	0.1285	18	49	12219	3.65	91534	5.10	60034	5.65
—	—	—	3.30	0.1299	18	49	12220	3.65	91535	5.10	60035	5.65
—	—	—	3.40	0.1339	20	52	12221	3.90	91536	5.35	60036	5.85
—	29	—	—	0.1360	20	52	12222	3.90	91537	5.35	60037	5.85
—	—	—	3.50	0.1378	20	52	12223	3.90	91538	5.35	60038	5.85
9/64	—	—	—	0.1406	20	52	12224	3.90	91539	5.40	60039	5.95
—	28	—	—	0.1405	20	52	12225	3.90	91540	5.40	60040	5.95
—	—	—	3.60	0.1417	20	52	12226	3.90	91541	5.40	60041	5.95
—	27	—	—	0.1440	20	52	12227	3.90	91542	5.40	60042	5.95
—	—	—	3.70	0.1457	20	52	12228	3.90	91543	5.40	60043	5.95
—	26	—	—	0.1470	20	52	12229	4.15	91544	5.60	60044	6.10
—	25	—	—	0.1495	22	55	12230	4.15	91545	5.60	60045	6.10

Screw Machine Length HPC Cobalt High Performance Wide Land Parabolic Flute Drills

List No. 1360 M35 Premium Cobalt Steel
List No. 1360G TiN — Titanium Nitride Coated
List No. 1360T TiALN — Titanium Aluminum Nitride Coated

Short flute length and short overall length for maximum rigidity

Size				Dec.	Flute Length	OAL	List No. 1360 Bright Finish		List No. 1360G TiN Coated		List No. 1360T TiALN Coated	
Fract.	Wire	Letter	Metric	Equiv.	MM	MM	EDP No.	List Price	EDP No.	List Price	EDP No.	List Price
—	24	—	—	0.1520	22	55	12231	$4.15	91546	$5.60	60046	$6.10
—	—	—	3.90	0.1535	22	55	12232	4.15	91547	5.60	60047	6.10
—	23	—	—	0.1540	22	55	12233	4.15	91548	5.60	60048	6.10
5/32	—	—	—	0.1562	22	55	12234	4.15	91549	5.60	60049	6.10
—	22	—	—	0.1570	22	55	12235	4.15	91550	5.60	60050	6.10
—	—	—	4.00	0.1575	22	55	12236	4.15	91551	5.60	60051	6.10
—	21	—	—	0.1590	22	55	12237	4.15	91552	5.60	60052	6.10
—	20	—	—	0.1610	22	55	12238	4.15	91553	5.60	60053	6.10
—	—	—	4.10	0.1614	22	55	12239	4.15	91554	5.60	60054	6.10
—	—	—	4.20	0.1654	22	55	12240	4.15	91555	5.60	60055	6.10
—	19	—	—	0.1660	22	55	12241	4.95	91556	6.40	60056	6.90
—	—	—	4.30	0.1693	24	58	12242	4.95	91557	6.40	60057	6.90
—	18	—	—	0.1695	24	58	12243	4.95	91558	6.40	60058	6.90
11/64	—	—	—	0.1719	24	58	12244	4.95	91559	6.40	60059	6.90
—	17	—	—	0.1730	24	58	12245	4.95	91560	6.40	60060	6.90
—	—	—	4.40	0.1732	24	58	12246	4.95	91561	6.40	60061	6.90
—	16	—	—	0.1770	24	58	12247	4.95	91562	6.40	60062	6.90
—	—	—	4.50	0.1772	24	58	12248	4.95	91563	6.40	60063	6.90
—	15	—	—	0.1800	24	58	12249	4.95	91564	6.40	60064	6.90
—	—	—	4.60	0.1811	24	58	12250	4.95	91565	6.40	60065	6.90
—	14	—	—	0.1820	24	58	12251	4.95	91566	6.40	60066	6.90
—	13	—	—	0.1850	24	58	12252	4.95	91567	6.40	60067	6.90
—	—	—	4.70	0.1850	24	58	12253	4.95	91568	6.40	60068	6.90
3/16	—	—	—	0.1875	26	62	12254	5.05	91569	6.50	60069	7.05
—	—	—	4.80	0.1890	26	62	12255	5.05	91570	7.55	60070	8.45
—	12	—	—	0.1890	26	62	12256	5.05	91571	7.55	60071	8.45
—	11	—	—	0.1910	26	62	12257	5.05	91572	7.55	60072	8.45
—	—	—	4.90	0.1929	26	62	12258	5.05	91573	7.55	60073	8.45
—	10	—	—	0.1935	26	62	12259	5.05	91574	7.55	60074	8.45
—	9	—	—	0.1960	26	62	12260	5.05	91575	7.55	60075	8.45
—	—	—	5.00	0.1969	26	62	12261	5.05	91576	7.55	60076	8.45
—	8	—	—	0.1990	26	62	12262	5.40	91577	7.90	60077	8.80
—	—	—	5.10	0.2008	26	62	12263	5.40	91578	7.90	60078	8.80
—	7	—	—	0.2010	26	62	12264	5.40	91579	7.90	60079	8.80
13/64	—	—	—	0.2031	26	62	12265	5.40	91580	7.90	60080	8.80
—	6	—	—	0.2040	26	62	12266	5.40	91581	7.90	60081	8.80
—	—	—	5.20	0.2047	26	62	12267	5.40	91582	7.90	60082	8.80
—	5	—	—	0.2055	26	62	12268	5.50	91583	8.00	60083	8.90
—	—	—	5.30	0.2087	26	62	12269	5.50	91584	8.00	60084	8.90
—	4	—	—	0.2090	28	66	12270	6.50	91585	9.05	60085	9.95
—	—	—	5.40	0.2126	28	66	12271	6.50	91586	9.05	60086	9.95
—	3	—	—	0.2130	28	66	12272	6.50	91587	9.05	60087	9.95
—	—	—	5.50	0.2165	28	66	12273	6.50	91588	9.05	60088	9.95
7/32	—	—	—	0.2188	28	66	12274	6.70	91589	9.20	60089	10.10
—	—	—	5.60	0.2205	28	66	12275	6.70	91590	9.20	60090	10.10
—	2	—	—	0.2210	28	66	12276	6.70	91591	9.20	60091	10.10

Screw Machine Length HPC Cobalt High Performance Wide Land Parabolic Flute Drills

List No. 1360 M35 Premium Cobalt Steel
List No. 1360G TiN — Titanium Nitride Coated
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Short flute length and short overall length for maximum rigidity

Speeds & Feeds: Page 22

Size				Dec.	Flute Length	OAL	List No. 1360 Bright Finish		List No. 1360G TiN Coated		List No. 1360T TiALN Coated	
Fract.	Wire	Letter	Metric	Equiv.	MM	MM	EDP No.	List Price	EDP No.	List Price	EDP No.	List Price
—	—	—	5.70	0.2244	28	66	12277	$6.70	91592	$9.20	60092	$10.10
—	1	—	—	0.2280	28	66	12278	6.70	91593	9.20	60093	10.10
—	—	—	5.80	0.2283	28	66	12279	6.70	91594	9.20	60094	10.10
—	—	—	5.90	0.2323	28	66	12280	6.70	91595	9.20	60095	10.10
15/64	—	—	—	0.2344	28	66	12281	6.70	91596	9.20	60096	10.10
—	—	—	6.00	0.2362	28	66	12282	6.70	91597	9.20	60097	10.10
—	—	—	6.10	0.2402	31	70	12283	7.10	91598	9.60	60098	10.50
—	—	—	6.20	0.2441	31	70	12284	7.10	91599	9.60	60099	10.50
—	—	—	6.30	0.2480	31	70	12285	7.10	91600	9.60	60100	10.50
1/4	—	—	—	0.2500	31	70	12286	7.75	91601	10.25	60101	11.15
—	—	—	6.40	0.2520	31	70	12287	7.75	91602	11.25	60102	12.55
—	—	—	6.50	0.2559	31	70	12288	6.50	91603	11.25	60103	12.55
—	—	—	6.60	0.2598	31	70	12289	7.75	91604	11.25	60104	12.55
—	—	—	6.70	0.2638	31	70	12290	7.75	91605	11.25	60105	12.55
17/64	—	—	—	0.2656	34	74	12291	8.00	91606	11.50	60106	12.80
—	—	—	6.80	0.2677	34	74	12292	8.00	91607	11.50	60107	12.80
—	—	—	6.90	0.2717	34	74	12293	8.00	91608	11.50	60108	12.80
—	—	—	7.00	0.2756	34	74	12294	7.65	91609	11.15	60109	12.40
—	—	—	7.10	0.2795	34	74	12295	10.80	91610	14.30	60110	15.60
9/32	—	—	—	0.2812	34	74	12296	10.80	91611	14.30	60111	15.60
—	—	—	7.20	0.2835	34	74	12297	10.80	91612	14.30	60112	15.60
—	—	—	7.30	0.2874	34	74	12298	7.95	91613	11.45	60113	12.70
—	—	—	7.40	0.2913	34	74	12299	7.95	91614	11.45	60114	12.70
—	—	—	7.50	0.2953	34	74	12300	7.95	91615	11.45	60115	12.70
19/64	—	—	—	0.2969	37	79	12301	11.95	91616	15.65	60116	17.00
—	—	—	7.60	0.2992	37	79	12302	11.95	91617	16.75	60117	18.45
—	—	—	7.70	0.3031	37	79	12303	11.95	91618	16.75	60118	18.45
—	—	—	7.80	0.3071	37	79	12304	11.95	91619	16.75	60119	18.45
—	—	—	7.90	0.3110	37	79	12305	9.40	91620	14.20	60120	15.90
5/16	—	—	—	0.3125	37	79	12306	9.40	91621	14.20	60121	15.90
—	—	—	8.00	0.3150	37	79	12307	9.40	91622	14.20	60122	15.90
—	—	—	8.10	0.3189	37	79	12308	12.60	91623	17.40	60123	19.10
—	—	—	8.20	0.3228	37	79	12309	12.60	91624	17.40	60124	19.10
—	—	—	8.30	0.3268	37	79	12310	9.65	91625	14.45	60125	16.15
21/64	—	—	—	0.3281	37	79	12311	9.65	91626	14.45	60126	16.15
—	—	—	8.40	0.3307	37	79	12312	9.65	91627	14.45	60127	16.15
—	—	—	8.50	0.3346	37	79	12313	9.65	91628	14.45	60128	16.15
—	—	—	8.60	0.3386	40	84	12314	14.70	91629	19.50	60129	21.20
—	—	—	8.70	0.3425	40	84	12315	14.70	91630	19.50	60130	21.20
11/32	—	—	—	0.3438	40	84	12316	14.70	91631	19.50	60131	21.20
—	—	—	8.80	0.3465	40	84	12317	14.70	91632	20.85	60132	23.05
—	—	—	8.90	0.3504	40	84	12318	11.00	91633	17.10	60133	19.30
—	—	—	9.00	0.3543	40	84	12319	11.00	91634	17.10	60134	19.30
—	—	—	9.10	0.3583	40	84	12320	11.85	91635	18.00	60135	20.20
23/64	—	—	—	0.3594	40	84	12321	11.85	91636	18.00	60136	20.20
—	—	—	9.20	0.3622	40	84	12322	11.85	91637	18.00	60137	20.20

Screw Machine Length HPC Cobalt High Performance Wide Land Parabolic Flute Drills

List No. 1360 M35 Premium Cobalt Steel
List No. 1360G TiN — Titanium Nitride Coated
List No. 1360T TiALN — Titanium Aluminum Nitride Coated

Short flute length and short overall length for maximum rigidity

Size				Dec.	Flute Length	OAL	List No. 1360 Bright Finish		List No. 1360G TiN Coated		List No. 1360T TiALN Coated	
Fract.	Wire	Letter	Metric	Equiv.	MM	MM	EDP No.	List Price	EDP No.	List Price	EDP No.	List Price
—	—	—	9.30	0.3661	40	84	12323	$11.85	91638	$18.00	60138	$20.20
—	—	—	9.40	0.3701	40	84	12324	11.85	91639	18.00	60139	20.20
—	—	—	9.50	0.3740	40	84	12325	11.85	91640	18.00	60140	20.20
3/8	—	—	—	0.3750	43	89	12326	11.85	91641	18.00	60141	20.20
—	—	—	9.60	0.3780	43	89	12327	11.85	91642	19.40	60142	22.15
—	—	—	9.70	0.3819	43	89	12328	11.85	91643	19.40	60143	22.15
—	—	—	9.80	0.3858	43	89	12329	11.85	91644	19.40	60144	22.15
—	—	—	9.90	0.3898	43	89	12330	11.85	91645	19.40	60145	22.15
25/64	—	—	—	0.3906	43	89	12331	11.85	91646	19.40	60146	22.15
—	—	—	10.00	0.3937	43	89	12332	11.85	91647	19.40	60147	22.15
13/32	—	—	—	0.4062	43	89	12333	19.40	91648	26.95	60148	29.70
27/64	—	—	—	0.4219	47	95	12334	19.40	91649	26.95	60149	29.70
7/16	—	—	—	0.4375	47	95	12335	22.10	91650	29.65	60150	32.40
29/64	—	—	—	0.4531	47	95	12336	22.10	91651	29.65	60151	32.40
15/32	—	—	—	0.4688	51	102	12337	22.10	91652	30.40	60152	33.40
31/64	—	—	—	0.4844	51	102	12338	26.95	91653	35.25	60153	38.25
1/2	—	—	—	0.5000	51	102	12339	27.65	91654	35.95	60154	38.95

PREMIUM M35 COBALT STEEL

Offers increased hardness, toughness, wear resistance and heat resistance. Highly recommended for drilling tough, high tensile strength materials up to 35 Rc hardness and materials that generate higher cutting temperatures. Applications include high alloy steels, ferrous castings, titanium, inconel, stainless steels and other difficult-to-drill materials. Specify coated tools for drilling materials over 35 Rc hardness.

TiN — TITANIUM NITRIDE COATING

An excellent all around coating, offers increased hardness and wear resistance, improved heat resistance, high lubricity, reduced edge build-up, improved surface finish and higher speeds and feeds. Increase productivity and tool life.

TiALN — TITANIUM ALUMINUM NITRIDE COATING

Is especially recommended for high thermal stress applications including dry machining, abrasive materials and hard-to-machine materials which generate higher cutting temperatures. TiALN actually forms a hard aluminum oxide layer in hot dry machining applications which reflects heat back into the chip and away from the tool while allowing higher speeds and feeds. High productivity with increased tool life.

Jobber Length HPC Cobalt High Performance Wide Land Parabolic Flute Drills

List No. 1361 M35 Premium Cobalt Steel
List No. 1361G TiN — Titanium Nitride Coated
List No. 1361T TiALN — Titanium Aluminum Nitride Coated

Speeds & Feeds: Page 22

Select the shortest drill possible for your application for maximum rigidty, hole accuracy and economy.

Size				Dec.	Flute Length	OAL	List No. 1361 Bright Finish		List No. 1361G TiN Coated		List No. 1361T TiALN Coated	
Fract.	Wire	Letter	Metric	Equiv.	MM	MM	EDP No.	List Price	EDP No.	List Price	EDP No.	List Price
5/64	—	—	—	0.0780	24	49	12350	$3.10	91660	$4.05	60160	$4.40
—	47	—	—	0.0783	24	49	12351	3.10	91661	4.05	60161	4.40
—	—	—	2.00	0.0787	24	49	12352	3.10	91662	4.05	60162	4.40
—	46	—	—	0.0810	24	49	12353	3.20	91663	4.15	60163	4.55
—	45	—	—	0.0820	24	49	12354	3.20	91664	4.15	60164	4.55
—	—	—	2.10	0.0827	24	49	12355	3.00	91665	4.00	60165	4.35
—	44	—	—	0.0860	27	53	12356	3.20	91666	4.20	60166	4.55
—	—	—	2.20	0.0866	27	53	12357	3.00	91667	4.00	60167	4.35
—	43	—	—	0.0890	27	53	12358	3.20	91668	4.20	60168	4.55
—	—	—	2.30	0.0906	27	53	12359	3.00	91669	4.00	60169	4.35
—	42	—	—	0.0935	30	57	12360	3.15	91670	4.15	60170	4.50
3/32	—	—	—	0.0938	30	57	12361	3.25	91671	4.20	60171	4.55
—	—	—	2.40	0.0945	30	57	12362	3.15	91672	4.15	60172	4.50
—	41	—	—	0.0960	30	57	12363	3.25	91673	4.20	60173	4.55
—	40	—	—	0.0980	30	57	12364	3.25	91674	4.20	60174	4.55
—	—	—	2.50	0.0984	30	57	12365	3.15	91675	4.15	60175	4.50
—	39	—	—	0.0995	30	57	12366	3.25	91676	4.25	60176	4.60
—	38	—	—	0.1015	30	57	12367	3.25	91677	4.25	60177	4.60
—	—	—	2.60	0.1024	30	57	12368	3.15	91678	4.15	60178	4.50
—	37	—	—	0.1040	30	57	12369	3.30	91679	4.30	60179	4.65
—	—	—	2.70	0.1063	33	61	12370	3.20	91680	4.20	60180	4.55
—	36	—	—	0.1067	33	61	12371	3.30	91681	4.30	60181	4.65
7/64	—	—	—	0.1094	33	61	12372	3.30	91682	4.30	60182	4.65
—	35	—	—	0.1100	33	61	12373	3.30	91683	4.30	60183	4.65
—	—	—	2.80	0.1102	33	61	12374	3.20	91684	4.20	60184	4.55
—	34	—	—	0.1110	33	61	12375	3.30	91685	4.30	60185	4.65
—	33	—	—	0.1130	33	61	12376	3.30	91686	4.30	60186	4.65
—	—	—	2.90	0.1142	33	61	12377	3.20	91687	4.20	60187	4.55
—	32	—	—	0.1160	33	61	12378	3.30	91688	4.30	60188	4.65
—	—	—	3.00	0.1181	33	61	12379	3.20	91689	4.20	60189	4.55
—	31	—	—	0.1200	36	65	12380	3.80	91690	4.80	60190	5.15
—	—	—	3.10	0.1220	36	65	12381	3.40	91691	4.40	60191	4.85
1/8	—	—	—	0.1250	36	65	12382	3.50	91692	4.50	60192	4.95
—	—	—	3.20	0.1260	36	65	12383	3.40	91693	4.85	60193	5.35
—	30	—	—	0.1285	36	65	12384	3.80	91694	5.25	60194	5.80
—	—	—	3.30	0.1299	36	65	12385	3.45	91695	4.90	60195	5.75
—	—	—	3.40	0.1339	39	70	12386	3.80	91696	5.25	60196	5.90
—	29	—	—	0.1360	39	70	12387	3.90	91697	5.35	60197	5.90
—	—	—	3.50	0.1378	39	70	12388	3.80	91698	5.25	60198	5.90
9/64	—	—	—	0.1406	39	70	12389	3.90	91699	5.35	60199	5.90
—	28	—	—	0.1405	39	70	12390	3.90	91700	5.35	60200	5.90
—	—	—	3.60	0.1417	39	70	12391	3.80	91701	5.25	60201	5.75
—	27	—	—	0.1440	39	70	12392	4.15	91702	5.60	60202	6.15
—	—	—	3.70	0.1457	39	70	12393	3.95	91703	5.40	60203	5.90
—	26	—	—	0.1470	39	70	12394	4.30	91704	5.75	60204	6.30
—	25	—	—	0.1495	43	75	12395	4.30	91705	5.75	60205	6.30
—	24	—	—	0.1520	43	75	12396	4.30	91706	5.75	60206	6.30
—	—	—	3.90	0.1535	43	75	12397	4.15	91707	5.60	60207	6.15
—	23	—	—	0.1540	43	75	12398	4.30	91708	5.75	60208	6.30
5/32	—	—	—	0.1562	43	75	12399	4.30	91709	5.75	60209	6.30

Jobber Length HPC Cobalt High Performance Wide Land Parabolic Flute Drills

List No. 1361 M35 Premium Cobalt Steel
List No. 1361G TiN — Titanium Nitride Coated
List No. 1361T TiALN — Titanium Aluminum Nitride Coated

Select the shortest drill possible for your application for maximum rigidty, hole accuracy and economy.

Size				Dec.	Flute Length	OAL	List No. 1361 Bright Finish		List No. 1361G TiN Coated		List No. 1361T TiALN Coated	
Fract.	Wire	Letter	Metric	Equiv.	MM	MM	EDP No.	List Price	EDP No.	List Price	EDP No.	List Price
—	22	—	—	0.1570	43	75	12400	$4.30	91710	$5.75	60210	$6.30
—	—	—	4.00	0.1575	43	75	12401	4.15	91711	5.60	60211	6.15
—	21	—	—	0.1590	43	75	12402	4.45	91712	5.90	60212	6.40
—	20	—	—	0.1610	43	75	12403	4.45	91713	5.90	60213	6.40
—	—	—	4.10	0.1614	43	75	12404	4.15	91714	5.60	60214	6.15
—	—	—	4.20	0.1654	43	75	12405	4.15	91715	5.60	60215	6.15
—	19	—	—	0.1660	43	75	12406	4.70	91716	6.15	60216	6.70
—	—	—	4.30	0.1693	47	80	12407	4.70	91717	6.20	60217	6.75
—	18	—	—	0.1695	47	80	12408	4.70	91718	6.20	60218	6.75
11/64	—	—	—	0.1719	47	80	12409	4.70	91719	6.20	60219	6.75
—	17	—	—	0.1730	47	80	12410	4.70	91720	6.20	60220	6.75
—	—	—	4.40	0.1732	47	80	12411	4.55	91721	6.00	60221	6.55
—	16	—	—	0.1770	47	80	12412	4.70	91722	6.20	60222	6.75
—	—	—	4.50	0.1772	47	80	12413	4.70	91723	6.20	60223	6.75
—	15	—	—	0.1800	47	80	12414	4.90	91724	6.35	60224	6.90
—	—	—	4.60	0.1811	47	80	12415	4.55	91725	6.00	60225	6.55
—	14	—	—	0.1820	47	80	12416	4.90	91726	6.35	60226	6.90
—	13	—	—	0.1850	47	80	12417	4.70	91727	6.20	60227	6.75
—	—	—	4.70	0.1850	47	80	12418	4.70	91728	6.20	60228	6.75
3/16	—	—	—	0.1875	52	86	12419	4.90	91729	6.35	60229	6.90
—	—	—	4.80	0.1890	52	86	12420	4.90	91730	7.45	60230	8.40
—	12	—	—	0.1890	52	86	12421	4.90	91731	7.45	60231	8.40
—	11	—	—	0.1910	52	86	12422	4.90	91732	7.45	60232	8.40
—	—	—	4.90	0.1929	52	86	12423	4.70	91733	7.30	60233	8.25
—	10	—	—	0.1935	52	86	12424	4.90	91734	7.45	60234	8.40
—	9	—	—	0.1960	52	86	12425	4.90	91735	7.45	60235	8.40
—	—	—	5.00	0.1969	52	86	12426	4.70	91736	7.30	60236	8.25
—	8	—	—	0.1990	52	86	12427	5.80	91737	8.40	60237	9.35
—	—	—	5.10	0.2008	52	86	12428	5.05	91738	7.65	60238	8.55
—	7	—	—	0.2010	52	86	12429	5.80	91739	8.40	60239	9.35
13/64	—	—	—	0.2031	52	86	12430	5.80	91740	8.40	60240	9.35
—	6	—	—	0.2040	52	86	12431	5.80	91741	8.40	60241	9.35
—	—	—	5.20	0.2047	52	86	12432	5.05	91742	7.65	60242	8.55
—	5	—	—	0.2055	52	86	12433	5.80	91743	8.40	60243	9.35
—	—	—	5.30	0.2087	52	86	12434	5.05	91744	7.65	60244	8.55
—	4	—	—	0.2090	57	93	12435	6.10	91745	8.70	60245	9.65
—	—	—	5.40	0.2126	57	93	12436	6.10	91746	8.70	60246	9.65
—	3	—	—	0.2130	57	93	12437	6.10	91747	8.70	60247	9.65
—	—	—	5.50	0.2165	57	93	12438	5.90	91748	8.50	60248	9.45
7/32	—	—	—	0.2188	57	93	12439	6.50	91749	9.10	60249	10.05
—	—	—	5.60	0.2205	57	93	12440	6.25	91750	8.85	60250	9.80
—	2	—	—	0.2210	57	93	12441	6.40	91751	9.00	60251	9.95
—	—	—	5.70	0.2244	57	93	12442	6.25	91752	8.85	60252	9.80
—	1	—	—	0.2280	57	93	12443	6.40	91753	9.00	60253	9.95
—	—	—	5.80	0.2283	57	93	12444	6.25	91754	8.85	60254	9.80
—	—	—	5.90	0.2323	57	93	12445	6.25	91755	8.85	60255	9.80
—	—	A	—	0.2340	57	93	12446	6.40	91756	9.00	60256	9.95
15/64	—	—	—	0.2344	57	93	12447	6.40	91757	9.00	60257	9.95
—	—	—	6.00	0.2362	57	93	12448	6.20	91758	8.75	60258	9.70
—	—	B	—	0.2380	63	101	12449	7.00	91759	9.60	60259	10.55

Jobber Length HPC Cobalt High Performance Wide Land Parabolic Flute Drills

List No. 1361 M35 Premium Cobalt Steel
List No. 1361G TiN — Titanium Nitride Coated
List No. 1361T TiALN — Titanium Aluminum Nitride Coated

Speeds & Feeds: Page 22

Select the shortest drill possible for your application for maximum rigidty, hole accuracy and economy.

Size				Dec.	Flute Length	OAL	List No. 1361 Bright Finish		List No. 1361G TiN Coated		List No. 1361T TiALN Coated	
Fract.	Wire	Letter	Metric	Equiv.	MM	MM	EDP No.	List Price	EDP No.	List Price	EDP No.	List Price
—	—	—	6.10	0.2402	63	101	12450	$6.85	91760	$9.45	60260	$10.40
—	—	C	—	0.2420	63	101	12451	7.00	91761	9.60	60261	10.55
—	—	—	6.20	0.2441	63	101	12452	6.85	91762	9.45	60262	10.40
—	—	D	—	0.2460	63	101	12453	7.00	91763	9.60	60263	10.55
—	—	—	6.30	0.2480	63	101	12454	7.20	91764	9.80	60264	10.75
1/4	—	—	—	0.2500	63	101	12455	7.65	91765	10.20	60265	11.15
—	—	E	—	0.2500	63	101	12455	7.65	91765	10.20	60265	11.15
—	—	—	6.40	0.2520	63	101	12457	7.35	91767	11.05	60267	12.40
—	—	—	6.50	0.2559	63	101	12458	6.90	91768	10.60	60268	11.95
—	—	F	—	0.2570	63	101	12459	7.55	91769	11.25	60269	12.60
—	—	—	6.60	0.2598	63	101	12460	7.35	91770	11.05	60270	12.40
—	—	G	—	0.2610	63	101	12461	7.55	91771	11.25	60271	12.60
—	—	—	6.70	0.2638	63	101	12462	7.40	91772	11.10	60272	12.40
17/64	—	—	—	0.2656	69	109	12463	7.85	91773	11.85	60273	13.35
—	—	H	—	0.2660	69	109	12464	7.85	91774	11.85	60274	13.35
—	—	—	6.80	0.2677	69	109	12465	7.60	91775	11.60	60275	13.05
—	—	—	6.90	0.2717	69	109	12466	7.55	91776	11.60	60276	13.05
—	—	I	—	0.2720	69	109	12467	7.55	91777	11.60	60277	13.05
—	—	—	7.00	0.2756	69	109	12468	7.30	91778	11.30	60278	12.75
—	—	J	—	0.2770	69	109	12469	7.85	91779	11.85	60279	13.35
—	—	—	7.10	0.2795	69	109	12470	8.75	91780	12.80	60280	14.25
—	—	K	—	0.2810	69	109	12471	8.50	91781	12.50	60281	13.95
9/32	—	—	—	0.2812	69	109	12472	8.50	91782	12.50	60282	13.95
—	—	—	7.20	0.2835	69	109	12473	8.75	91783	12.80	60283	14.25
—	—	—	7.30	0.2874	69	109	12474	8.75	91784	12.80	60284	14.25
—	—	L	—	0.2900	69	109	12475	8.50	91785	12.50	60285	13.95
—	—	—	7.40	0.2913	69	109	12476	8.75	91786	12.80	60286	14.25
—	—	M	—	0.2950	69	109	12477	7.85	91787	11.85	60287	13.35
—	—	—	7.50	0.2953	69	109	12478	7.60	91788	11.60	60288	13.05
19/64	—	—	—	0.2969	75	117	12479	9.40	91789	13.45	60289	14.90
—	—	—	7.60	0.2992	75	117	12480	9.95	91790	15.00	60290	16.80
—	—	N	—	0.3020	75	117	12481	10.10	91791	15.15	60291	16.95
—	—	—	7.70	0.3031	75	117	12482	9.95	91792	15.00	60292	16.80
—	—	—	7.80	0.3071	75	117	12483	9.95	91793	15.00	60293	16.80
—	—	—	7.90	0.3110	75	117	12484	9.95	91794	15.00	60294	16.80
5/16	—	—	—	0.3125	75	117	12485	9.40	91795	14.45	60295	16.25
—	—	—	8.00	0.3150	75	117	12486	9.10	91796	14.10	60296	15.90
—	—	O	—	0.3160	75	117	12487	9.55	91797	14.60	60297	16.40
—	—	—	8.10	0.3189	75	117	12488	10.20	91798	15.25	60298	17.05
—	—	—	8.20	0.3228	75	117	12489	9.55	91799	14.60	60299	16.40
—	—	P	—	0.3230	75	117	12490	9.55	91800	14.60	60300	16.40
—	—	—	8.30	0.3268	75	117	12491	10.30	91801	15.30	60301	17.10
21/64	—	—	—	0.3281	75	117	12492	10.45	91802	15.50	60302	17.30
—	—	—	8.40	0.3307	75	117	12493	10.30	91803	15.30	60303	17.10
—	—	Q	—	0.3320	75	117	12494	9.65	91804	14.65	60304	16.45
—	—	—	8.50	0.3346	75	117	12495	9.30	91805	14.30	60305	16.10
—	—	—	8.60	0.3386	81	125	12496	12.95	91806	17.95	60306	19.75
—	—	R	—	0.3390	81	125	12497	11.25	91807	16.25	60307	18.10
—	—	—	8.70	0.3425	81	125	12498	12.95	91808	17.95	60308	19.75
11/32	—	—	—	0.3438	81	125	12499	12.55	91809	17.55	60309	19.40

Jobber Length HPC Cobalt High Performance Wide Land Parabolic Flute Drills

List No. 1361 M35 Premium Cobalt Steel
List No. 1361G TiN — Titanium Nitride Coated
List No. 1361T TiALN — Titanium Aluminum Nitride Coated

Select the shortest drill possible for your application for maximum rigidty, hole accuracy and economy.

Size				Dec.	Flute Length	OAL	List No. 1361 Bright Finish		List No. 1361G TiN Coated		List No. 1361T TiALN Coated	
Fract.	Wire	Letter	Metric	Equiv.	MM	MM	EDP No.	List Price	EDP No.	List Price	EDP No.	List Price
—	—	—	8.80	0.3465	81	125	12500	$11.75	91810	$19.05	60310	$21.65
—	—	S	—	0.3480	81	125	12501	11.25	91811	18.55	60311	21.15
—	—	—	8.90	0.3504	81	125	12502	12.95	91812	20.20	60312	22.85
—	—	—	9.00	0.3543	81	125	12503	10.85	91813	18.15	60313	20.75
—	—	T	—	0.3580	81	125	12504	12.60	91814	19.90	60314	22.50
—	—	—	9.10	0.3583	81	125	12505	13.70	91815	21.00	60315	23.60
23/64	—	—	—	0.3594	81	125	12506	11.90	91816	19.20	60316	21.80
—	—	—	9.20	0.3622	81	125	12507	12.55	91817	19.80	60317	22.45
—	—	—	9.30	0.3661	81	125	12508	14.70	91818	21.95	60318	24.60
—	—	U	—	0.3680	81	125	12509	14.40	91819	21.65	60319	24.30
—	—	—	9.40	0.3701	81	125	12510	14.70	91820	21.95	60320	24.60
—	—	—	9.50	0.3740	81	125	12511	11.50	91821	18.80	60321	21.40
3/8	—	—	—	0.3750	87	133	12512	13.75	91822	22.25	60322	25.30
—	—	V	—	0.3770	87	133	12513	13.75	91823	22.90	60323	26.20
—	—	—	9.60	0.3780	87	133	12514	15.00	91824	24.15	60324	27.45
—	—	—	9.70	0.3819	87	133	12515	15.00	91825	24.15	60325	27.45
—	—	—	9.80	0.3858	87	133	12516	13.60	91826	22.75	60326	26.05
—	—	W	—	0.3860	87	133	12517	13.60	91827	22.75	60327	26.05
—	—	—	9.90	0.3898	87	133	12518	15.30	91828	24.45	60328	27.75
25/64	—	—	—	0.3906	87	133	12519	12.60	91829	21.75	60329	25.05
—	—	—	10.00	0.3937	87	133	12520	12.25	91830	21.40	60330	24.70
—	—	X	—	0.3970	87	133	12521	17.40	91831	26.55	60331	29.85
—	—	—	10.10	0.3976	87	133	12522	16.90	91832	26.05	60332	29.35
—	—	—	10.20	0.4016	87	133	12523	14.55	91833	23.70	60333	27.00
—	—	Y	—	0.4040	87	133	12524	15.70	91834	24.85	60334	28.15
—	—	—	10.30	0.4055	87	133	12525	17.25	91835	26.40	60335	29.70
13/32	—	—	—	0.4062	87	133	12526	15.70	91836	24.85	60336	28.15
—	—	—	10.40	0.4094	87	133	12527	17.25	91837	26.40	60337	29.70
—	—	Z	—	0.4130	87	133	12528	15.35	91838	24.50	60338	27.80
—	—	—	10.50	0.4134	87	133	12529	14.85	91839	24.00	60339	27.30
—	—	—	10.60	0.4173	87	133	12530	17.25	91840	26.40	60340	29.70
—	—	—	10.70	0.4213	94	142	12531	18.15	91841	27.30	60341	30.60
27/64	—	—	—	0.4219	94	142	12532	19.80	91842	28.95	60342	32.25
—	—	—	10.80	0.4252	94	142	12533	18.15	91843	27.30	60343	30.60
—	—	—	10.90	0.4291	94	142	12534	23.15	91844	32.30	60344	35.60
—	—	—	11.00	0.4331	94	142	12535	18.20	91845	27.35	60345	30.65
—	—	—	11.10	0.4370	94	142	12536	26.45	91846	35.60	60346	38.90
7/16	—	—	—	0.4375	94	142	12537	22.30	91847	31.45	60347	34.75
—	—	—	11.20	0.4409	94	142	12538	22.45	91848	31.60	60348	34.90
—	—	—	11.30	0.4449	94	142	12539	29.85	91849	39.00	60349	42.30
—	—	—	11.40	0.4488	94	142	12540	29.85	91850	39.00	60350	42.30
—	—	—	11.50	0.4528	94	142	12541	25.85	91851	35.00	60351	38.30
29/64	—	—	—	0.4531	94	142	12542	22.40	91852	31.50	60352	34.80
—	—	—	11.60	0.4567	94	142	12543	29.85	91853	39.00	60353	42.30
—	—	—	11.70	0.4606	94	142	12544	29.85	91854	39.00	60354	42.30
—	—	—	11.80	0.4646	94	142	12545	25.85	91855	35.00	60355	38.30
—	—	—	11.90	0.4685	101	151	12546	30.45	91856	39.60	60356	42.90
15/32	—	—	—	0.4688	101	151	12547	22.40	91857	31.50	60357	34.80
—	—	—	12.00	0.4724	101	151	12548	21.70	91858	30.85	60358	34.15
—	—	—	12.10	0.4764	101	151	12549	33.70	91859	42.85	60359	46.15
—	—	—	12.20	0.4803	101	151	12550	33.70	91860	42.85	60360	46.15
31/64	—	—	—	0.4844	101	151	12551	28.70	91861	39.85	60361	41.15
—	—	—	12.40	0.4882	101	151	12552	27.80	91862	36.95	60362	40.25
—	—	—	12.50	0.4921	101	151	12553	27.80	91863	36.95	60363	40.25
—	—	—	12.60	0.4961	101	151	12554	37.15	91864	46.30	60364	49.60
1/2	—	—	—	0.5000	101	151	12555	37.15	91865	46.30	60365	49.60
—	—	—	12.80	0.5039	101	151	12556	37.15	91866	48.90	60366	53.15
—	—	—	12.90	0.5079	101	151	12557	37.15	91867	48.90	60367	53.15
—	—	—	13.00	0.5118	101	151	12558	29.75	91868	41.55	60368	45.80

Taper Length HPC Cobalt High Performance Wide Land Parabolic Flute Drills

Longer flute length and longer overall length for increased reach and deeper hole drilling.

Speeds & Feeds: Page 22

List No. 1362 M35 Premium Cobalt Steel
List No. 1362G TiN — Titanium Nitride Coated
List No. 1362T TiALN — Titanium Aluminum Nitride Coated

Size				Dec.	Flute Length	OAL	List No. 1362 Bright Finish		List No. 1362G TiN Coated		List No. 1362T TiALN Coated	
Fract.	Wire	Letter	Metric	Equiv.	MM	MM	EDP No.	List Price	EDP No.	List Price	EDP No.	List Price
5/64	—	—	—	0.0780	56	85	12560	$7.30	91880	$8.35	60380	$8.70
—	47	—	—	0.0783	56	85	12561	7.15	91881	8.20	60381	8.55
—	—	—	2.00	0.0787	56	85	12562	6.90	91882	7.95	60382	8.35
—	46	—	—	0.0810	56	85	12563	7.60	91883	8.60	60383	9.00
—	45	—	—	0.0820	56	85	12564	7.60	91884	8.60	60384	9.00
—	—	—	2.10	0.0827	56	85	12565	8.15	91885	9.20	60385	9.55
—	44	—	—	0.0860	59	90	12566	7.80	91886	8.85	60386	9.20
—	—	—	2.20	0.0866	59	90	12567	8.15	91887	9.20	60387	9.55
—	43	—	—	0.0890	59	90	12568	7.85	91888	8.85	60388	9.25
—	—	—	2.30	0.0906	59	90	12569	7.85	91889	8.90	60389	9.30
—	42	—	—	0.0935	62	95	12570	7.85	91890	8.85	60390	9.25
3/32	—	—	—	0.0938	62	95	12571	7.85	91891	8.85	60391	9.25
—	—	—	2.40	0.0945	62	95	12572	7.90	91892	8.95	60392	9.30
—	41	—	—	0.0960	62	95	12573	7.00	91893	8.05	60393	8.40
—	40	—	—	0.0980	62	95	12574	7.00	91894	8.05	60394	8.40
—	—	—	2.50	0.0984	62	95	12575	7.95	91895	8.95	60395	9.35
—	39	—	—	0.0995	62	95	12576	7.60	91896	8.60	60396	9.00
—	38	—	—	0.1015	62	95	12577	7.60	91897	8.60	60397	9.00
—	—	—	2.60	0.1024	62	95	12578	8.35	91898	9.40	60398	9.75
—	37	—	—	0.1040	62	95	12579	7.60	91899	8.60	60399	9.00
—	—	—	2.70	0.1063	66	100	12580	8.50	91900	9.55	60400	9.90
—	36	—	—	0.1067	66	100	12581	7.60	91901	8.60	60401	9.00
7/64	—	—	—	0.1094	66	100	12582	7.60	91902	8.60	60402	9.00
—	35	—	—	0.1100	66	100	12583	7.60	91903	8.60	60403	9.00
—	—	—	2.80	0.1102	66	100	12584	8.30	91904	9.30	60404	9.70
—	34	—	—	0.1110	66	100	12585	7.60	91905	8.60	60405	9.00
—	33	—	—	0.1130	66	100	12586	7.60	91906	8.60	60406	9.00
—	—	—	2.90	0.1142	66	100	12587	8.50	91907	9.55	60407	9.90
—	32	—	—	0.1160	66	100	12588	6.60	91908	7.65	60408	8.00
—	—	—	3.00	0.1181	66	100	12589	6.50	91909	7.50	60409	7.80
—	31	—	—	0.1200	69	106	12590	8.20	91910	9.60	60410	10.15
—	—	—	3.10	0.1220	69	106	12591	9.10	91911	10.50	60411	11.05
1/8	—	—	—	0.1250	69	106	12592	8.40	91912	9.80	60412	10.30
—	—	—	3.20	0.1260	69	106	12593	9.10	91913	10.70	60413	11.25
—	30	—	—	0.1285	69	106	12594	8.20	91914	9.80	60414	10.35
—	—	—	3.30	0.1299	69	106	12595	9.10	91915	10.80	60415	11.40
—	—	—	3.40	0.1339	73	112	12596	9.45	91916	11.05	60416	11.60
—	29	—	—	0.1360	73	112	12597	8.20	91917	9.80	60417	10.35
—	—	—	3.50	0.1378	73	112	12598	8.40	91918	10.00	60418	10.55
9/64	—	—	—	0.1406	73	112	12599	9.35	91919	10.95	60419	11.50
—	28	—	—	0.1405	73	112	12600	9.35	91920	10.95	60420	11.50
—	—	—	3.60	0.1417	73	112	12601	9.45	91921	11.05	60421	11.60
—	27	—	—	0.1440	73	112	12602	9.15	91922	10.75	60422	11.30
—	—	—	3.70	0.1457	73	112	12603	9.45	91923	11.05	60423	11.60
—	26	—	—	0.1470	73	112	12604	9.15	91924	10.75	60424	11.30
—	25	—	—	0.1495	78	119	12605	9.65	91925	11.25	60425	11.80
—	24	—	—	0.1520	78	119	12606	9.15	91926	10.75	60426	11.30
—	—	—	3.90	0.1535	78	119	12607	10.10	91927	11.70	60427	12.25
—	23	—	—	0.1540	78	119	12608	9.15	91928	10.75	60428	11.30
5/32	—	—	—	0.1562	78	119	12609	9.35	91929	10.95	60429	11.50

Taper Length HPC Cobalt High Performance Wide Land Parabolic Flute Drills

Longer flute length and longer overall length for increased reach and deeper hole drilling.

List No. 1362 M35 Premium Cobalt Steel
List No. 1362G TiN — Titanium Nitride Coated
List No. 1362T TiALN — Titanium Aluminum Nitride Coated

Size				Dec. Equiv.	Flute Length MM	OAL MM	List No. 1362 Bright Finish		List No. 1362G TiN Coated		List No. 1362T TiALN Coated	
Fract.	Wire	Letter	Metric				EDP No.	List Price	EDP No.	List Price	EDP No.	List Price
—	22	—	—	0.1570	78	119	12610	$9.15	91930	$10.75	60430	$11.30
—	—	—	4.00	0.1575	78	119	12611	8.90	91931	10.45	60431	11.05
—	21	—	—	0.1590	78	119	12612	11.10	91932	12.65	60432	13.25
—	20	—	—	0.1610	78	119	12613	11.10	91933	12.65	60433	13.25
—	—	—	4.10	0.1614	78	119	12614	10.30	91934	11.85	60434	12.45
—	—	—	4.20	0.1654	78	119	12615	10.30	91935	11.85	60435	12.45
—	19	—	—	0.1660	78	119	12616	11.10	91936	12.65	60436	13.25
—	—	—	4.30	0.1693	82	126	12617	12.45	91937	14.05	60437	14.60
—	18	—	—	0.1695	82	126	12618	12.45	91938	14.05	60438	14.60
11/64	—	—	—	0.1719	82	126	12619	11.35	91939	12.95	60439	13.50
—	17	—	—	0.1730	82	126	12620	11.10	91940	12.65	60440	13.25
—	—	—	4.40	0.1732	82	126	12621	12.10	91941	13.70	60441	14.25
—	16	—	—	0.1770	82	126	12622	11.10	91942	12.65	60442	13.25
—	—	—	4.50	0.1772	82	126	12623	11.10	91943	12.65	60443	13.25
—	15	—	—	0.1800	82	126	12624	11.60	91944	13.15	60444	13.75
—	—	—	4.60	0.1811	82	126	12625	12.25	91945	13.80	60445	14.40
—	14	—	—	0.1820	82	126	12626	11.60	91946	13.15	60446	13.75
—	13	—	—	0.1850	82	126	12627	11.85	91947	13.40	60447	14.00
—	—	—	4.70	0.1850	82	126	12628	11.85	91948	13.40	60448	14.00
3/16	—	—	—	0.1875	87	132	12629	11.85	91949	13.55	60449	14.20
—	—	—	4.80	0.1890	87	132	12630	11.90	91950	15.30	60450	16.50
—	12	—	—	0.1890	87	132	12631	11.90	91951	15.30	60451	16.50
—	11	—	—	0.1910	87	132	12632	11.60	91952	15.00	60452	16.20
—	—	—	4.90	0.1929	87	132	12633	12.65	91953	16.05	60453	17.30
—	10	—	—	0.1935	87	132	12634	11.60	91954	15.00	60454	16.20
—	9	—	—	0.1960	87	132	12635	11.60	91955	15.00	60455	16.20
—	—	—	5.00	0.1969	87	132	12636	11.25	91956	14.60	60456	15.85
—	8	—	—	0.1990	87	132	12637	12.90	91957	16.30	60457	17.55
—	—	—	5.10	0.2008	87	132	12638	13.10	91958	16.50	60458	17.75
—	7	—	—	0.2010	87	132	12639	12.90	91959	16.30	60459	17.75
13/64	—	—	—	0.2031	87	132	12640	13.20	91960	16.60	60460	17.85
—	6	—	—	0.2040	87	132	12641	12.90	91961	16.30	60461	17.55
—	—	—	5.20	0.2047	87	132	12642	13.10	91962	16.50	60462	17.75
—	5	—	—	0.2055	87	132	12643	12.90	91963	16.30	60463	17.55
—	—	—	5.30	0.2087	87	132	12644	13.00	91964	16.40	60464	17.65
—	4	—	—	0.2090	91	139	12645	12.90	91965	16.30	60465	17.55
—	—	—	5.40	0.2126	91	139	12646	14.65	91966	18.05	60466	19.30
—	3	—	—	0.2130	91	139	12647	12.90	91967	16.30	60467	17.55
—	—	—	5.50	0.2165	91	139	12648	12.50	91968	15.90	60468	17.15
7/32	—	—	—	0.2188	91	139	12649	13.55	91969	16.95	60469	18.15
—	—	—	5.60	0.2205	91	139	12650	14.85	91970	18.25	60470	19.45
—	2	—	—	0.2210	91	139	12651	13.25	91971	16.65	60471	17.85
—	—	—	5.70	0.2244	91	139	12652	14.85	91972	18.25	60472	19.45
—	1	—	—	0.2280	91	139	12653	13.25	91973	16.65	60473	17.85
—	—	—	5.80	0.2283	91	139	12654	14.85	91974	18.25	60474	19.45
—	—	—	5.90	0.2323	91	139	12655	14.85	91975	18.25	60475	19.45
—	—	A	—	0.2340	91	139	12656	13.25	91976	16.65	60476	17.85
15/64	—	—	—	0.2344	91	139	12657	13.55	91977	16.95	60477	18.15
—	—	—	6.00	0.2362	91	139	12658	12.80	91978	16.20	60478	17.45
—	—	B	—	0.2380	97	148	12659	15.40	91979	18.80	60479	20.05

Taper Length HPC Cobalt High Performance Wide Land Parabolic Flute Drills

Longer flute length and longer overall length for increased reach and deeper hole drilling.

Speeds & Feeds: Page 22

List No. 1362 M35 Premium Cobalt Steel
List No. 1362G TiN — Titanium Nitride Coated
List No. 1362T TiALN — Titanium Aluminum Nitride Coated

Size				Dec.	Flute Length	OAL	List No. 1362 Bright Finish		List No. 1362G TiN Coated		List No. 1362T TiALN Coated	
Fract.	Wire	Letter	Metric	Equiv.	MM	MM	EDP No.	List Price	EDP No.	List Price	EDP No.	List Price
—	—	—	6.10	0.2402	97	148	12660	$16.80	91980	$20.20	60480	$21.40
—	—	C	—	0.2420	97	148	12661	15.40	91981	18.80	60481	20.05
—	—	—	6.20	0.2441	97	148	12662	16.80	91982	20.20	60482	21.40
—	—	D	—	0.2460	97	148	12663	15.40	91983	18.80	60483	20.05
—	—	—	6.30	0.2480	97	148	12664	16.45	91984	19.85	60484	21.05
1/4	—	—	—	0.2500	97	148	12665	15.80	91985	19.20	60485	20.45
—	—	E	—	0.2500	97	148	12665	15.80	91985	19.20	60485	20.45
—	—	—	6.40	0.2520	97	148	12667	16.80	91987	21.25	60487	22.85
—	—	—	6.50	0.2559	97	148	12668	14.95	91988	19.40	60488	21.00
—	—	F	—	0.2570	97	148	12669	17.75	91989	22.15	60489	23.80
—	—	—	6.60	0.2598	97	148	12670	17.25	91990	21.70	60490	23.30
—	—	G	—	0.2610	97	148	12671	17.75	91991	22.15	60491	23.80
—	—	—	6.70	0.2638	97	148	12672	17.25	91992	21.70	60492	23.80
17/64	—	—	—	0.2656	102	156	12673	18.20	91993	23.80	60493	25.85
—	—	H	—	0.2660	102	156	12674	18.20	91994	23.80	60494	25.85
—	—	—	6.80	0.2677	102	156	12675	20.65	91995	26.30	60495	28.35
—	—	—	6.90	0.2717	102	156	12676	19.90	91996	25.50	60496	27.55
—	—	I	—	0.2720	102	156	12677	19.90	91997	25.50	60497	27.55
—	—	—	7.00	0.2756	102	156	12678	17.20	91998	22.85	60498	24.90
—	—	J	—	0.2770	102	156	12679	21.15	91999	26.75	60499	28.80
—	—	—	7.10	0.2795	102	156	12680	22.20	92000	27.80	60500	29.85
—	—	K	—	0.2810	102	156	12681	22.05	92001	27.65	60501	29.70
9/32	—	—	—	0.2812	102	156	12682	22.05	92002	27.65	60502	29.70
—	—	—	7.20	0.2835	102	156	12683	21.90	92003	27.50	60503	29.55
—	—	—	7.30	0.2874	102	156	12684	21.90	92004	27.50	60504	29.55
—	—	L	—	0.2900	102	156	12685	21.50	92005	27.10	60505	29.15
—	—	—	7.40	0.2913	102	156	12686	21.90	92006	27.50	60506	29.55
—	—	M	—	0.2950	102	156	12687	21.20	92007	26.80	60507	28.85
—	—	—	7.50	0.2953	102	156	12688	20.85	92008	26.45	60508	28.50
19/64	—	—	—	0.2969	109	165	12689	22.40	92009	28.00	60509	30.05
—	—	—	7.60	0.2992	109	165	12690	25.15	92010	31.15	60510	33.30
—	—	N	—	0.3020	109	165	12691	21.85	92011	27.85	60511	30.00
—	—	—	7.70	0.3031	109	165	12692	25.15	92012	31.15	60512	33.30
—	—	—	7.80	0.3071	109	165	12693	25.15	92013	31.15	60513	33.30
—	—	—	7.90	0.3110	109	165	12694	25.15	92014	31.15	60514	33.30
5/16	—	—	—	0.3125	109	165	12695	22.40	92015	28.40	60515	30.60
—	—	—	8.00	0.3150	109	165	12696	21.15	92016	27.15	60516	29.35
—	—	O	—	0.3160	109	165	12697	24.50	92017	30.50	60517	32.65
—	—	—	8.10	0.3189	109	165	12698	25.35	92018	31.35	60518	33.55
—	—	—	8.20	0.3228	109	165	12699	26.40	92019	32.40	60519	34.60
—	—	P	—	0.3230	109	165	12700	26.40	92020	32.40	60520	34.60
—	—	—	8.30	0.3268	109	165	12701	26.35	92021	32.40	60521	34.60
21/64	—	—	—	0.3281	109	165	12702	25.10	92022	31.10	60522	33.30
—	—	—	8.40	0.3307	109	165	12703	26.35	92023	32.40	60523	34.55
—	—	Q	—	0.3320	109	165	12704	24.50	92024	30.50	60524	32.65
—	—	—	8.50	0.3346	109	165	12705	23.70	92025	29.70	60525	31.80
—	—	—	8.60	0.3386	115	175	12706	27.05	92026	33.05	60526	35.25
—	—	R	—	0.3390	115	175	12707	25.05	92027	31.05	60527	33.25
—	—	—	8.70	0.3425	115	175	12708	27.05	92028	33.05	60528	35.25
11/32	—	—	—	0.3438	115	175	12709	25.70	92029	31.70	60529	33.85

Taper Length HPC Cobalt High Performance Wide Land Parabolic Flute Drills

List No. 1362 M35 Premium Cobalt Steel
List No. 1362G TiN — Titanium Nitride Coated
List No. 1362T TiALN — Titanium Aluminum Nitride Coated

Size				Dec.	Flute Length	OAL	List No. 1362 Bright Finish		List No. 1362G TiN Coated		List No. 1362T TiALN Coated	
Fract.	Wire	Letter	Metric	Equiv.	MM	MM	EDP No.	List Price	EDP No.	List Price	EDP No.	List Price
—	—	—	8.80	0.3465	115	175	12710	$27.05	92030	$36.65	60530	$40.15
—	—	S	—	0.3480	115	175	12711	25.05	92031	34.65	60531	38.15
—	—	—	8.90	0.3504	115	175	12712	26.55	92032	36.15	60532	39.65
—	—	—	9.00	0.3543	115	175	12713	24.30	92033	33.90	60533	37.35
—	—	T	—	0.3580	115	175	12714	29.75	92034	39.35	60534	42.85
—	—	—	9.10	0.3583	115	175	12715	31.80	92035	41.40	60535	44.85
23/64	—	—	—	0.3594	115	175	12716	28.70	92036	38.30	60536	41.80
—	—	—	9.20	0.3622	115	175	12717	31.85	92037	41.45	60537	44.95
—	—	—	9.30	0.3661	115	175	12718	31.85	92038	41.45	60538	44.95
—	—	U	—	0.3680	115	175	12719	27.95	92039	37.55	60539	41.00
—	—	—	9.40	0.3701	115	175	12720	31.85	92040	41.45	60540	44.95
—	—	—	9.50	0.3740	115	175	12721	28.95	92041	38.60	60541	42.05
3/8	—	—	—	0.3750	121	184	12722	35.90	92042	46.80	60542	50.75
—	—	V	—	0.3770	121	184	12723	34.55	92043	46.35	60543	50.55
—	—	—	9.60	0.3780	121	184	12724	39.85	92044	51.65	60544	55.85
—	—	—	9.70	0.3819	121	184	12725	39.85	92045	51.65	60545	55.85
—	—	—	9.80	0.3858	121	184	12726	39.60	92046	51.40	60546	55.65
—	—	W	—	0.3860	121	184	12727	39.60	92047	51.40	60547	55.65
—	—	—	9.90	0.3898	121	184	12728	39.85	92048	51.65	60548	55.85
25/64	—	—	—	0.3906	121	184	12729	37.95	92049	49.75	60549	54.00
—	—	—	10.00	0.3937	121	184	12730	36.70	92050	48.50	60550	52.75
—	—	X	—	0.3970	121	184	12731	43.75	92051	55.55	60551	59.80
—	—	—	10.10	0.3976	121	184	12732	46.70	92052	58.50	60552	62.75
—	—	—	10.20	0.4016	121	184	12733	46.40	92053	58.20	60553	62.45
—	—	Y	—	0.4040	121	184	12734	42.10	92054	53.85	60554	58.10
—	—	—	10.30	0.4055	121	184	12735	47.75	92055	59.55	60555	63.75
13/32	—	—	—	0.4062	121	184	12736	43.10	92056	54.90	60556	59.15
—	—	—	10.40	0.4094	121	184	12737	47.75	92057	59.55	60557	63.75
—	—	Z	—	0.4130	121	184	12738	45.85	92058	57.65	60558	61.90
—	—	—	10.50	0.4134	121	184	12739	45.00	92059	56.80	60559	61.05
—	—	—	10.60	0.4173	121	184	12740	57.35	92060	69.15	60560	73.40
—	—	—	10.70	0.4213	128	195	12741	60.05	92061	71.70	60561	75.95
27/64	—	—	—	0.4219	128	195	12742	55.40	92062	67.20	60562	71.45
—	—	—	10.80	0.4252	128	195	12743	52.30	92063	64.10	60563	68.35
—	—	—	10.90	0.4291	128	195	12744	48.10	92064	59.90	60564	64.10
—	—	—	11.00	0.4331	128	195	12745	46.70	92065	58.45	60565	62.70
—	—	—	11.10	0.4370	128	195	12746	60.15	92066	71.95	60566	76.20
7/16	—	—	—	0.4375	128	195	12747	58.40	92067	70.15	60567	74.40
—	—	—	11.20	0.4409	128	195	12748	60.15	92068	71.95	60568	76.20
—	—	—	11.30	0.4449	128	195	12749	58.10	92069	69.90	60569	74.15
—	—	—	11.40	0.4488	128	195	12750	58.10	92070	69.90	60570	74.15
—	—	—	11.50	0.4528	128	195	12751	58.10	92071	69.90	60571	74.15
29/64	—	—	—	0.4531	128	195	12752	57.80	92072	69.60	60572	73.85
—	—	—	11.60	0.4567	128	195	12753	59.55	92073	71.35	60573	75.60
—	—	—	11.70	0.4606	128	195	12754	59.15	92074	70.95	60574	75.20
—	—	—	11.80	0.4646	128	195	12755	60.50	92075	76.35	60575	82.05
—	—	—	11.90	0.4685	134	205	12756	58.65	92076	74.50	60576	82.25
15/32	—	—	—	0.4688	134	205	12757	54.05	92077	69.85	60577	75.60
—	—	—	12.00	0.4724	134	205	12758	51.00	92078	66.85	60578	72.55
—	—	—	12.10	0.4764	134	205	12759	63.20	92079	79.05	60579	84.80
—	—	—	12.20	0.4803	134	205	12760	63.20	92080	79.05	60580	84.80
31/64	—	—	—	0.4844	134	205	12761	63.20	92081	79.05	60581	84.80
—	—	—	12.40	0.4882	134	205	12762	60.80	92082	76.65	60582	82.35
—	—	—	12.50	0.4921	134	205	12763	60.80	92083	76.65	60583	82.35
—	—	—	12.60	0.4961	134	205	12764	70.35	92084	86.20	60584	91.95
1/2	—	—	—	0.5000	134	205	12765	63.20	92085	79.05	60585	84.80
—	—	—	12.80	0.5039	134	205	12766	60.80	92086	80.05	60586	87.00
—	—	—	12.90	0.5079	134	205	12767	60.80	92087	80.05	60587	87.00
—	—	—	13.00	0.5118	134	205	12768	60.80	92088	80.05	60588	87.00

Speeds and Feeds for HPC Cobalt High Performance Wide Land Parabolic Flute Drills

Material	Material Hardness (BHN)	Speed (SFM)	Feed (IPR) by Drill Diameter 1/8	1/4	3/8	1/2
Aluminum/Aluminum Alloys	40-100	180	.0050	.0080	.0100	.0130
Copper/ Copper Alloys	60-100	120	.0040	.0065	.0080	.0100
Brass	180-210	150	.0040	.0065	.0080	.0100
Bronze	140-200	90	.0030	.0050	.0065	.0080
Plastics/Duraplastics	—	60	.0030	.0050	.0065	.0080
Iron, Grey Cast - Soft	120-210	90	.0050	.0080	.0100	.0130
Iron, Grey Cast - Hard	up to 350	25	.0050	.0080	.0100	.0130
Iron, Cast - Malleable	<300	70	.0050	.0080	.0100	.0130
Iron, Cast - Chilled	<340	25	.0025	.0040	.0050	.0070
Steel - Low Carbon	80-120	90	.0040	.0065	.0080	.0100
Steel - Medium Carbon	120-180	90	.0040	.0065	.0080	.0100
Steel - High Carbon	180-230	90	.0030	.0050	.0065	.0080
Steel - Alloyed	200-300	60	.0025	.0040	.0050	.0070
Steel, Tool	<250	60	.0030	.0050	.0065	.0080
Steel, Tool	>250	35	.0025	.0040	.0050	.0070
Steel - Spring	400	25	.0020	.0030	.0040	.0050
Stainless Steel Sulphurized	<260	45	.0025	.0040	.0050	.0070
Stainless Steel, 300 Series Austenitic	120-210	35	.0030	.0050	.0060	.0075
Stainless Steel, 400 Series Martensitic	200-300	40	.0025	.0040	.0050	.0070

NOTE: The speeds and feeds shown are suggested starting points only and may be increased or decreased depending on actual material and machining conditions. Start conservatively and increase speed and feed until drilling cycle is optimized.

For TiN coated drills increase speed by up to 25% depending on actual material and machining conditions.

For TiALN coated drills increase speed by up to 100% depending on actual material and machining conditions.

SIZE SPECIFICATIONS:
Screw Machine Length Din 1897
Jobber Length Din 338
Taper Length Din 340

Jobber Length Drills

Straight Shank – High Speed Steel
118° Point – General Purpose

Designed for drilling a wide variety of materials.

Black Oxide Surface Treatment increases wear resistance, reduces galling and chip welding, improves chip flow and increases drill lubricant retention.

Bright Finish with polished flutes enhances chip ejection especially for aluminum and other non-ferrous materials.

Titanium Nitride (TiN) Coating increases tool surface hardness, wear resistance, heat resistance, chip flow and resists chip welding. Enhanced hole quality at higher speeds and feeds.

BLACK OXIDE TREATED

List No. 1330 Fractional
List No. 1332 Letter
List No. 1340 Wire Gage

BRIGHT FINISH

List No. 1330B Fractional
List No. 1332B Letter
List No. 1340B Wire Gage

TITANIUM NITRIDE COATED

List No. 1330G All Sizes

STANDARD PACKAGE
Fractional Sizes
1/64″ thru 3/8″ – 12 each
25/64″ thru 1/2″ – 6 each
33/64″ thru 1 1/16″ – 1 each

Letter Sizes
A thru V – 12 each
W thru Z – 6 each
Wire Gage Sizes
#1 thru #80 – 12 each

SIZE FRACTIONAL	SIZE WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	1330, 1332, 1340 EDP NO.	1330B, 1332B, 1340B EDP NO.	1330/B, 1332/B 1340/B LIST PRICE	1330G EDP NO.	1330G LIST PRICE
	80	.0135	1/8	3/4	11351	11551	$2.33	—	—
	79	.0145	1/8	3/4	11352	11552	2.33	—	—
1/64		.0156	3/16	3/4	11353	11553	1.91	—	—
	78	.0160	3/16	7/8	11354	11554	1.94	—	—
	77	.0180	3/16	7/8	11355	11555	1.94	—	—
	76	.0200	3/16	7/8	11356	11556	1.94	—	—
	75	.0210	1/4	1	11357	11557	1.94	—	—
	74	.0225	1/4	1	11358	11558	1.94	—	—
	73	.0240	5/16	1 1/8	11359	11559	1.94	—	—
	72	.0250	5/16	1 1/8	11360	11560	1.94	—	—
	71	.0260	3/8	1 1/4	11361	11561	1.94	—	—
	70	.0280	3/8	1 1/4	11362	11562	1.56	—	—
	69	.0292	1/2	1 3/8	11363	11563	1.56	—	—
	68	.0310	1/2	1 3/8	11364	11564	1.42	—	—
1/32		.0312	1/2	1 3/8	11365	11565	1.22	—	—
	67	.0320	1/2	1 3/8	11366	11566	1.42	—	—
	66	.0330	1/2	1 3/8	11367	11567	1.42	—	—
	65	.0350	5/8	1 1/2	11368	11568	1.42	—	—
	64	.0360	5/8	1 1/2	11369	11569	1.42	—	—
	63	.0370	5/8	1 1/2	11370	11570	1.42	—	—
	62	.0380	5/8	1 1/2	11371	11571	1.42	—	—
	61	.0390	11/16	1 5/8	11372	11572	1.42	—	—
	60	.0400	11/16	1 5/8	11373	11573	1.22	91373	$3.00
	59	.0410	11/16	1 5/8	11374	11574	1.22	91374	3.00
	58	.0420	11/16	1 5/8	11375	11575	1.22	91375	3.00
	57	.0430	3/4	1 3/4	11376	11576	1.22	91376	3.00
	56	.0465	3/4	1 3/4	11377	11577	1.22	91377	3.00
3/64		.0469	3/4	1 3/4	11378	11578	1.20	91378	3.00
	55	.0520	7/8	1 7/8	11379	11579	1.22	91379	3.00
	54	.0550	7/8	1 7/8	11380	11580	1.22	91380	3.00
	53	.0595	7/8	1 7/8	11381	11581	1.22	91381	3.00
1/16		.0625	7/8	1 7/8	11382	11582	1.20	91382	3.00
	52	.0635	7/8	1 7/8	11383	11583	1.22	91383	3.00
	51	.0670	1	2	11384	11584	1.22	91384	3.00
	50	.0700	1	2	11385	11585	1.22	91385	3.00
	49	.0730	1	2	11386	11586	1.22	91386	3.00

(continued)

Jobber Length Drills (continued)

List Nos. 1330/B, 1332/B, 1340/B and 1330G

SIZE FRACTIONAL	SIZE WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	1330, 1332, 1340 EDP NO.	1330B, 1332B, 1340B EDP NO.	1330/B, 1332/B 1340/B LIST PRICE	1330G EDP NO.	1330G LIST PRICE
	48	.0760	1	2	11387	11587	$1.22	91387	$3.00
5/64		.0781	1	2	11388	11588	1.20	91388	3.00
	47	.0785	1	2	11389	11589	1.22	91389	3.00
	46	.0810	1 1/8	2 1/8	11390	11590	1.22	91390	3.00
	45	.0820	1 1/8	2 1/8	11391	11591	1.22	91391	3.00
	44	.0860	1 1/8	2 1/8	11392	11592	1.22	91392	3.00
	43	.0890	1 1/4	2 1/4	11393	11593	1.22	91393	3.00
	42	.0935	1 1/4	2 1/4	11394	11594	1.22	91394	3.00
3/32		.0937	1 1/4	2 1/4	11395	11595	1.20	91395	3.00
	41	.0960	1 3/8	2 3/8	11396	11596	1.22	91396	3.00
	40	.0980	1 3/8	2 3/8	11397	11597	1.22	91397	3.00
	39	.0995	1 3/8	2 3/8	11398	11598	1.22	91398	3.00
	38	.1015	1 7/16	2 1/2	11399	11599	1.22	91399	3.00
	37	.1040	1 7/16	2 1/2	11400	11600	1.22	91400	3.00
	36	.1065	1 7/16	2 1/2	11401	11601	1.22	91401	3.00
7/64		.1094	1 1/2	2 5/8	11402	11602	1.27	91402	3.05
	35	.1100	1 1/2	2 5/8	11403	11603	1.28	91403	3.05
	34	.1110	1 1/2	2 5/8	11404	11604	1.28	91404	3.05
	33	.1130	1 1/2	2 5/8	11405	11605	1.28	91405	3.05
	32	.1160	1 5/8	2 3/4	11406	11606	1.28	91406	3.05
	31	.1200	1 5/8	2 3/4	11407	11607	1.28	91407	3.05
1/8		.1250	1 5/8	2 3/4	11408	11608	1.29	91408	3.05
	30	.1285	1 5/8	2 3/4	11409	11609	1.24	91409	3.05
	29	.1360	1 3/4	2 7/8	11410	11610	1.24	91410	3.66
	28	.1405	1 3/4	2 7/8	11411	11611	1.24	91411	3.66
9/64		.1406	1 3/4	2 7/8	11412	11612	1.44	91412	3.20
	27	.1440	1 7/8	3	11413	11613	1.38	91413	3.78
	26	.1470	1 7/8	3	11414	11614	1.38	91414	3.78
	25	.1495	1 7/8	3	11415	11615	1.38	91415	3.78
	24	.1520	2	3 1/8	11416	11616	1.44	91416	3.84
	23	.1540	2	3 1/8	11417	11617	1.44	91417	3.84
5/32		.1562	2	3 1/8	11418	11618	1.46	91418	3.55
	22	.1570	2	3 1/8	11419	11619	1.46	91419	3.90
	21	.1590	2 1/8	3 1/4	11420	11620	1.46	91420	3.90
	20	.1610	2 1/8	3 1/4	11421	11621	1.54	91421	3.96
	19	.1660	2 1/8	3 1/4	11422	11622	1.54	91422	3.96
	18	.1695	2 1/8	3 1/4	11423	11623	1.54	91423	3.96
11/64		.1719	2 1/8	3 1/4	11424	11624	1.54	91424	3.60
	17	.1730	2 3/16	3 3/8	11425	11625	1.87	91425	4.44
	16	.1770	2 3/16	3 3/8	11426	11626	1.87	91426	4.44
	15	.1800	2 3/16	3 3/8	11427	11627	1.87	91427	4.44
	14	.1820	2 3/16	3 3/8	11428	11628	1.87	91428	4.44
	13	.1850	2 5/16	3 1/2	11429	11629	1.90	91429	4.44
3/16		.1875	2 5/16	3 1/2	11430	11630	1.72	91430	3.80
	12	.1890	2 5/16	3 1/2	11431	11631	1.94	91431	4.50
	11	.1910	2 5/16	3 1/2	11432	11632	1.94	91432	5.62
	10	.1935	2 7/16	3 5/8	11433	11633	2.04	91433	5.50
	9	.1960	2 7/16	3 5/8	11434	11634	2.04	91434	5.50
	8	.1990	2 7/16	3 5/8	11435	11635	2.04	91435	5.50
	7	.2010	2 7/16	3 5/8	11436	11636	2.04	91436	5.50
13/64		.2031	2 7/16	3 5/8	11437	11637	1.94	91437	5.40
	6	.2040	2 1/2	3 3/4	11438	11638	2.32	91438	5.80
	5	.2055	2 1/2	3 3/4	11439	11639	2.32	91439	5.80
	4	.2090	2 1/2	3 3/4	11440	11640	2.32	91440	5.80
	3	.2130	2 1/2	3 3/4	11441	11641	2.32	91441	5.80
7/32		.2187	2 1/2	3 3/4	11442	11642	2.12	91442	5.55
	2	.2210	2 5/8	3 7/8	11443	11643	2.56	91443	6.05
	1	.2280	2 5/8	3 7/8	11444	11644	2.56	91444	6.05

(continued)

Jobber Length Drills (continued)

List Nos. 1330/B, 1332/B and 1330G

SIZE FRACTIONAL	SIZE LETTER	DEC. EQUIV.	FLUTE LENGTH	OAL	1330, 1332 EDP NO.	1330B, 1332B EDP NO.	1330/B, 1332/B LIST PRICE	1330G EDP NO.	1330G LIST PRICE
	A	.2349	2 5/8	3 7/8	11445	11645	$2.56	91445	$6.05
15/64		.2344	2 5/8	3 7/8	11446	11646	2.29	91446	5.80
	B	.2380	2 3/4	4	11447	11647	2.70	91447	6.20
	C	.2420	2 3/4	4	11448	11648	2.70	91448	6.20
	D	.2460	2 3/4	4	11449	11649	2.70	91449	6.20
1/4	E	.2500	2 3/4	4	11450	11650	2.48	91450	5.95
	F	.2570	2 7/8	4 1/8	11452	11652	2.98	91452	10.20
	G	.2610	2 7/8	4 1/8	11453	11653	3.30	91453	10.50
17/64		.2656	2 7/8	4 1/8	11454	11654	2.95	91454	8.61
	H	.2660	2 7/8	4 1/8	11455	11655	3.30	91455	10.50
	I	.2720	2 7/8	4 1/8	11456	11656	3.30	91456	10.50
	J	.2770	2 7/8	4 1/8	11457	11657	3.53	91457	10.70
	K	.2810	2 15/16	4 1/4	11458	11658	3.90	91458	11.05
9/32		.2812	2 15/16	4 1/4	11459	11659	3.06	91459	9.48
	L	.2900	2 15/16	4 1/4	11460	11660	3.90	91460	11.05
	M	.2950	3 1/16	4 3/8	11461	11661	4.08	91461	11.25
19/64		.2969	3 1/16	4 3/8	11462	11662	3.58	91462	9.90
	N	.3020	3 1/16	4 3/8	11463	11663	4.18	91463	11.45
5/16		.3125	3 3/16	4 1/2	11464	11664	3.90	91464	10.13
	O	.3160	3 3/16	4 1/2	11465	11665	4.18	91465	11.45
	P	.3230	3 5/16	4 5/8	11466	11666	4.71	91466	11.95
21/64		.3281	3 5/16	4 5/8	11467	11667	4.34	91467	11.59
	Q	.3320	3 7/16	4 3/4	11468	11668	4.71	91468	11.95
	R	.3390	3 7/16	4 3/4	11469	11669	5.02	91469	12.25
11/32		.3437	3 7/16	4 3/4	11470	11670	4.87	91470	12.15
	S	.3480	3 1/2	4 7/8	11471	11671	5.40	91471	15.45
	T	.3580	3 1/2	4 7/8	11472	11672	6.09	91472	16.20
23/64		.3594	3 1/2	4 7/8	11473	11673	5.44	91473	13.70
	U	.3680	3 5/8	5	11474	11674	6.09	91474	16.20
3/8		.3750	3 5/8	5	11475	11675	5.57	91475	13.84
	V	.3770	3 5/8	5	11476	11676	6.36	91476	16.40
	W	.3860	3 3/4	5 1/8	11477	11677	6.57	91477	19.00
25/64		.3906	3 3/4	5 1/8	11478	11678	6.48	91478	17.33
	X	.3970	3 3/4	5 1/8	11479	11679	7.99	91479	20.45
	Y	.4040	3 7/8	5 1/4	11480	11680	9.30	91480	21.80
13/32		.4062	3 7/8	5 1/4	11481	11681	6.69	91481	17.52
	Z	.4130	3 7/8	5 1/4	11482	11682	9.50	91482	22.05
27/64		.4219	3 15/16	5 3/8	11483	11683	7.36	91483	18.14
7/16		.4375	4 1/16	5 1/2	11484	11684	7.68	91484	18.52
29/64		.4531	4 3/16	5 5/8	11485	11685	8.58	91485	20.35
15/32		.4687	4 5/16	5 3/4	11486	11686	9.12	91486	20.95
31/64		.4844	4 3/8	5 7/8	11487	11687	9.60	91487	20.95
1/2		.5000	4 1/2	6	11488	11688	9.75	91488	21.55
33/64		.5156	4 13/16	6 5/8	11489	—	16.38	—	—
17/32		.5312	4 13/16	6 5/8	11490	—	17.16	—	—
35/64		.5469	4 13/16	6 5/8	11491	—	18.59	—	—
9/16		.5625	4 13/16	6 5/8	11492	—	19.45	—	—
37/64		.5781	4 13/16	6 5/8	11493	—	19.52	—	—
19/32		.5938	5 3/16	7 1/8	11494	—	20.06	—	—
39/64		.6094	5 3/16	7 1/8	11495	—	22.02	—	—
5/8		.6250	5 3/16	7 1/8	11496	—	21.49	—	—
41/64		.6406	5 3/16	7 1/8	11497	—	23.51	—	—
21/32		.6562	5 3/16	7 1/8	11498	—	22.72	—	—
43/64		.6719	5 5/8	7 5/8	11499	—	26.70	—	—
11/16		.6875	5 5/8	7 5/8	11500	—	26.11	—	—

Automotive Series Jobber Length Drills

Straight Shank — High Speed Steel
118° Point — Treated (Black Oxide)

Designed for drilling a wide variety of materials, this drill will perform well under many different operating conditions. Tanged shank allows use with ASA split sleeve drivers.

List No. 1300A – Tanged Shank

STANDARD PACKAGE

Fractional Sizes
1/8″ thru 3/8″ — 12 each
25/64″ thru 1/2″ — 6 each
33/64″ thru 11/16″ — 1 each

Letter Sizes
D thru U — 12 each
W and X — 6 each

Wire Gage Sizes
1 thru 30 — 12 each

Metric Sizes
3.3mm thru 9.0mm — 12 each

List No. 1330A – Tanged Shank

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
1/8	.1250	1 5/8	2 3/4	12101	$2.16
30	.1285	1 5/8	2 3/4	12102	2.12
29	.1360	1 3/4	2 7/8	12103	1.99
9/64	.1406	1 3/4	2 7/8	12104	1.94
27	.1440	1 7/8	3	12105*	2.08
26	.1470	1 7/8	3	12106	2.08
5/32	.1562	2	3 1/8	12108	2.07
20	.1610	2 1/8	3 1/4	12109	2.28
19	.1660	2 1/8	3 1/4	12110	2.28
11/64	.1719	2 1/8	3 1/4	12112	2.30
17	.1730	2 3/16	3 3/8	12113	2.63
16	.1770	2 3/16	3 3/8	12114	2.63
15	.1800	2 3/16	3 3/8	12115	2.63
3/16	.1875	2 5/16	3 1/2	12117	2.62
11	.1910	2 5/16	3 1/2	12118	2.98
10	.1935	2 7/16	3 5/8	12119*	2.92
8	.1990	2 7/16	3 5/8	12121*	2.92
13/64	.2031	2 7/16	3 5/8	12122	2.94
4	.2090	2 1/2	3 3/4	12123*	3.32
7/32	.2187	2 1/2	3 3/4	12125	3.22
15/64	.2344	2 5/8	3 7/8	12127	3.46
D	.2460	2 3/4	4	12128*	3.92
1/4 - E	.2500	2 3/4	4	12129	3.70
G	.2610	2 7/8	4 1/8	12131	4.92
17/64	.2656	2 7/8	4 1/8	12132	4.34
J	.2770	2 7/8	4 1/8	12134	5.13
9/32	.2812	2 15/16	4 1/4	12135	4.88
19/64	.2969	3 1/16	4 3/8	12136	$5.14
5/16	.3125	3 3/16	4 1/2	12138	5.66
P	.3230	3 5/16	4 5/8	12140*	6.95
21/64	.3281	3 5/16	4 5/8	12141	6.20
Q	.3320	3 7/16	4 3/4	12142	6.65
R	.3390	3 7/16	4 3/4	12143*	6.67
11/32	.3437	3 7/16	4 3/4	12144	6.52
S	.3480	3 1/2	4 7/8	12145	7.91
23/64	.3594	3 1/2	4 7/8	12146	8.06
U	.3680	3 5/8	5	12147	8.66
3/8	.3750	3 5/8	5	12148	7.75
W	.3860	3 3/4	5 1/8	12149*	9.29
25/64	.3906	3 3/4	5 1/8	12150	9.27
X	.3970	3 3/4	5 1/8	12151*	11.20
13/32	.4062	3 7/8	5 1/4	12152	9.71
27/64	.4219	3 15/16	5 3/8	12153	9.93
7/16	.4375	4 1/16	5 1/2	12154	10.32
29/64	.4531	4 3/16	5 5/8	12155	11.94
15/32	.4687	4 5/16	5 3/4	12156	12.64
1/2	.5000	4 1/2	6	12158	13.27
17/32	.5312	4 13/16	6 5/8	12160*	22.94
35/64	.5469	4 13/16	6 5/8	12161*	25.11
9/16	.5625	4 13/16	6 5/8	12162	29.36
37/64	.5781	4 13/16	6 5/8	12163*	27.01
19/32	.5937	5 3/16	7 1/8	12164*	26.99
39/64	.6094	5 3/16	7 1/8	12165*	29.36
5/8	.6250	5 3/16	7 1/8	12166	29.34
41/64	.6406	5 3/16	7 1/8	12167	30.99
21/32	.6562	5 3/16	7 1/8	12168*	30.97
43/64	.6719	5 5/8	7 5/8	12169*	35.76
11/16	.6875	5 5/8	7 5/8	12170	39.27

*** Available While Supplies Last**

Metric Sizes - Tanged Shank

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
3.30 mm	.1299	44	73	12171	$2.33
3.40 mm	.1339	44	73	12172	2.56
3.50 mm	.1378	44	73	12173	2.56
5.70 mm	.2244	67	98	12174	3.65
6.10 mm	.2402	70	102	12175	4.02
6.40 mm	.2520	73	105	12176	$4.35
7.25 mm	.2854	75	108	12177	6.18
7.40 mm	.2913	78	111	12178	6.79
7.80 mm	.3071	81	114	12179	6.18
9.00 mm	.3543	89	124	12180	10.31

Aircraft Type A Jobber Length Drills

List No. 1396 – NAS 907, Type A

Straight Shank — High Speed Steel
118° Split Point — Treated (Black Oxide)

118° Self-centering split point eliminates "walking" and reduces thrust. Recommended for drilling a wide range of materials including aluminum, magnesium, medium to soft steels and other soft materials

STANDARD PACKAGE

Fractional Sizes
7/64" thru 3/8" – 12 each
25/64" thru 1/2" – 6 each

Letter Sizes
A thru V – 12 each
W thru Z – 6 each

Wire Gage Sizes
#1 thru #40 – 12 each

SIZE FRACTIONAL	SIZE WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
	40	.0980	1 3/8	2 3/8	14601	$1.49
	39	.0995	1 3/8	2 3/8	14602	1.49
	38	.1015	1 7/16	2 1/2	14603	1.49
	37	.1040	1 7/16	2 1/2	14604	1.49
	36	.1065	1 7/16	2 1/2	14605	1.49
7/64		.1094	1 1/2	2 5/8	14606	1.61
	35	.1100	1 1/2	2 5/8	14607	1.49
	34	.1110	1 1/2	2 5/8	14608	1.49
	33	.1130	1 1/2	2 5/8	14609	1.49
	32	.1160	1 5/8	2 3/4	14610	1.49
	31	.1200	1 5/8	2 3/4	14611	1.49
1/8		.1250	1 5/8	2 3/4	14612	1.63
	30	.1285	1 5/8	2 3/4	14613	1.49
	29	.1360	1 3/4	2 7/8	14614	1.49
	28	.1405	1 3/4	2 7/8	14615	1.49
9/64		.1406	1 3/4	2 7/8	14616	1.67
	27	.1440	1 7/8	3	14617	1.66
	26	.1470	1 7/8	3	14618	1.66
	25	.1495	1 7/8	3	14619	1.66
	24	.1520	2	3 1/8	14620	1.67
	23	.1540	2	3 1/8	14621	1.67
5/32		.1562	2	3 1/8	14622	1.70
	22	.1570	2	3 1/8	14623	1.70
	21	.1590	2 1/8	3 1/4	14624	1.70
	20	.1610	2 1/8	3 1/4	14625	1.82
	19	.1660	2 1/8	3 1/4	14626	1.82
	18	.1695	2 1/8	3 1/4	14627	1.82
11/64		.1719	2 1/8	3 1/4	14628	1.82
	17	.1730	2 3/16	3 3/8	14629	2.21
	16	.1770	2 3/16	3 3/8	14630	2.21
	15	.1800	2 3/16	3 3/8	14631	2.21
	14	.1820	2 3/16	3 3/8	14632	2.21
	13	.1850	2 5/16	3 1/2	14633	2.21
3/16		.1875	2 5/16	3 1/2	14634	2.07
	12	.1890	2 5/16	3 1/2	14635	2.28
	11	.1910	2 5/16	3 1/2	14636	2.28
	10	.1935	2 7/16	3 5/8	14637	2.46
	9	.1960	2 7/16	3 5/8	14638	2.46
	8	.1990	2 7/16	3 5/8	14639	2.46
	7	.2010	2 7/16	3 5/8	14640	2.46
13/64		.2031	2 7/16	3 5/8	14641	2.28
	6	.2040	2 1/2	3 3/4	14642	2.76
	5	.2055	2 1/2	3 3/4	14643	2.76
	4	.2090	2 1/2	3 3/4	14644	2.76
	3	.2130	2 1/2	3 3/4	14645	3.06
7/32		.2187	2 1/2	3 3/4	14646	2.59
	2	.2210	2 5/8	3 7/8	14647	3.06
	1	.2280	2 5/8	3 7/8	14648	3.06

SIZE FRACTIONAL	SIZE LETTER	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
	A	.2340	2 5/8	3 7/8	14671	$3.55
15/64		.2344	2 5/8	3 7/8	14650	2.79
	B	.2380	2 3/4	4	14672	3.23
	C	.2420	2 3/4	4	14674	3.23
	D	.2460	2 3/4	4	14676	3.23
1/4	E	.2500	2 3/4	4	14678	3.02
	F	.2570	2 7/8	4 1/8	14679	3.47
	G	.2610	2 7/8	4 1/8	14681	3.87
17/64		.2656	2 7/8	4 1/8	14658	3.46
	H	.2660	2 7/8	4 1/8	14682	4.19
	I	.2720	2 7/8	4 1/8	14684	3.87
	J	.2770	2 7/8	4 1/8	14691	4.60
	K	.2810	2 15/16	4 1/4	14692	4.60
9/32		.2812	2 15/16	4 1/4	14663	3.61
	L	.2900	2 15/16	4 1/4	14693	5.06
	M	.2950	3 1/16	4 3/8	14694	5.31
19/64		.2969	3 1/16	4 3/8	14665	4.19
	N	.3020	3 1/16	4 3/8	14695	4.83
5/16		.3125	3 3/16	4 1/2	14667	4.34
	O	.3160	3 3/16	4 1/2	14696	5.38
	P	.3230	3 5/16	4 5/8	14697	5.54
21/64		.3281	3 5/16	4 5/8	14670	5.07
	Q	.3320	3 7/16	4 3/4	14698	6.10
	R	.3390	3 7/16	4 3/4	14699	5.94
11/32		.3437	3 7/16	4 3/4	14673	5.68
	S	.3480	3 1/2	4 7/8	14700	6.87
	T	.3580	3 1/2	4 7/8	14701	7.83
23/64		.3594	3 1/2	4 7/8	14675	6.39
	U	.3680	3 5/8	5	14702	7.83
3/8		.3750	3 5/8	5	14677	6.57
	V	.3770	3 5/8	5	14703	8.06
	W	.3860	3 3/4	5 1/8	14704	7.54
25/64		.3906	3 3/4	5 1/8	14680	7.44
	X	.3970	3 3/4	5 1/8	14705	9.17
	Y	.4040	3 7/8	5 1/4	14706	11.32
13/32		.4062	3 7/8	5 1/4	14683	7.67
	Z	.4130	3 7/8	5 1/4	14707	12.04
27/64		.4219	3 15/16	5 3/8	14685	8.36
7/16		.4375	4 1/16	5 1/2	14686	9.01
29/64		.4531	4 3/16	5 5/8	14687	9.91
15/32		.4687	4 5/16	5 3/4	14688	11.56
31/64		.4844	4 3/8	5 7/8	14689	11.03
1/2		.5000	4 1/2	6	14690	11.24

Left Hand Jobber Length Drills

Straight Shank – High Speed Steel
118° Point

Used extensively in screw machine operations and in close center multiple spindle gear driven drilling heads where adjacent spindles operate alternately right and left hand.

List No. 1330L

STANDARD PACKAGE

Fractional Sizes
1/32" thru 3/8" — 12 each
25/64" thru 1/2" — 6 each

Wire Gage Sizes
#1 thru #80 — 12 each

SIZE FRACTIONAL	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
	80	.0135	1/8	3/4	11951*	$7.79
	79	.0145	1/8	3/4	11952*	7.79
	77	.0180	3/16	7/8	11954*	6.63
	76	.0200	3/16	7/8	11955*	6.63
	75	.0210	1/4	1	11956*	6.63
	74	.0225	1/4	1	11957*	6.63
	73	.0240	5/16	1 1/8	11958*	6.63
	72	.0250	5/16	1 1/8	11959*	6.63
	71	.0260	3/8	1 1/4	11960*	6.63
	70	.0280	3/8	1 1/4	11961*	6.94
	69	.0292	1/2	1 3/8	11962*	6.94
	68	.0310	1/2	1 3/8	11963*	6.25
	67	.0320	1/2	1 3/8	11965*	6.25
	66	.0330	1/2	1 3/8	11966*	6.25
	65	.0350	5/8	1 1/2	11967*	6.25
	64	.0360	5/8	1 1/2	11968*	6.25
	63	.0370	5/8	1 1/2	11969*	6.25
	62	.0380	5/8	1 1/2	11970*	6.25
	61	.0390	11/16	1 5/8	11971*	3.38
	60	.0400	11/16	1 5/8	11972*	3.38
	59	.0410	11/16	1 5/8	11973*	3.38
	58	.0420	11/16	1 5/8	11974*	3.38
	56	.0465	3/4	1 3/4	11976*	3.38
	55	.0520	7/8	1 7/8	11978*	3.38
	54	.0550	7/8	1 7/8	11979*	3.38
	53	.0595	7/8	1 7/8	11980*	3.38
1/16		.0625	7/8	1 7/8	11981	3.91
	52	.0635	7/8	1 7/8	11982	3.91
	51	.0670	1	2	11983	3.91
	50	.0700	1	2	11984	3.91
	49	.0730	1	2	11985	3.91
	48	.0760	1	2	11986	3.91
5/64		.0781	1	2	11987	3.91
	47	.0785	1	2	11988	3.91
	46	.0810	1 1/8	2 1/8	11989	3.91
	45	.0820	1 1/8	2 1/8	11990	3.91
	44	.0860	1 1/8	2 1/8	11991	3.91
	43	.0890	1 1/4	2 1/4	11992	3.91
	42	.0935	1 1/4	2 1/4	11993	4.25
3/32		.0937	1 1/4	2 1/4	11994	4.05
	41	.0960	1 3/8	2 3/8	11995	4.25
	40	.0980	1 3/8	2 3/8	11996	4.05
	39	.0995	1 3/8	2 3/8	11997	4.25
	38	.1015	1 7/16	2 1/2	11998	4.05
	37	.1040	1 7/16	2 1/2	11999	4.05
	36	.1065	1 7/16	2 1/2	12000	$4.05
7/64		.1094	1 1/2	2 5/8	12001	3.86
	35	.1100	1 1/2	2 5/8	12002	4.25
	34	.1110	1 1/2	2 5/8	12003	4.40
	33	.1130	1 1/2	2 5/8	12004	4.25
	32	.1160	1 5/8	2 3/4	12005	4.40
	31	.1200	1 5/8	2 3/4	12006	4.25
1/8		.1250	1 5/8	2 3/4	12007	3.86
	30	.1285	1 5/8	2 3/4	12008	4.25
	29	.1360	1 3/4	2 7/8	12009	4.25
	28	.1405	1 3/4	2 7/8	12010	4.25
9/64		.1406	1 3/4	2 7/8	12011	4.00
	27	.1440	1 7/8	3	12012	4.40
	26	.1470	1 7/8	3	12013	4.40
	25	.1495	1 7/8	3	12014	4.40
	24	.1520	2	3 1/8	12015	4.86
	23	.1540	2	3 1/8	12016	4.86
5/32		.1562	2	3 1/8	12017	4.42
	22	.1570	2	3 1/8	12018	5.52
	21	.1590	2 1/8	3 1/4	12019	4.86
	20	.1610	2 1/8	3 1/4	12020	4.86
	19	.1660	2 1/8	3 1/4	12021	4.86
	18	.1695	2 1/8	3 1/4	12022	4.86
11/64		.1719	2 1/8	3 1/4	12023	5.02
	17	.1730	2 3/16	3 3/8	12024	5.52
	16	.1770	2 3/16	3 3/8	12025	6.17
	15	.1800	2 3/16	3 3/8	12026	5.52
	14	.1820	2 3/16	3 3/8	12027	6.17
	13	.1850	2 5/16	3 1/2	12028	5.52
3/16		.1875	2 5/16	3 1/2	12029	5.61
	12	.1890	2 5/16	3 1/2	12030	7.00
	11	.1910	2 5/16	3 1/2	12031	6.17
	10	.1935	2 7/16	3 5/8	12032	6.17
	9	.1960	2 7/16	3 5/8	12033	7.00
	8	.1990	2 7/16	3 5/8	12034	6.17
	7	.2010	2 7/16	3 5/8	12035	6.17
13/64		.2031	2 7/16	3 5/8	12036	6.36
	6	.2040	2 1/2	3 3/4	12037	8.01
	5	.2055	2 1/2	3 3/4	12038	7.00
	4	.2090	2 1/2	3 3/4	12039	7.00
	3	.2130	2 1/2	3 3/4	12040	7.00
7/32		.2187	2 1/2	3 3/4	12041	7.28
	2	.2210	2 5/8	3 7/8	12042	8.02
	1	.2280	2 5/8	3 7/8	12043	8.02
15/64		.2344	2 5/8	3 7/8	12044	8.98
1/4		.2500	2 3/4	4	12045	8.16
17/64		.2656	2 7/8	4 1/8	12046	8.16
9/32		.2812	2 15/16	4 1/4	12047	8.16

* Available While Supplies Last

(continued)

Left Hand Jobber Length Drills (continued)

List No. 1330L

SIZE FRACTIONAL	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
19/64	.2969	3 1/16	4 3/8	12048	$9.16
5/16	.3125	3 3/16	4 1/2	12049	9.72
21/64	.3281	3 5/16	4 5/8	12050	10.52
11/32	.3437	3 7/16	4 3/4	12051	11.97
23/64	.3594	3 1/2	4 7/8	12052	14.03
3/8	.3750	3 5/8	5	12053	14.75
25/64	.3906	3 3/4	5 1/8	12054	15.75

SIZE FRACTIONAL	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
13/32	.4062	3 7/8	5 1/4	12055	$16.76
27/64	.4219	3 15/16	5 3/8	12056	18.92
7/16	.4375	4 1/16	5 1/2	12057	19.77
29/64	.4531	4 3/16	5 5/8	12058	22.53
15/32	.4687	4 5/16	5 3/4	12059	23.95
31/64	.4844	4 3/8	5 7/8	12060	24.66
1/2	.5000	4 1/2	6	12061	25.30

Metric Jobber Length Drills

Straight Shank — High Speed Steel
118° Point – Treated (Black Oxide)

List No. 1333

STANDARD PACKAGE .15 mm thru 9.5 mm — 12 each
9.6 mm thru 13.0 mm — 6 each
13.5mm thru 17.5 mm — 1 each

SIZE MM	DEC. EQUIV.	FLUTE LENGTH MM	FLUTE LENGTH IN.	OAL MM	OAL IN.	EDP NO.	LIST PRICE
.15	.0059	1.25	3/64	19	3/4	12893*	$6.12
.16	.0063	1.25	3/64	19	3/4	12894*	6.12
.17	.0067	1.25	3/64	19	3/4	12895*	5.56
.18	.0071	1.50	1/16	19	3/4	12896*	5.56
.19	.0075	1.50	1/16	19	3/4	12897*	4.40
.20	.0079	1.50	1/16	19	3/4	12898*	4.40
.21	.0083	1.50	1/16	19	3/4	12899*	4.40
.22	.0087	1.75	1/16	19	3/4	12990*	4.40
.32	.0126	2.50	3/32	19	3/4	12999*	2.77
.34	.0134	3.00	1/8	19	3/4	13000*	2.35
.40	.0158	5.00	3/16	22	7/8	13002*	2.35
.42	.0165	5.00	3/16	22	7/8	12852*	1.99
.44	.0173	5.00	3/16	22	7/8	12853*	1.99
.48	.0181	5.00	3/16	22	7/8	12855	2.54
.50	.0197	5.00	3/16	22	7/8	13004	1.99
.55	.0217	6.00	1/4	25	1	13005	1.99
.60	.0236	8.00	5/16	29	1 1/8	13006	1.99
.65	.0265	10.00	3/8	32	1 1/4	13007	1.99
.70	.0276	10.00	3/8	32	1 1/4	13008	1.61
.75	.0295	13.00	1/2	35	1 3/8	13009	1.45
.80	.0315	13.00	1/2	35	1 3/8	13010	1.37
.85	.0335	16.00	5/8	38	1 1/2	13011	1.37
.90	.0354	16.00	5/8	38	1 1/2	13012	1.37
.95	.0374	16.00	5/8	38	1 1/2	13013	1.37
1.00	.0394	18.00	11/16	41	1 5/8	13014	1.37
1.05	.0413	18.00	11/16	41	1 5/8	13015	1.37
1.10	.0433	19.00	3/4	44	1 3/4	13016	1.37

SIZE MM	DEC. EQUIV.	FLUTE LENGTH MM	FLUTE LENGTH IN.	OAL MM	OAL IN.	EDP NO.	LIST PRICE
1.15	.0453	19.00	3/4	44	1 3/4	13017	$1.37
1.20	.0472	22.00	7/8	48	1 7/8	13018	1.41
1.25	.0492	22.00	7/8	48	1 7/8	13019	1.41
1.30	.0512	22.00	7/8	48	1 7/8	13020	1.41
1.35	.0531	22.00	7/8	48	1 7/8	13021	1.41
1.40	.0551	22.00	7/8	48	1 7/8	13022	1.41
1.45	.0571	22.00	7/8	48	1 7/8	13023	1.41
1.50	.0591	22.00	7/8	48	1 7/8	13024	1.41
1.55	.0610	22.00	7/8	48	1 7/8	13025	1.41
1.60	.0630	22.00	7/8	48	1 7/8	13026	1.41
1.65	.0650	25.00	1	51	2	13027	1.41
1.70	.0669	25.00	1	51	2	13028	1.41
1.75	.0689	25.00	1	51	2	13029	1.41
1.80	.0709	25.00	1	51	2	13030	1.41
1.85	.0728	25.00	1	51	2	13031	1.41
1.90	.0748	25.00	1	51	2	13032	1.41
1.95	.0768	25.00	1	51	2	13033	1.41
2.00	.0787	29.00	1 1/8	54	2 1/8	13034	1.41
2.05	.0807	29.00	1 1/8	54	2 1/8	13035	1.41
2.10	.0827	29.00	1 1/8	54	2 1/8	13036	1.41
2.15	.0846	29.00	1 1/8	54	2 1/8	13037	1.41
2.20	.0866	32.00	1 1/4	57	2 1/4	13038	1.41
2.25	.0886	32.00	1 1/4	57	2 1/4	13039	1.41
2.30	.0906	32.00	1 1/4	57	2 1/4	13040	1.41
2.35	.0925	32.00	1 1/4	57	2 1/4	13041	1.41
2.40	.0945	35.00	1 3/8	60	2 3/8	13042	1.49
2.45	.0965	35.00	1 3/8	60	2 3/8	13043	1.49

* Available While Supplies Last

Replenishment to DIN specs as of 1999

(continued)

Metric Jobber Length Drills (continued)

List No. 1333

SIZE MM	DEC. EQUIV.	FLUTE LENGTH MM	FLUTE LENGTH IN.	OAL MM	OAL IN.	EDP NO.	LIST PRICE
2.50	.0984	35	1⅜	60	2⅜	13044	$1.49
2.60	.1024	37	1⁷⁄₁₆	64	2½	13045	1.49
2.70	.1063	37	1⁷⁄₁₆	64	2½	13046	1.49
2.75	.1083	38	1½	67	2⅝	13047	1.49
2.80	.1102	38	1½	67	2⅝	13048	1.49
2.90	.1142	41	1⅝	70	2¾	13049	1.49
3.00	.1181	41	1⅝	70	2¾	13050	1.49
3.10	.1220	41	1⅝	70	2¾	13051	1.49
3.20	.1260	41	1⅝	70	2¾	13052	1.66
3.25	.1280	41	1⅝	70	2¾	13053	1.66
3.30	.1299	45	1¾	73	2⅞	13054	1.66
3.40	.1339	45	1¾	73	2⅞	13055	1.66
3.50	.1378	45	1¾	73	2⅞	13056	1.57
3.60	.1417	48	1⅞	76	3	13057	1.70
3.70	.1457	48	1⅞	76	3	13058	1.70
3.75	.1476	48	1⅞	76	3	13059	1.70
3.80	.1496	51	2	79	3⅛	13060	1.70
3.90	.1535	51	2	79	3⅛	13061	1.70
4.00	.1575	54	2⅛	83	3¼	13062	1.72
4.10	.1614	54	2⅛	83	3¼	13063	1.74
4.20	.1654	54	2⅛	83	3¼	13064	1.74
4.25	.1673	54	2⅛	83	3¼	13065	1.74
4.30	.1693	54	2⅛	83	3¼	13066	1.74
4.40	.1732	56	2³⁄₁₆	86	3⅜	13067	1.93
4.50	.1772	56	2³⁄₁₆	86	3⅜	13068	1.93
4.60	.1811	56	2³⁄₁₆	86	3⅜	13069	1.93
4.70	.1850	59	2⅜	89	3½	13070	1.93
4.75	.1870	59	2⅜	89	3½	13071	2.13
4.80	.1890	59	2⅜	89	3½	13072	2.19
4.90	.1929	62	2⁷⁄₁₆	92	3⅝	13073	2.19
5.00	.1968	62	2⁷⁄₁₆	92	3⅝	13074	2.19
5.10	.2008	62	2⁷⁄₁₆	92	3⅝	13075	2.19
5.20	.2047	64	2½	95	3¾	13076	2.44
5.25	.2067	64	2½	95	3¾	13077	2.44
5.30	.2087	64	2½	95	3¾	13078	2.44
5.40	.2126	64	2½	95	3¾	13079	2.44
5.50	.2165	64	2½	95	3¾	13080	2.44
5.60	.2205	67	2⅝	98	3⅞	13081	2.65
5.70	.2244	67	2⅝	98	3⅞	13082	2.65
5.75	.2264	67	2⅝	98	3⅞	13083	2.65
5.80	.2283	67	2⅝	98	3⅞	13084	2.65
5.90	.2323	67	2⅝	98	3⅞	13085	2.65
6.00	.2362	70	2¾	102	4	13086	2.82
6.10	.2402	70	2¾	102	4	13087	2.82
6.20	.2441	70	2¾	102	4	13088	2.82
6.25	.2461	70	2¾	102	4	13089	2.82
6.30	.2480	70	2¾	102	4	13090	2.86
6.40	.2520	73	2⅞	105	4⅛	13091	3.35
6.50	.2559	73	2⅞	105	4⅛	13092	3.35
6.60	.2598	73	2⅞	105	4⅛	13093	3.35
6.70	.2638	73	2⅞	105	4⅛	13094	3.35
6.75	.2657	73	2⅞	105	4⅛	13095	3.44
6.80	.2677	73	2⅞	105	4⅛	13096	3.44
6.90	.2717	73	2⅞	105	4⅛	13097	3.44
7.00	.2756	73	2⅞	105	4⅛	13098	3.44
7.10	.2795	75	2¹⁵⁄₁₆	108	4¼	13099	3.44
7.20	.2835	75	2¹⁵⁄₁₆	108	4¼	13100	$3.92
7.25	.2854	75	2¹⁵⁄₁₆	108	4¼	13101	4.02
7.30	.2874	75	2¹⁵⁄₁₆	108	4¼	13102	4.10
7.40	.2913	78	3⅛	111	4⅜	13103	4.10
7.50	.2953	78	3⅛	111	4⅜	13104	4.10
7.60	.2992	78	3⅛	111	4⅜	13105	4.47
7.70	.3031	81	3³⁄₁₆	114	4½	13106	4.47
7.75	.3051	81	3³⁄₁₆	114	4½	13107	4.47
7.80	.3071	81	3³⁄₁₆	114	4½	13108	4.47
7.90	.3110	81	3³⁄₁₆	114	4½	13109	4.47
8.00	.3150	81	3³⁄₁₆	114	4½	13110	4.97
8.10	.3189	84	3⅝	117	4⅝	13111	4.97
8.20	.3228	84	3⅝	117	4⅝	13112	4.97
8.25	.3248	84	3⅝	117	4⅝	13113	4.97
8.30	.3268	84	3⅝	117	4⅝	13114	4.97
8.40	.3307	87	3⁷⁄₁₆	121	4¾	13115	5.34
8.50	.3346	87	3⁷⁄₁₆	121	4¾	13116	5.38
8.60	.3386	87	3⁷⁄₁₆	121	4¾	13117	5.36
8.70	.3425	87	3⁷⁄₁₆	121	4¾	13118	5.36
8.75	.3445	89	3½	124	4⅞	13119	6.08
8.80	.3465	89	3½	124	4⅞	13120	6.08
8.90	.3504	89	3½	124	4⅞	13121	6.08
9.00	.3543	89	3½	124	4⅞	13122	6.26
9.10	.3583	89	3½	124	4⅞	13123	6.26
9.20	.3622	92	3⅝	127	5	13124	6.42
9.25	.3642	92	3⅝	127	5	13125	6.42
9.30	.3661	92	3⅝	127	5	13126	6.42
9.40	.3701	92	3⅝	127	5	13127	6.42
9.50	.3740	92	3⅝	127	5	13128	6.42
9.60	.3780	95	3¾	130	5⅛	13129	7.06
9.70	.3819	95	3¾	130	5⅛	13130	7.06
9.75	.3839	95	3¾	130	5⅛	13131	7.06
9.80	.3898	95	3¾	130	5⅛	13132	7.06
9.90	.3998	95	3¾	130	5⅛	13133	7.06
10.00	.3937	95	3¾	130	5⅛	13134	7.24
10.20	.4016	98	3⅞	133	5¼	12858	7.24
10.30	.4055	98	3⅞	133	5¼	12859	8.06
10.50	.4134	100	3¹⁵⁄₁₆	137	5⅜	13135	8.08
10.80	.4252	103	4⅛	140	5½	12863	8.36
11.00	.4331	103	4⅛	140	5½	13136	8.36
11.20	.4409	106	4³⁄₁₆	143	5⅝	12866	9.34
11.50	.4528	106	4³⁄₁₆	143	5⅝	13137	9.36
11.80	.4646	110	4⅝	146	5¾	12871	9.96
12.00	.4724	111	4⅜	150	5⅞	13138	10.42
12.20	.4803	111	4⅜	150	5⅞	12874	10.42
12.50	.4921	114	4½	152	6	13139	10.61
13.00	.5118	114	4½	152	6	13140	18.56
13.50	.5315	122	4¹³⁄₁₆	168	6⅝	12881	21.06
14.00	.5512	122	4¹³⁄₁₆	168	6⅝	12882	22.05
14.50	.5709	122	4¹³⁄₁₆	168	6⅝	12883	22.45
15.00	.5906	132	5³⁄₁₆	181	7⅛	12884	23.47
15.50	.6102	132	5³⁄₁₆	181	7⅛	12885	24.49
16.00	.6299	132	5³⁄₁₆	181	7⅛	12886	26.53
16.50	.6496	132	5³⁄₁₆	181	7⅛	12887	28.57
17.00	.6693	143	5⅝	194	7⅝	12888	30.61
17.50	.6890	143	5⅝	194	7⅝	12890	30.61

Low Helix & High Helix Jobber Length Drills

Straight Shank — High Speed Steel
118° Point

Low Helix drills are recommended for drilling brass, bronze, hard plastic and hard rubber. Wide flutes and low helix angle enhance chip ejection at high rates of penetration.

High Helix drills are recommended for deep hole drilling in low tensile strength materials such as aluminum, magnesium, zinc, copper, soft steels and some plastics. Wide polished flutes and a high helix angle enhance chip ejection.

List No. 1344 — Low Helix - All Sizes

List No. 1363 — High Helix-Fractional
List No. 1364 — High Helix-Wire Gage

STANDARD PACKAGE

Fractional Sizes
1/16" thru 3/8" — 12 each
25/64" thru 1/2" — 6 each

Wire Gage Sizes
#1 thru #60 — 12 each

SIZE FRACTIONAL	SIZE WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	1344 EDP NO.	1344 LIST PRICE	1363, 1364 EDP NO.	1363, 1364 LIST PRICE
	60	.0400	11/16	1 5/8	14023	$2.30	14172	$1.82
	59	.0410	11/16	1 5/8	14024	2.30	14173	1.82
	58	.0420	11/16	1 5/8	14025	2.30	14174	1.82
	57	.0430	3/4	1 3/4	14026	2.30	14175	1.82
	56	.0465	3/4	1 3/4	14027	2.30	14176	1.82
	55	.0520	7/8	1 7/8	14028	2.30	14178	1.82
	54	.0550	7/8	1 7/8	14029	2.10	14179	1.82
	53	.0595	7/8	1 7/8	14030	2.10	14180	1.82
1/16		.0625	7/8	1 7/8	14031	2.06	14181	1.54
	52	.0635	7/8	1 7/8	14032	2.12	14182	1.82
	51	.0670	1	2	14033	2.30	14183	1.82
	50	.0700	1	2	14034	2.12	14184	1.82
	49	.0730	1	2	14035	2.12	14185	1.82
	48	.0760	1	2	14036	2.12	14186	1.82
5/64		.0781	1	2	14037	2.06	14187	1.54
	47	.0785	1	2	14038	2.12	14188	1.82
	46	.0810	1 1/8	2 1/8	14039	2.12	14189	1.82
	45	.0820	1 1/8	2 1/8	14040	2.12	14190	1.78
	44	.0860	1 1/8	2 1/8	14041	2.30	14191	1.78
	43	.0890	1 1/4	2 1/4	14042	2.12	14192	1.78
	42	.0935	1 1/4	2 1/4	14043	2.12	14193	1.78
3/32		.0937	1 1/4	2 1/4	14044	2.06	14194	1.54
	41	.0960	1 3/8	2 3/8	14045	2.30	14195	1.78
	40	.0980	1 3/8	2 3/8	14046	2.30	14196	1.78
	39	.0995	1 3/8	2 3/8	14047	2.12	14197	1.78
	38	.1015	1 7/16	2 1/2	14048	2.12	14198	1.78
	37	.1040	1 7/16	2 1/2	14049	2.30	14199	1.78
	36	.1065	1 7/16	2 1/2	14050	2.12	14200	1.78
7/64		.1094	1 1/2	2 5/8	14051	2.24	14201	1.54
	35	.1100	1 1/2	2 5/8	14052	2.30	14202	1.78
	34	.1110	1 1/2	2 5/8	14053	2.12	14203	1.78
	33	.1130	1 1/2	2 5/8	14054	2.30	14204	1.78
	32	.1160	1 5/8	2 3/4	14055	2.30	14205	1.73
	31	.1200	1 5/8	2 3/4	14056	2.12	14206	1.73
1/8		.1250	1 5/8	2 3/4	14057	2.06	14207	1.54
	30	.1285	1 5/8	2 3/4	14058	2.30	14208	1.73
	29	.1360	1 3/4	2 7/8	14059	2.12	14209	1.73
	28	.1405	1 3/4	2 7/8	14060	2.39	14210	1.73
9/64		.1406	1 3/4	2 7/8	14061	2.06	14211	1.54
	27	.1440	1 7/8	3	14062	2.39	14212	1.82

(continued)

Low Helix & High Helix Jobber Length Drills (continued)

List Nos. 1344, 1363 and 1364

SIZE FRACTIONAL	SIZE WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	1344 EDP NO.	1344 LIST PRICE	1363, 1364 EDP NO.	1363, 1364 LIST PRICE
	26	.1470	1 7/8	3	14063	$2.58	14213	$1.82
	25	.1495	1 7/8	3	14064	2.58	14214	1.82
	24	.1520	2	3 1/8	14065	2.58	14215	1.86
	23	.1540	2	3 1/8	14066	2.92	14216	1.90
5/32		.1562	2	3 1/8	14067	2.70	14217	1.73
	22	.1570	2	3 1/8	14068	2.92	14218	2.07
	21	.1590	2 1/8	3 1/4	14069	2.66	14219	2.07
	20	.1610	2 1/8	3 1/4	14070	3.01	14220	2.25
	19	.1660	2 1/8	3 1/4	14071	3.01	14221	2.25
	18	.1695	2 1/8	3 1/4	14072	3.30	14222	2.25
11/64		.1719	2 1/8	3 1/4	14073	2.74	14223	2.04
	17	.1730	2 3/16	3 3/8	14074	3.43	14224	2.63
	16	.1770	2 3/16	3 3/8	14075	3.43	14225	2.63
	15	.1800	2 3/16	3 3/8	14076	3.43	14226	2.63
	14	.1820	2 3/16	3 3/8	14077	3.43	14227	2.63
	13	.1850	2 5/16	3 1/2	14078	3.43	14228	2.63
3/16		.1875	2 5/16	3 1/2	14079	2.89	14229	2.38
	12	.1890	2 5/16	3 1/2	14080	3.66	14230	2.73
	11	.1910	2 5/16	3 1/2	14081	3.66	14231	2.73
	10	.1935	2 7/16	3 5/8	14082	3.59	14232	2.86
	9	.1960	2 7/16	3 5/8	14083	3.94	14233	2.86
	8	.1990	2 7/16	3 5/8	14084	4.02	14234	2.86
	7	.2010	2 7/16	3 5/8	14085	4.02	14235	2.86
13/64		.2031	2 7/16	3 5/8	14086	3.62	14236	2.55
	6	.2040	2 1/2	3 3/4	14087	4.57	14237	3.41
	5	.2055	2 1/2	3 3/4	14088	4.57	14238	3.41
	4	.2090	2 1/2	3 3/4	14089	4.57	14239	3.41
	3	.2130	2 1/2	3 3/4	14090	4.57	14240	3.41
7/32		.2187	2 1/2	3 3/4	14091	3.81	14241	2.94
	2	.2210	2 5/8	3 7/8	14092	4.31	14242	3.61
	1	.2280	2 5/8	3 7/8	14093	4.31	14243	3.61
15/64		.2344	2 5/8	3 7/8	14095	4.18	14245	3.10
1/4		.2500	2 3/4	4	14099	4.18	14249	3.19
17/64		.2656	2 7/8	4 1/8	14103	5.51	14253	4.03
9/32		.2812	2 15/16	4 1/4	14108	5.70	14258	4.35
19/64		.2969	3 1/16	4 3/8	14111	6.32	14261	5.19
5/16		.3125	3 3/16	4 1/2	14113	6.89	14263	5.68
21/64		.3281	3 5/16	4 5/8	14116	7.30	14266	6.13
11/32		.3437	3 7/16	4 3/4	14119	8.19	14269	6.87
23/64		.3593	3 1/2	4 7/8	14122	9.72	14272	8.07
3/8		.3750	3 5/8	5	14124	9.74	14274	8.42
25/64		.3906	3 3/4	5 1/8	14127	10.80	14277	9.46
13/32		.4062	3 7/8	5 1/4	14130	11.20	14280	9.70
27/64		.4219	3 15/16	5 3/8	14132	12.68	14282	11.05
7/16		.4375	4 1/16	5 1/2	14133	13.06	14283	11.61
29/64		.4531	4 3/16	5 5/8	14134	14.84	14284	13.21
15/32		.4687	4 5/16	5 3/4	14135	15.96	14285	12.71
31/64		.4844	4 3/8	5 7/8	14136	16.66	14286	13.46
1/2		.5000	4 1/2	6	14137	16.71	14287	13.46

Parabolic Flute Jobber Length Drills

Straight Shank – High Speed Steel Split Point

Parabolic Flute drills feature a unique flute design that greatly enhances chip flow, coolant flow to the drill point and heat dissipation in deep hole drilling greater than three diameters deep. Recommended for drilling aluminum and other low to medium tensile strength materials.

Titanium Nitride (TiN) Coating increases tool surface hardness, wear resistance, heat resistance, chip flow and resists chip welding. Enhanced hole quality at higher speeds and feeds.

List No. 1355 — Bright Finish

List No. 1355G — TiN Coated

STANDARD PACKAGE

Fractional Sizes
1/16″ thru 3/8″ — 12 each
25/64″ Thru 1/2″ — 6 each

Wire Gages
#1 thru #52 — 12 each

SIZE FRACTIONAL	SIZE WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	1355 BRIGHT EDP NO.	1355 LIST PRICE	1355G TIN COAT EDP NO.	1355G LIST PRICE
1/16		.0625	7/8	1 7/8	13330	$2.19	93330	$3.16
	52	.0635	7/8	1 7/8	13329	2.19	93329	3.16
	51	.0670	1	2	13328	2.19	93328	3.16
	50	.0700	1	2	13327	2.19	93327	3.16
	49	.0730	1	2	13326	2.19	93326	3.16
	48	.0760	1	2	13325	2.19	93325	3.16
5/64		.0781	1	2	13331	2.19	93331	3.16
	47	.0785	1	2	13324	2.19	93324	3.16
	46	.0810	1 1/8	2 1/8	13323	2.19	93323	3.16
	45	.0820	1 1/8	2 1/8	13322	2.19	93322	3.16
	44	.0860	1 1/8	2 1/8	13321	2.19	93321	3.16
	43	.0890	1 1/4	2 1/4	13320	2.19	93320	3.16
	42	.0935	1 1/4	2 1/4	13319	2.23	93319	3.20
3/32		.0938	1 1/4	2 1/4	13332	2.23	93332	3.20
	41	.0960	1 3/8	2 3/8	13318	2.23	93318	3.20
	40	.0980	1 3/8	2 3/8	13317	2.23	93317	3.20
	39	.0995	1 3/8	2 3/8	13316	2.23	93316	3.20
	38	.1015	1 7/16	2 1/2	13315	2.23	93315	3.20
	37	.1040	1 7/16	2 1/2	13314	2.39	93314	3.36
	36	.1065	1 7/16	2 1/2	13313	2.39	93313	3.36
7/64		.1094	1 1/2	2 5/8	13333	2.39	93333	3.36
	35	.1100	1 1/2	2 5/8	13312	2.39	93312	3.36
	34	.1110	1 1/2	2 5/8	13311	2.39	93311	3.36
	33	.1130	1 1/2	2 5/8	13310	2.39	93310	3.36
	32	.1160	1 5/8	2 3/4	13309	2.39	93309	3.36
	31	.1200	1 5/8	2 3/4	13308	2.62	93308	3.59
1/8		.1250	1 5/8	2 3/4	13334	2.62	93334	3.59
	30	.1285	1 5/8	2 3/4	13307	2.62	93307	3.59
	29	.1360	1 3/4	2 7/8	13306	2.81	93306	3.77
	28	.1405	1 3/4	2 7/8	13305	2.81	93305	3.77
9/64		.1406	1 3/4	2 7/8	13335	2.81	93335	3.77
	27	.1440	1 7/8	3	13304	2.81	93304	3.77
	26	.1470	1 7/8	3	13303	3.18	93303	4.35
	25	.1495	1 7/8	3	13302	3.18	93302	4.35
	24	.1520	2	3 1/8	13301	3.18	93301	4.35
	23	.1540	2	3 1/8	13300	3.18	93300	4.35
5/32		.1562	2	3 1/8	13336	3.18	93336	4.35
	22	.1570	2	3 1/8	13299	3.18	93299	4.35
	21	.1590	2 1/8	3 1/4	13298	3.18	93298	4.35
	20	.1610	2 1/8	3 1/4	13297	3.18	93297	4.35
	19	.1660	2 1/8	3 1/4	13296	3.66	93296	5.49
	18	.1695	2 1/8	3 1/4	13295	3.66	93295	5.49
11/64		.1719	2 1/8	3 1/4	13337	3.66	93337	5.49

(continued)

Parabolic Flute Jobber Length Drills (continued)

List Nos. 1355 and 1355G

FRACTIONAL	SIZE WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	1355 BRIGHT EDP NO.	1355 LIST PRICE	1355G TIN COAT EDP NO.	1355G LIST PRICE
	17	.1730	2 3/16	3 3/8	13294	$3.66	93294	$5.49
	16	.1770	2 3/16	3 3/8	13293	3.66	93293	5.49
	15	.1800	2 3/16	3 3/8	13292	3.66	93292	5.49
	14	.1820	2 3/16	3 3/8	13291	3.66	93291	5.49
	13	.1850	2 5/16	3 1/2	13290	3.66	93290	5.49
3/16		.1875	2 5/16	3 1/2	13338	3.66	93338	5.49
	12	.1890	2 5/16	3 1/2	13289	3.66	93289	5.49
	11	.1910	2 5/16	3 1/2	13288	3.66	93288	5.49
	10	.1935	2 7/16	3 5/8	13287	3.66	93287	5.49
	9	.1960	2 7/16	3 5/8	13286	3.66	93286	5.49
	8	.1990	2 7/16	3 5/8	13285	3.99	93285	5.82
	7	.2010	2 7/16	3 5/8	13284	3.99	93284	5.82
13/64		.2031	2 7/16	3 5/8	13339	3.99	93339	5.82
	6	.2040	2 1/2	3 3/4	13283	3.99	93283	5.82
	5	.2055	2 1/2	3 3/4	13282	3.99	93282	5.82
	4	.2090	2 1/2	3 3/4	13281	4.62	93281	6.45
	3	.2130	2 1/2	3 3/4	13280	4.62	93280	6.45
7/32		.2188	2 1/2	3 3/4	13340	4.85	93340	6.68
	2	.2210	2 5/8	3 7/8	13279	4.85	93279	6.68
	1	.2280	2 5/8	3 7/8	13278	4.85	93278	6.68
15/64		.2344	2 5/8	3 7/8	13341	4.85	93341	6.68
1/4		.2500	2 3/4	4	13342	5.76	93342	9.28
17/64		.2656	2 7/8	4 1/8	13343	5.76	93343	9.28
9/32		.2812	2 15/16	4 1/4	13344	7.24	93344	10.76
19/64		.2969	3 1/16	4 3/8	13345	7.24	93345	10.76
5/16		.3125	3 3/16	4 1/2	13346	7.24	93346	10.76
21/64		.3281	3 5/16	4 5/8	13347	9.19	93347	12.71
11/32		.3438	3 7/16	4 3/4	13348	8.38	93348	11.92
23/64		.3594	3 1/2	4 7/8	13349	8.76	93349	13.60
3/8		.3750	3 5/8	5	13350	8.06	93350	12.90
25/64		.3906	3 3/4	5 1/8	13351	9.12	93351	17.28
13/32		.4062	3 7/8	5 1/4	13352	11.42	93352	19.58
27/64		.4219	3 15/16	5 3/8	13353	14.51	93353	22.67
7/16		.4375	4 1/16	5 1/2	13354	14.61	93354	22.77
29/64		.4531	4 3/16	5 5/8	13355	14.76	93355	22.92
15/32		.4688	4 5/16	5 3/4	13356	14.76	93356	22.92
31/64		.4844	4 3/8	5 7/8	13357	15.22	93357	23.39
1/2		.5000	4 1/2	6	13358	15.61	93358	23.77

TOOL COATING SERVICE

Morse Cutting tools now offers a variety of tool coatings for enhanced cutting performance and increased tool life. Please inquire.

TiN — Titanium Carbide

TiCN — Titanium Carbonitride

TiALN — Titanium Aluminum Nitride

CrN — Chromium Nitride

Ambore™ Heavy Duty Jobber Length Drills

List No. 1384 — Gold & Black Finish

STANDARD PACKAGE — **Fractional Sizes**
1/16″ thru 3/8″ — 12 each
25/64″ thru 1/2″ — 6 each

Straight Shank — High Speed Steel
135° Split Point — Heavy Duty

135° Self-centering split point eliminates "walking" and reduces thrust. Recommended for tough drilling applications including medium and high tensile strength materials

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
1/16	.0625	7/8	1 7/8	12062	$1.51
5/64	.0781	1	2	12063	1.51
3/32	.0938	1 1/4	2 1/4	12064	1.51
7/64	.1094	1 1/2	2 5/8	12065	1.67
1/8	.1250	1 5/8	2 3/4	12066	1.71
9/64	.1406	1 3/4	2 7/8	12067	1.78
5/32	.1562	2	3 1/8	12068	1.80
11/64	.1719	2 1/8	3 1/4	12069	1.93
3/16	.1875	2 5/16	3 1/2	12070	2.15
13/64	.2031	2 7/16	3 5/8	12071	2.40
7/32	.2188	2 1/2	3 3/4	12072	2.75
15/64	.2344	2 5/8	3 7/8	12073	2.93
1/4	.2500	2 3/4	4	12074	3.17
17/64	.2656	2 7/8	4 1/8	12075	3.63
9/32	.2812	2 15/16	4 1/4	12076	3.80
19/64	.2969	3 1/16	4 3/8	12077	$4.40
5/16	.3125	3 3/16	4 1/2	12078	4.87
21/64	.3281	3 5/16	4 5/8	12079	5.37
11/32	.3438	3 7/16	4 3/4	12080	6.02
23/64	.3594	3 1/2	4 7/8	12081	6.76
3/8	.3750	3 5/8	5	12082	6.95
25/64	.3906	3 3/4	5 1/8	12083	7.85
13/32	.4062	3 7/8	5 1/4	12084	8.13
27/64	.4219	3 15/16	5 3/8	12085	9.01
7/16	.4375	4 1/16	5 1/2	12086	9.35
29/64	.4531	4 3/16	5 5/8	12087	10.47
15/32	.4688	4 5/16	5 3/4	12088	11.11
31/64	.4844	4 3/8	5 7/8	12089	11.65
1/2	.5000	4 1/2	6	12090	11.87

Aircraft Type B Heavy Duty Jobber Length Drills

List No. 1385 – NAS 907, Type B

STANDARD PACKAGE — **Fractional Sizes**
1/64″ thru 3/8″ — 12 each
25/64″ thru 1/2″ — 6 each

Letter Sizes
A thru V — 12 each
W thru Z — 6 each

Wire Gage Sizes
#1 thru #80 — 12 each

Straight Shank — High Speed Steel
135° Split Point — Treated (Black Oxide)

135° Self-centering split point eliminates "walking" and reduces thrust. Recommended for drilling stainless steels, titanium, steel alloys and other low to medium tensile strength materials.

SIZE		DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
FRACTIONAL	WIRE GAGE					
	80	.0135	1/8	3/4	14301**	$2.59
	79	.0145	1/8	3/4	14302**	2.59
1/64		.0156	3/16	3/4	14303**	2.39
	78	.0160	3/16	7/8	14304**	2.21
	77	.0180	3/16	7/8	14305**	2.21
	76	.0200	3/16	7/8	14306**	2.21
	75	.0210	1/4	1	14307**	2.21
	74	.0225	1/4	1	14308**	2.21
	73	.0240	5/16	1 1/8	14309**	2.21
	72	.0250	5/16	1 1/8	14310**	2.21
	71	.0260	3/8	1 1/4	14311**	2.21
	70	.0280	3/8	1 1/4	14312**	1.76
	69	.0292	1/2	1 3/8	14313**	1.83
	68	.0310	1/2	1 3/8	14314**	1.68
1/32		.0312	1/2	1 3/8	14315**	1.56
	67	.0320	1/2	1 3/8	14316**	1.70
	66	.0330	1/2	1 3/8	14317**	1.70
	65	.0350	5/8	1 1/2	14318**	$1.70
	64	.0360	5/8	1 1/2	14319**	1.70
	63	.0370	5/8	1 1/2	14320**	1.70
	62	.0380	5/8	1 1/2	14321**	1.70
	61	.0390	11/16	1 5/8	14322**	1.70
	60	.0400	11/16	1 5/8	14323**	1.65
	59	.0410	11/16	1 5/8	14324**	1.65
	58	.0420	11/16	1 5/8	14325**	1.65
	57	.0430	3/4	1 3/4	14326**	1.65
	56	.0465	3/4	1 3/4	14327**	1.65
3/64		.0469	3/4	1 3/4	14328**	1.65
	55	.0520	7/8	1 7/8	14329**	1.65
	54	.0550	7/8	1 7/8	14330**	1.65
	53	.0595	7/8	1 7/8	14331**	1.65
1/16		.0625	7/8	1 7/8	14451	1.48
	52	.0635	7/8	1 7/8	14452	1.56
	51	.0670	1	2	14453	1.56

** Sizes #53 and smaller furnished with 135° regular point

(continued)

Aircraft Type B Jobber Length Drills (continued)

List No. 1385

SIZE FRACTIONAL	SIZE WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
	50	.0700	1	2	14454	$1.56
	49	.0730	1	2	14455	1.56
	48	.0760	1	2	14456	1.56
5/64		.0781	1	2	14457	1.48
	47	.0785	1	2	14458	1.56
	46	.0810	1 1/8	2 1/8	14459	1.56
	45	.0820	1 1/8	2 1/8	14460	1.56
	44	.0860	1 1/8	2 1/8	14461	1.56
	43	.0890	1 1/4	2 1/4	14462	1.56
	42	.0935	1 1/4	2 1/4	14463	1.56
3/32		.0937	1 1/4	2 1/4	14464	1.48
	41	.0960	1 3/8	2 3/8	14465	1.56
	40	.0980	1 3/8	2 3/8	14466	1.56
	39	.0995	1 3/8	2 3/8	14467	1.56
	38	.1015	1 7/16	2 1/2	14468	1.56
	37	.1040	1 7/16	2 1/2	14469	1.56
	36	.1065	1 7/16	2 1/2	14470	1.56
7/64		.1094	1 1/2	2 5/8	14471	1.64
	35	.1100	1 1/2	2 5/8	14472	1.56
	34	.1110	1 1/2	2 5/8	14473	1.56
	33	.1130	1 1/2	2 5/8	14474	1.56
	32	.1160	1 5/8	2 3/4	14475	1.56
	31	.1200	1 5/8	2 3/4	14476	1.56
1/8		.1250	1 5/8	2 3/4	14477	1.68
	30	.1285	1 5/8	2 3/4	14478	1.56
	29	.1360	1 3/4	2 7/8	14479	1.56
	28	.1405	1 3/4	2 7/8	14480	1.56
9/64		.1406	1 3/4	2 7/8	14481	1.74
	27	.1440	1 7/8	3	14482	1.73
	26	.1470	1 7/8	3	14483	1.73
	25	.1495	1 7/8	3	14484	1.73
	24	.1520	2	3 1/8	14485	1.73
	23	.1540	2	3 1/8	14486	1.73
5/32		.1562	2	3 1/8	14487	1.76
	22	.1570	2	3 1/8	14488	1.77
	21	.1590	2 1/8	3 1/4	14489	1.77
	20	.1610	2 1/8	3 1/4	14490	1.91
	19	.1660	2 1/8	3 1/4	14491	1.91
	18	.1695	2 1/8	3 1/4	14492	1.91
11/64		.1719	2 1/8	3 1/4	14493	1.91
	17	.1730	2 3/16	3 3/8	14494	2.33
	16	.1770	2 3/16	3 3/8	14495	2.33
	15	.1800	2 3/16	3 3/8	14496	2.33
	14	.1820	2 3/16	3 3/8	14497	2.33
	13	.1850	2 5/16	3 1/2	14498	2.33
3/16		.1875	2 5/16	3 1/2	14499	2.12
	12	.1890	2 5/16	3 1/2	14500	2.37
	11	.1910	2 5/16	3 1/2	14501	2.37
	10	.1935	2 7/16	3 5/8	14502	2.56
	9	.1960	2 7/16	3 5/8	14503	2.56
	8	.1990	2 7/16	3 5/8	14504	2.56
	7	.2010	2 7/16	3 5/8	14505	2.56
13/64		.2031	2 7/16	3 5/8	14506	2.22
	6	.2040	2 1/2	3 3/4	14507	2.69
	5	.2055	2 1/2	3 3/4	14508	2.69
	4	.2090	2 1/2	3 3/4	14509	2.69
	3	.2130	2 1/2	3 3/4	14510	2.69
7/32		.2187	2 1/2	3 3/4	14511	2.55
	2	.2210	2 5/8	3 7/8	14512	2.98
	1	.2280	2 5/8	3 7/8	14513	2.98

SIZE FRACTIONAL	SIZE LETTER	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
	A	.2340	2 5/8	3 7/8	14514	$3.29
15/64		.2344	2 5/8	3 7/8	14515	2.71
	B	.2380	2 3/4	4	14516	3.30
	C	.2420	2 3/4	4	14517	3.30
	D	.2460	2 3/4	4	14518	3.30
1/4	E	.2500	2 3/4	4	14519	2.94
	F	.2570	2 7/8	4 1/8	14521	3.48
	G	.2610	2 7/8	4 1/8	14522	3.80
17/64		.2656	2 7/8	4 1/8	14523	3.37
	H	.2660	2 7/8	4 1/8	14524	3.97
	I	.2720	2 7/8	4 1/8	14525	3.97
	J	.2770	2 7/8	4 1/8	14526	4.17
	K	.2810	2 15/16	4 1/4	14527	4.48
9/32		.2812	2 15/16	4 1/4	14528	3.53
	L	.2900	2 15/16	4 1/4	14529	4.48
	M	.2950	3 1/16	4 3/8	14530	4.94
19/64		.2969	3 1/16	4 3/8	14531	4.07
	N	.3020	3 1/16	4 3/8	14532	4.94
5/16		.3125	3 3/16	4 1/2	14533	4.52
	O	.3160	3 3/16	4 1/2	14534	5.03
	P	.3230	3 5/16	4 5/8	14535	4.86
21/64		.3281	3 5/16	4 5/8	14536	4.88
	Q	.3320	3 7/16	4 3/4	14537	5.53
	R	.3390	3 7/16	4 3/4	14538	5.80
11/32		.3437	3 7/16	4 3/4	14539	5.47
	S	.3480	3 1/2	4 7/8	14540	6.24
	T	.3580	3 1/2	4 7/8	14541	6.87
23/64		.3594	3 1/2	4 7/8	14542	6.14
	U	.3680	3 5/8	5	14543	6.87
3/8		.3750	3 5/8	5	14544	6.32
	V	.3770	3 5/8	5	14545	7.16
	W	.3860	3 3/4	5 1/8	14546	7.44
25/64		.3906	3 3/4	5 1/8	14547	7.14
	X	.3970	3 3/4	5 1/8	14548	8.97
	Y	.4040	3 7/8	5 1/4	14549	10.44
13/32		.4062	3 7/8	5 1/4	14550	7.39
	Z	.4130	3 7/8	5 1/4	14551	10.70
27/64		.4219	3 15/16	5 3/8	14552	8.20
7/16		.4375	4 1/16	5 1/2	14553	8.50
29/64		.4531	4 3/16	5 5/8	14554	9.52
15/32		.4687	4 5/16	5 3/4	14555	10.10
31/64		.4844	4 3/8	5 7/8	14556	10.60
1/2		.5000	4 1/2	6	14557	10.79

Drill Blanks

High Speed Steel
Hardened and Ground

Made to the same length as jobber length drills. Applications include use as blanks for small cutting tools, checking hole sizes and use as punches, pins and drifts.

Tolerance: Up to 1/4" +0/-.0005
1/4" or larger +0/-.0007

List No. 1439

STANDARD PACKAGE

Fractional Sizes
1/64" thru 3/8" — 12 each
25/64" thru 1/2" — 6 each

Letter Sizes - Limited Quantities
A thru V — 12 each
W - Z — 6 each

Wire Gage Sizes
#1 thru #80 — 12 each

SIZE FRACTIONAL	SIZE WIRE GAGE	DEC. EQUIV.	OAL	EDP NO.	LIST PRICE
		.0156	¾	15453*	$2.08
1/64	78	.0160	⅞	15454*	2.08
	77	.0180	⅞	15455*	2.08
	76	.0200	⅞	15456*	2.08
	75	.0210	1	15457*	2.08
	74	.0225	1	15458*	2.08
	73	.0240	1⅛	15459*	2.08
	71	.0260	1¼	15461*	2.08
	69	.0292	1⅜	15463*	2.08
	68	.0310	1⅜	15464*	2.08
1/32		.0312	1⅜	15465*	2.08
	67	.0320	1⅜	15466*	2.08
	66	.0330	1⅜	15467*	2.08
	65	.0350	1½	15468*	2.08
	64	.0360	1½	15469*	2.08
	60	.0400	1⅝	15473	2.21
	59	.0410	1⅝	15474	2.21
	58	.0420	1⅝	15475	2.21
	57	.0430	1¾	15476	2.21
	56	.0465	1¾	15477	2.21
3/64		.0469	1¾	15478	2.21
	55	.0520	1⅞	15479	2.21
	54	.0550	1⅞	15480	2.21
	53	.0595	1⅞	15481	2.21
1/16		.0625	1⅞	15482	2.21
	52	.0635	1⅞	15483	2.21
	51	.0670	2	15484	2.21
	50	.0700	2	15485	2.37
	49	.0730	2	15486	2.37
	48	.0760	2	15487	2.37
5/64		.0781	2	15488	2.37
	47	.0785	2	15489	2.37
	46	.0810	2⅛	15490	2.37
	45	.0820	2⅛	15491	2.37
	44	.0860	2⅛	15492	2.37
	43	.0890	2¼	15493	2.37
	42	.0935	2¼	15494	2.37
3/32		.0937	2¼	15495	2.37
	41	.0960	2⅜	15496	2.37
	40	.0980	2⅜	15497	2.37
	39	.0995	2⅜	15498	$2.37
	38	.1015	2½	15499	2.37
	37	.1040	2½	15500	2.37
	36	.1065	2½	15501	2.37
7/64		.1094	2⅝	15502	2.37
	35	.1100	2⅝	15503	$2.37
	34	.1110	2⅝	15504	2.37
	33	.1130	2⅝	15505	2.37
	32	.1160	2¾	15506	2.37
	31	.1200	2¾	15507	2.37
1/8		.1250	2¾	15508	2.37
	30	.1285	2¾	15509	2.37
	29	.1360	2⅞	15510	2.37
	28	.1405	2⅞	15511	2.37
9/64		.1406	2⅞	15512	2.37
	27	.1440	3	15513	2.37
	26	.1470	3	15514	2.37
	25	.1495	3	15515	2.66
	24	.1520	3⅛	15516	2.66
	23	.1540	3⅛	15517	2.98
5/32		.1562	3⅛	15518	2.66
	22	.1570	3⅛	15519	2.66
	21	.1590	3¼	15520	2.66
	20	.1610	3¼	15521	2.66
	19	.1660	3¼	15522	2.66
	18	.1695	3¼	15523	2.98
11/64		.1719	3¼	15524	2.66
	17	.1730	3⅜	15525	2.66
	16	.1770	3⅜	15526	2.66
	15	.1800	3⅜	15527	2.98
	14	.1820	3⅜	15528	2.98
	13	.1850	3½	15529	2.98
3/16		.1875	3½	15530	2.98
	12	.1890	3½	15531	2.98
	11	.1910	3½	15532	3.77
	10	.1935	3⅝	15533	3.77
	9	.1960	3⅝	15534	3.77
	8	.1990	3⅝	15535	3.77
	7	.2010	3⅝	15536	3.77
13/64		.2031	3⅝	15537	3.77
	6	.2040	3¾	15538	3.77
	5	.2055	3¾	15539	3.95
	4	.2090	3¾	15540	3.95
	3	.2130	3¾	15541	3.95
7/32		.2187	3¾	15542	3.95
	2	.2210	3⅞	15543	3.95
	1	.2280	3⅞	15544	3.95

*Available While Supplies Last

(continued)

Drill Blanks (continued)

List No. 1439

SIZE FRACTIONAL	SIZE LETTER	DEC. EQUIV.	OAL	EDP NO.	LIST PRICE
15/64		.2344	3 7/8	15546	$4.26
1/4	E	.2500	4	15550	4.64
17/64		.2656	4 1/8	15554	5.03
9/32		.2812	4 1/4	15559	5.41
19/64		.2969	4 3/8	15562	6.00
	N	.3020	4 3/8	15563*	4.16
5/16		.3125	4 1/2	15564	6.18
21/64		.3281	4 5/8	15567	6.80
11/32		.3437	4 3/4	15570	7.29
23/64		.3594	4 7/8	15573	8.21
3/8		.3750	5	15575	$9.00
25/64		.3906	5 1/8	15578	9.41
	Y	.4040	5 1/4	15580*	7.91
13/32		.4062	5 1/4	15581	10.20
	Z	.4130	5 1/4	15582*	7.91
27/64		.4219	5 3/8	15583	11.39
7/16		.4375	5 1/2	15584	12.88
29/64		.4531	5 5/8	15585	13.21
15/32		.4687	5 3/4	15586	14.75
31/64		.4844	5 7/8	15587	15.20
1/2		.5000	6	15588	16.07

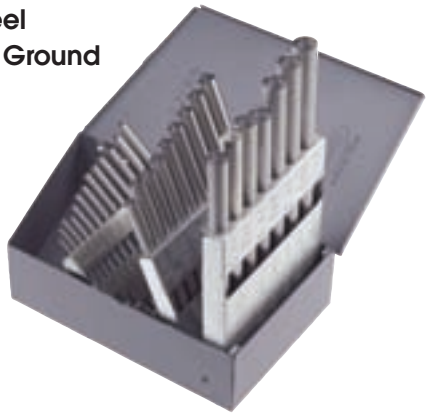
*Available While Supplies Last

Drill Blank Sets

In metal indexed case

High Speed Steel
Hardened and Ground

List No. 1439



SIZE RANGE	SET NO.	EDP NO.	LIST PRICE
1/16 to 1/2 by 64ths	1MC	15593	$209.61
Nos. 1 to 60	3MC	15595	173.86

TOOL COATING SERVICE

Morse Cutting tools now offers a variety of tool coatings for enhanced cutting performance and increased tool life. Please inquire.

TiN — Titanium Carbide

TiCN — Titanium Carbonitride

TiALN — Titanium Aluminum Nitride

CrN — Chromium Nitride

Cobalt – Metric Jobber Length Drills

Straight Shank – Cobalt
135° Split Point – Heavy Duty

Sizes 1.5mm and smaller furnished with 135° regular point.

Heavy duty construction. Cobalt steel offers increased hardness, toughness, wear resistance and heat resistance. Recommended for drilling tough, high tensile strength materials that generate higher cutting temperatures including high alloy steels, ferrous castings, titanium, inconel, stainless steels and other difficult-to-drill materials.

List No. 2345 NAS-907 Aircraft, Type J

STANDARD PACKAGE .90 mm thru 9.5 mm – 12 each
9.6 mm thru 13.0 mm – 6 each

SIZE MM	DEC. EQUIV.	FLUTE LENGTH MM	FLUTE LENGTH IN.	OAL MM	OAL IN.	EDP NO.	LIST PRICE
.90	.0354	16	5/8	38	1 1/2	17600	$2.37
.95	.0374	16	5/8	38	1 1/2	17601	2.37
1.00	.0394	17	11/16	41	1 5/8	17602	2.24
1.05	.0413	17	11/16	41	1 5/8	17603	2.24
1.10	.0433	19	3/4	44	1 3/4	17604	2.24
1.20	.0472	22	7/8	48	1 7/8	17605	2.24
1.30	.0512	22	7/8	48	1 7/8	17606	2.24
1.40	.0551	22	7/8	48	1 7/8	17607	2.24
1.50	.0591	22	7/8	48	1 7/8	17608	2.24
1.60	.0630	22	7/8	48	1 7/8	17609	2.24
1.70	.0669	25	1	51	2	17610	2.24
1.80	.0709	25	1	51	2	17611	2.24
1.90	.0748	25	1	51	2	17612	2.24
2.00	.0787	25	1	51	2	17613	1.92
2.05	.0807	29	1 5/32	54	2 1/8	17614	1.92
2.10	.0827	29	1 5/32	54	2 1/8	17615	1.92
2.20	.0866	32	1 1/4	57	2 1/4	17616	1.98
2.30	.0906	32	1 1/4	57	2 1/4	17617	1.98
2.40	.0945	35	1 3/8	60	2 23/64	17618	1.98
2.50	.0984	35	1 3/8	60	2 23/64	17619	2.04
2.60	.1024	37	1 15/32	64	2 1/2	17620	2.09
2.70	.1063	37	1 15/32	64	2 1/2	17621	2.12
2.80	.1102	38	1 1/2	67	2 5/8	17622	2.19
2.90	.1142	41	1 5/8	70	2 3/4	17623	2.24
3.00	.1181	41	1 5/8	70	2 3/4	17624	2.30
3.10	.1220	41	1 5/8	70	2 3/4	17625	2.48
3.20	.1260	41	1 5/8	70	2 3/4	17626	2.59
3.30	.1299	45	1 3/4	73	2 7/8	17627	2.62
3.40	.1339	45	1 3/4	73	2 7/8	17628	2.62
3.50	.1378	45	1 3/4	73	2 7/8	17629	2.62
3.60	.1417	48	1 7/8	76	3	17630	2.77
3.70	.1457	48	1 7/8	76	3	17631	2.77
3.80	.1496	48	1 7/8	76	3	17632	2.80
3.90	.1535	51	2	79	3 1/8	17633	3.08
4.00	.1575	54	2 1/8	83	3 1/4	17634	3.08
4.10	.1614	54	2 1/8	83	3 1/4	17635	3.15
4.20	.1654	54	2 1/8	83	3 1/4	17636	3.15
4.30	.1693	54	2 1/8	83	3 1/4	17637	3.15
4.40	.1732	56	2 13/64	86	3 3/8	17638	3.32
4.50	.1772	56	2 13/64	86	3 3/8	17639	3.47
4.60	.1811	56	2 13/64	86	3 3/8	17640	3.78
4.70	.1850	59	2 21/64	89	3 1/2	17641	3.70
4.80	.1890	59	2 21/64	89	3 1/2	17642	4.23
4.90	.1929	62	2 7/16	92	3 5/8	17643	4.38
5.00	.1969	62	2 7/16	92	3 5/8	17644	4.38
5.10	.2008	62	2 7/16	92	3 5/8	17645	4.51
5.20	.2047	64	2 1/2	95	3 3/4	17646	4.76
5.30	.2087	64	2 1/2	95	3 3/4	17647	5.02
5.40	.2126	64	2 1/2	95	3 3/4	17648	5.02
5.50	.2165	64	2 1/2	95	3 3/4	17649	4.63
5.60	.2205	67	2 5/8	98	3 7/8	17650	5.15
5.70	.2244	67	2 5/8	98	3 7/8	17651	5.51
5.80	.2283	67	2 5/8	98	3 7/8	17652	$5.51
5.90	.2323	67	2 5/8	98	3 7/8	17653	5.51
6.00	.2362	70	2 3/4	102	4	17654	5.15
6.10	.2402	70	2 3/4	102	4	17655	5.45
6.20	.2441	70	2 3/4	102	4	17656	5.92
6.30	.2480	70	2 3/4	102	4	17657	6.12
6.40	.2520	73	2 7/8	105	4 1/8	17658	6.12
6.50	.2559	73	2 7/8	105	4 1/8	17659	6.20
6.60	.2598	73	2 7/8	105	4 1/8	17660	6.26
6.70	.2638	73	2 7/8	105	4 1/8	17661	6.26
6.80	.2677	73	2 7/8	105	4 1/8	17662	6.66
6.90	.2717	73	2 7/8	105	4 1/8	17663	6.66
7.00	.2756	73	2 7/8	105	4 1/8	17664	6.66
7.10	.2795	75	2 61/64	108	4 1/4	17665	7.18
7.20	.2835	75	2 61/64	108	4 1/4	17666	7.18
7.30	.2874	75	2 61/64	108	4 1/4	17667	7.18
7.40	.2913	78	3	111	4 3/8	17668	7.86
7.50	.2953	78	3	111	4 3/8	17669	7.70
7.60	.2992	78	3	111	4 3/8	17670	8.10
7.70	.3031	81	3 3/16	114	4 1/2	17671	8.35
7.80	.3071	81	3 3/16	114	4 1/2	17672	8.35
7.90	.3110	81	3 3/16	114	4 1/2	17673	8.82
8.00	.3150	81	3 3/16	114	4 1/2	17674	8.75
8.10	.3189	84	3 5/16	117	4 9/16	17675	9.08
8.20	.3228	84	3 5/16	117	4 9/16	17676	9.37
8.30	.3268	84	3 5/16	117	4 9/16	17677	9.90
8.40	.3307	87	3 27/64	121	4 3/4	17678	10.27
8.50	.3346	87	3 27/64	121	4 3/4	17679	10.17
8.60	.3386	87	3 27/64	121	4 3/4	17680	10.56
8.70	.3425	87	3 27/64	121	4 3/4	17681	10.56
8.80	.3465	89	3 1/2	124	4 7/8	17682	10.56
8.90	.3504	89	3 1/2	124	4 7/8	17683	11.85
9.00	.3543	89	3 1/2	124	4 7/8	17684	11.62
9.10	.3583	89	3 1/2	124	4 7/8	17685	12.03
9.20	.3622	92	3 5/8	127	5	17686	12.40
9.30	.3661	92	3 5/8	127	5	17687	12.54
9.40	.3701	92	3 5/8	127	5	17688	13.30
9.50	.3740	92	3 5/8	127	5	17689	13.15
9.60	.3780	95	3 3/4	130	5 1/8	17690	14.09
9.70	.3819	95	3 3/4	130	5 1/8	17691	14.09
9.80	.3858	95	3 3/4	130	5 1/8	17692	14.09
10.00	.3937	95	3 3/4	130	5 1/8	17693	14.36
10.20	.4016	98	3 55/64	133	5 1/4	17694	15.29
10.50	.4134	98	3 55/64	133	5 1/4	17695	16.37
10.80	.4252	103	4 1/16	140	5 1/2	17696	16.78
11.00	.4331	103	4 1/16	140	5 1/2	17697	17.24
11.20	.4409	106	4 7/32	143	5 5/8	17698	17.84
11.50	.4528	106	4 7/32	143	5 5/8	17699	20.21
11.80	.4646	110	4 11/32	146	5 3/4	17700	21.30
12.00	.4724	111	4 3/8	149	5 7/8	17701	21.30
12.20	.4803	111	4 3/8	149	5 7/8	17702	21.85
12.50	.4921	114	4 1/2	152	6	17703	22.54
13.00	.5118	114	4 1/2	152	6	17704	23.68

Cobalt — Aircraft Type J Jobber Length Drills

Straight Shank — Cobalt
135° Split Point — Heavy Duty

Sizes #53 and smaller furnished with 135° Regular Point

Heavy duty construction. Cobalt steel offers increased hardness, toughness, wear resistance and heat resistance. Recommended for drilling tough, high tensile strength materials that generate higher cutting temperatures including high alloy steels, ferrous castings, titanium, inconel, stainless steels and other difficult-to-drill materials

List No. 2330 Fractional
List No. 2332 Letter
LIst No. 2340 Wire Gage

NAS-907, Type J

STANDARD PACKAGE

Fractional Sizes
3/64" thru 3/8" — 12 each
25/64" thru 1/2" — 6 each

Letter Sizes
A thru V — 12 each
W thru Z — 6 each

Wire Gage Sizes
#1 thru #60 — 12 each

SIZE FRACTIONAL	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
	60	.0400	1 1/16	1 5/8	17101	$2.48
	59	.0410	1 1/16	1 5/8	17102	2.76
	58	.0420	1 1/16	1 5/8	17103	2.71
	57	.0430	3/4	1 3/4	17104	2.48
	56	.0465	3/4	1 3/4	17105	2.18
3/64		.0469	3/4	1 3/4	17106	2.07
	55	.0520	7/8	1 7/8	17107	2.18
	54	.0550	7/8	1 7/8	17108	2.18
	53	.0595	7/8	1 7/8	17109	2.18
1/16		.0625	7/8	1 7/8	17110	1.96
	52	.0635	7/8	1 7/8	17111	2.03
	51	.0670	1	2	17112	2.03
	50	.0700	1	2	17113	2.03
	49	.0730	1	2	17114	2.03
	48	.0760	1	2	17115	2.03
5/64		.0781	1	2	17116	1.92
	47	.0785	1	2	17117	2.03
	46	.0810	1 1/8	2 1/8	17118	2.03
	45	.0820	1 1/8	2 1/8	17119	2.03
	44	.0860	1 1/8	2 1/8	17120	2.03
	43	.0890	1 1/4	2 1/4	17121	2.03
	42	.0935	1 1/4	2 1/4	17122	2.03
3/32		.0937	1 1/4	2 1/4	17123	1.92
	41	.0960	1 3/8	2 3/8	17124	2.05
	40	.0980	1 3/8	2 3/8	17125	2.10
	39	.0995	1 3/8	2 3/8	17126	2.10
	38	.1015	1 7/16	2 1/2	17127	2.05
	37	.1040	1 7/16	2 1/2	17128	2.38
	36	.1065	1 7/16	2 1/2	17129	2.18
7/64		.1094	1 1/2	2 5/8	17130	2.07
	35	.1100	1 1/2	2 5/8	17131	2.38
	34	.1110	1 1/2	2 5/8	17132	2.38
	33	.1130	1 1/2	2 5/8	17133	2.38
	32	.1160	1 5/8	2 3/4	17134	2.38
	31	.1200	1 5/8	2 3/4	17135	2.38
1/8		.1250	1 5/8	2 3/4	17136	2.52
	30	.1285	1 5/8	2 3/4	17137	2.38
	29	.1360	1 3/4	2 7/8	17138	2.59
	28	.1405	1 3/4	2 7/8	17139	2.66
9/64		.1406	1 3/4	2 7/8	17140	2.55
	27	.1440	1 7/8	3	17141	2.84
	26	.1470	1 7/8	3	17142	2.80
	25	.1495	1 7/8	3	17143	2.89
	24	.1520	2	3 1/8	17144	3.18
	23	.1540	2	3 1/8	17145	3.16
5/32		.1562	2	3 1/8	17146	2.88
	22	.1570	2	3 1/8	17147	3.16
	21	.1590	2 1/8	3 1/4	17148	2.91
	20	.1610	2 1/8	3 1/4	17149	3.03
	19	.1660	2 1/8	3 1/4	17150	3.16
	18	.1695	2 1/8	3 1/4	17151	3.23

SIZE FRACTIONAL	LETTER	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
11/64			.1719	2 1/8	3 1/4	17152	$3.03
		17	.1730	2 3/16	3 3/8	17153	3.52
		16	.1770	2 3/16	3 3/8	17154	3.61
		15	.1800	2 3/16	3 3/8	17155	3.88
		14	.1820	2 3/16	3 3/8	17156	3.88
		13	.1850	2 5/16	3 1/2	17157	3.80
3/16			.1875	2 5/16	3 1/2	17158	3.38
		12	.1890	2 5/16	3 1/2	17159	4.35
		11	.1910	2 5/16	3 1/2	17160	4.35
		10	.1935	2 7/16	3 5/8	17161	4.02
		9	.1960	2 7/16	3 5/8	17162	4.62
		8	.1990	2 7/16	3 5/8	17163	4.02
		7	.2010	2 7/16	3 5/8	17164	3.96
13/64			.2031	2 7/16	3 5/8	17165	4.00
		6	.2040	2 1/2	3 3/4	17166	5.18
		5	.2055	2 1/2	3 3/4	17167	5.18
		4	.2090	2 1/2	3 3/4	17168	5.18
		3	.2130	2 1/2	3 3/4	17169	4.95
7/32			.2187	2 1/2	3 3/4	17170	4.40
		2	.2210	2 5/8	3 7/8	17171	5.51
		1	.2280	2 5/8	3 7/8	17172	5.51
	A		.2340	2 5/8	3 7/8	17173	5.32
15/64			.2344	2 5/8	3 7/8	17174	4.72
	B		.2380	2 3/4	4	17175	5.66
	C		.2420	2 3/4	4	17176	5.66
	D		.2460	2 3/4	4	17177	5.66
1/4	E		.2500	2 3/4	4	17178	5.02
	F		.2570	2 7/8	4 1/8	17180	6.17
	G		.2610	2 7/8	4 1/8	17181	6.17
17/64			.2656	2 7/8	4 1/8	17182	5.86
	H		.2660	2 7/8	4 1/8	17183	6.91
	I		.2720	2 7/8	4 1/8	17184	6.52
	J		.2770	2 7/8	4 1/8	17185	6.91
	K		.2810	2 15/16	4 1/4	17186	6.91
9/32			.2812	2 15/16	4 1/4	17187	6.02
	L		.2900	2 15/16	4 1/4	17188	7.73
	M		.2950	3 1/16	4 3/8	17189	8.33
19/64			.2969	3 1/16	4 3/8	17190	7.32
	N		.3020	3 1/16	4 3/8	17191	8.35
5/16			.3125	3 3/16	4 1/2	17192	7.70
	O		.3160	3 3/16	4 1/2	17193	9.22
	P		.3230	3 5/16	4 5/8	17194	9.83
21/64			.3281	3 5/16	4 5/8	17195	8.59
	Q		.3320	3 7/16	4 3/4	17196	9.96
	R		.3390	3 7/16	4 3/4	17197	9.96
11/32			.3437	3 7/16	4 3/4	17198	9.40
	S		.3480	3 1/2	4 7/8	17199	12.41
	T		.3580	3 1/2	4 7/8	17200	12.41
23/64			.3594	3 1/2	4 7/8	17201	10.91
	U		.3680	3 5/8	5	17202	16.50

(continued)

Cobalt — Aircraft Type J Jobber Length Drills (continued)

List Nos. 2330 and 2332

SIZE FRACTIONAL	LETTER	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
3/8		.3750	3 5/8	5	17203	$10.91
	V	.3770	3 5/8	5	17204	14.26
	W	.3860	3 3/4	5 1/8	17205	14.26
25/64		.3906	3 3/4	5 1/8	17206	12.39
	X	.3970	3 3/4	5 1/8	17207	14.26
	Y	.4040	3 7/8	5 1/4	17208	15.20
13/32		.4062	3 7/8	5 1/4	17209	12.97
	Z	.4130	3 7/8	5 1/4	17210	$16.50
27/64		.4219	3 15/16	5 3/8	17211	14.32
7/16		.4375	4 1/16	5 1/2	17212	14.62
29/64		.4531	4 3/16	5 5/8	17213	17.57
15/32		.4687	4 5/16	5 3/4	17214	17.90
31/64		.4844	4 3/8	5 7/8	17215	18.42
1/2		.5000	4 1/2	6	17216	18.42

Carbide Tipped Jobber Length Drills

Heavy duty construction. Excellent wear resistance. Recommended for drilling cast iron, non-ferrous metals, composites, hard plastics, fiberglass and other abrasive non-ferrous materials.

NOT FOR USE IN STEEL.

List No. 5330
118˚ Point

STANDARD PACKAGE All sizes — 1 each

SIZE FRACTIONAL	LETTER	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
		32	.1160	1 5/8	2 3/4	50356*	$19.41
		31	.1200	1 5/8	2 3/4	50357*	18.98
1/8			.1250	1 5/8	2 3/4	50358	18.99
		30	.1285	1 5/8	2 3/4	50359	20.52
		29	.1360	1 3/4	2 7/8	50360	21.95
		28	.1405	1 3/4	2 7/8	50361	22.38
9/64			.1406	1 3/4	2 7/8	50362	22.14
		27	.1440	1 7/8	3	50363	22.38
		26	.1470	1 7/8	3	50364	21.82
		25	.1495	1 7/8	3	50365	21.82
		24	.1520	2	3 1/8	50366	23.06
		23	.1540	2	3 1/8	50367	21.82
5/32			.1562	2	3 1/8	50368	20.11
		22	.1570	2	3 1/8	50369	24.11
		21	.1590	2 1/8	3 1/4	50370	23.13
		20	.1610	2 1/8	3 1/4	50371	23.57
		19	.1660	2 1/8	3 1/4	50372	23.57
		18	.1695	2 1/8	3 1/4	50373	23.57
11/64			.1719	2 1/8	3 1/4	50374	23.57
		17	.1730	2 3/16	3 3/8	50375	23.57
		16	.1770	2 3/16	3 3/8	50376	23.13
		15	.1800	2 3/16	3 3/8	50377	24.11
		14	.1820	2 3/16	3 3/8	50378	23.13
		13	.1850	2 5/16	3 1/2	50379	23.13
3/16			.1875	2 5/16	3 1/2	50380	21.41
		12	.1890	2 5/16	3 1/2	50381	24.11
		11	.1910	2 5/16	3 1/2	50382	24.56
		10	.1935	2 7/16	3 5/8	50383	24.11
		9	.1960	2 7/16	3 5/8	50384	24.56
		8	.1990	2 7/16	3 5/8	50385	24.56
		7	.2010	2 7/16	3 5/8	50386	24.56
13/64			.2031	2 7/16	3 5/8	50387	25.32
		6	.2040	2 1/2	3 3/4	50388	25.11
		5	.2055	2 1/2	3 3/4	50389	24.45
		4	.2090	2 1/2	3 3/4	50390	25.11
		3	.2130	2 1/2	3 3/4	50391	24.45
7/32			.2187	2 1/2	3 3/4	50392	25.21
		2	.2210	2 5/8	3 7/8	50393	26.42
		1	.2280	2 5/8	3 7/8	50394	25.86
	A		.2340	2 5/8	3 7/8	50395	28.60
15/64			.2344	2 5/8	3 7/8	50396	27.29
	B		.2380	2 3/4	4	50397	$28.60
	C		.2420	2 3/4	4	50398	28.60
	D		.2460	2 3/4	4	50399	28.05
1/4	E		.2500	2 3/4	4	50401	25.27
	F		.2570	2 7/8	4 1/8	50402	32.19
	G		.2610	2 7/8	4 1/8	50403	32.97
17/64			.2656	2 7/8	4 1/8	50404	32.07
	H		.2660	2 7/8	4 1/8	50405	33.62
	I		.2720	2 7/8	4 1/8	50406	32.97
	J		.2770	2 7/8	4 1/8	50407	33.62
	K		.2810	2 15/16	4 1/4	50408	34.81
9/32			.2812	2 15/16	4 1/4	50409	32.09
	L		.2900	2 15/16	4 1/4	50410	33.62
	M		.2950	3 1/16	4 3/8	50411	38.42
19/64			.2969	3 1/16	4 3/8	50412	35.35
	N		.3020	3 1/16	4 3/8	50413	36.24
5/16			.3125	3 3/16	4 1/2	50414	32.13
	O		.3160	3 3/16	4 1/2	50415	35.57
	P		.3230	3 5/16	4 5/8	50416	37.86
21/64			.3281	3 5/16	4 5/8	50417	36.89
	Q		.3320	3 7/16	4 3/4	50418	38.75
	R		.3390	3 7/16	4 3/4	50419	37.86
11/32			.3437	3 7/16	4 3/4	50420	36.89
	S		.3480	3 1/2	4 7/8	50421	40.93
	T		.3580	3 1/2	4 7/8	50422	41.91
23/64			.3594	3 1/2	4 7/8	50423	39.29
	U		.3680	3 5/8	5	50424	40.15
3/8			.3750	3 5/8	5	50425	36.38
	V		.3770	3 5/8	5	50426	40.93
	W		.3860	3 3/4	5 1/8	50427	44.74
25/64			.3906	3 3/4	5 1/8	50428	39.62
	X		.3970	3 3/4	5 1/8	50429	42.99
	Y		.4040	3 7/8	5 1/4	50430	44.74
13/32			.4062	3 7/8	5 1/4	50431	42.79
	Z		.4130	3 7/8	5 1/4	50432	49.54
27/64			.4219	3 15/16	5 3/8	50433	46.27
7/16			.4375	4 1/16	5 1/2	50434	46.27
29/64			.4531	4 3/16	5 5/8	50435	53.04
15/32			.4687	4 5/16	5 3/4	50436	52.05
31/64			.4844	4 3/8	5 7/8	50437	58.28
1/2			.5000	4 1/2	6	50438	53.96

* Available While Supplies Last

Solid Carbide Regular Helix Drills

Solid carbide offers excellent wear resistance and heat resistance for drilling abrasive materials and applications generating higher drilling temperatures. Solid carbide also features high rigidity for increased hole accuracy and quality.

Recommended for drilling cast iron, non ferrous alloys, plastics, aluminum and other easily machined materials.

List No. 5374
118˚ Point

STANDARD PACKAGE All sizes — 1 each

SIZE FRACTIONAL	SIZE WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
3/64		.0469	3/4	1 1/2	51028	$ 9.14
	55	.0520	3/4	1 1/2	51029	9.14
	54	.0550	3/4	1 1/2	51030	9.24
	53	.0595	3/4	1 1/2	51031	9.24
1/16		.0625	3/4	1 1/2	51032	9.24
	52	.0635	3/4	1 1/2	51033	9.24
	51	.0670	3/4	1 1/2	51034	9.24
	50	.0700	7/8	1 3/4	51035	9.24
	49	.0730	7/8	1 3/4	51036	9.43
	48	.0760	7/8	1 3/4	51037	9.81
5/64		.0781	7/8	1 3/4	51038	9.81
	47	.0785	7/8	1 3/4	51039	9.81
	46	.0810	7/8	1 3/4	51040	9.81
	45	.0820	7/8	1 3/4	51041	10.05
	44	.0860	1	2	51042	10.33
	43	.0890	1	2	51043	10.33
	42	.0935	1	2	51044	10.57
3/32		.0938	1	2	51045	11.00
	41	.0960	1	2	51046	11.00
	40	.0980	1	2	51047	11.00
	39	.0995	1 1/4	2 1/4	51048	11.14
	38	.1015	1 1/4	2 1/4	51049	11.48
	37	.1040	1 1/4	2 1/4	51050	11.48
	36	.1065	1 1/4	2 1/4	51051	11.48
7/64		.1094	1 1/4	2 1/4	51052	12.00
	35	.1100	1 1/4	2 1/4	51053	12.00
	34	.1110	1 1/4	2 1/4	51054	12.05
	33	.1130	1 1/4	2 1/4	51055	12.05
	32	.1160	1 1/4	2 1/4	51056	12.29
	31	.1200	1 1/4	2 1/4	51057	12.43
1/8		.1250	1 1/4	2 1/4	51058	12.67
	30	.1285	1 1/4	2 1/4	51059	12.95
	29	.1360	1 3/8	2 1/2	51060	14.05
	28	.1405	1 3/8	2 1/2	51061	14.05
9/64		.1406	1 3/8	2 1/2	51062	14.76
	27	.1440	1 3/8	2 1/2	51063	14.76
	26	.1470	1 3/8	2 1/2	51064	14.95
	25	.1495	1 3/8	2 1/2	51065	14.95
	24	.1520	1 3/8	2 1/2	51066	14.95
	23	.1540	1 3/8	2 1/2	51067	15.29
5/32		.1562	1 3/8	2 1/2	51068	15.62
	22	.1570	1 3/8	2 1/2	51069	15.86
	21	.1590	1 3/8	2 1/2	51070	16.24
	20	.1610	1 3/8	2 1/2	51071	16.33
	19	.1660	1 5/8	2 3/4	51072	16.90

SIZE FRACTIONAL	SIZE LETTER	SIZE WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
		18	.1695	1 5/8	2 3/4	51073	$17.05
11/64			.1719	1 5/8	2 3/4	51074	18.33
		17	.1730	1 5/8	2 3/4	51075	18.33
		16	.1770	1 5/8	2 3/4	51076	18.33
		15	.1800	1 5/8	2 3/4	51077	18.33
		14	.1820	1 5/8	2 3/4	51078	18.48
		13	.1850	1 5/8	2 3/4	51079	18.48
3/16			.1875	1 5/8	2 3/4	51080	18.48
		12	.1890	1 5/8	2 3/4	51081	18.62
		11	.1910	1 5/8	2 3/4	51082	18.86
		10	.1935	1 5/8	2 3/4	51083	19.19
		9	.1960	1 3/4	3	51084	20.38
		8	.1990	1 3/4	3	51085	20.38
		7	.2010	1 3/4	3	51086	20.38
13/64			.2031	1 3/4	3	51087	22.38
		6	.2040	1 3/4	3	51088	22.38
		5	.2055	1 3/4	3	51089	22.38
		4	.2090	1 3/4	3	51090	22.38
		3	.2130	1 3/4	3	51091	22.57
7/32			.2187	1 3/4	3	51092	23.00
		2	.2210	1 3/4	3	51093	23.48
		1	.2280	1 3/4	3	51094	26.24
	A		.2340	2	3 1/4	51095	28.57
15/64			.2344	2	3 1/4	51096	27.29
	B		.2380	2	3 1/4	51097	29.33
	C		.2420	2	3 1/4	51098	29.57
	D		.2460	2	3 1/4	51099	30.29
1/4	E		.2500	2	3 1/4	51100	27.29
	F		.2570	2	3 1/4	51102	32.05
	G		.2610	2 1/8	3 1/2	51103	32.57
17/64			.2656	2 1/8	3 1/2	51104	28.86
	H		.2660	2 1/8	3 1/2	51105	33.52
	I		.2720	2 1/8	3 1/2	51106	34.10
	J		.2770	2 1/8	3 1/2	51107	34.95
	K		.2810	2 1/8	3 1/2	51108	35.24
9/32			.2812	2 1/8	3 1/2	51109	30.95
	L		.2900	2 1/8	3 1/2	51110	37.00
	M		.2950	2 3/8	3 3/4	51111	38.29
19/64			.2969	2 3/8	3 3/4	51112	34.24
	N		.3020	2 3/8	3 3/4	51113	40.57
5/16			.3125	2 3/8	3 3/4	51114	36.29
	O		.3160	2 3/8	3 3/4	51115	42.90
	P		.3230	2 3/8	3 3/4	51116	44.33
21/64			.3281	2 1/2	4	51117	39.57

(continued)

Solid Carbide Regular Helix Drills (continued)

List No. 5374

SIZE FRACTIONAL	SIZE LETTER	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
	Q	.3320	2½	4	51118	$47.14
	R	.3390	2½	4	51119	48.52
11/32		.3437	2½	4	51120	43.86
	S	.3480	2½	4	51121	51.81
	T	.3580	2½	4	51122	53.67
23/64		.3594	2½	4	51123	47.90
	U	.3680	2¾	4¼	51124	56.24
3/8		.3750	2¾	4¼	51125	51.95
	V	.3770	2¾	4¼	51126	60.95
	W	.3860	2⅞	4½	51127	64.00
25/64		.3906	2⅞	4½	51128	58.71
	X	.3970	2⅞	4½	51129	$69.90
	Y	.4040	2⅞	4½	51130	72.19
13/32		.4062	2⅞	4½	51131	65.14
	Z	.4130	2⅞	4½	51132	89.57
27/64		.4219	2⅞	4½	51133	71.29
7/16		.4375	2⅞	4½	51134	77.24
29/64		.4531	3	4¾	51135	83.69
15/32		.4687	3	4¾	51136	90.10
31/64		.4844	3	4¾	51137	100.33
½		.5000	3	4¾	51138	96.00

SHEARDRILL™ High Performance Solid Carbide Drills

Recommended for tough drilling applications including carbon steel, stainless steel, cast iron, inconel, titanium, high temperature alloy steel, tool steel, work hardened and gummy materials and other high strength ferrous materials.

Heavy duty web, 135° point, 15° helix angle, submicro-grain solid carbide.

135˚ Point

List No. 5375G - TiN coated

List No. 5375C - TiCN coated

STANDARD PACKAGE All sizes — 1 each

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	5375G TiN EDP NO.	5375G TiN LIST PRICE	5375C TiCN EDP NO.	5375C TiCN LIST PRICE
3/16	.1875	1⅛	2 3/16	51139	$24.03	51163	$25.23
13/64	.2031	1 3/16	2¼	51140	31.12	51164	32.44
7/32	.2187	1¼	2⅜	51141	31.12	51165	32.44
15/64	.2344	1 5/16	2 7/16	51142	37.87	51166	39.19
¼	.2500	1⅜	2½	51143	34.50	51167	35.87
17/64	.2656	1 7/16	2⅝	51144	48.05	51168	51.03
9/32	.2812	1½	2 11/16	51145	49.77	51169	52.74
19/64	.2969	1 9/16	2¾	51146	54.00	51170	56.98
5/16	.3125	1⅝	2 13/16	51147	49.77	51171	52.74
21/64	.3281	1 11/16	2 15/16	51148	60.41	51172	63.38
11/32	.3437	1 11/16	3	51149	66.47	51173	69.39
23/64	.3594	1¾	3 1/16	51150	74.88	51174	77.80
3/8	.3750	1 13/16	3⅛	51151	78.71	51175	81.69
25/64	.3906	1⅞	3¼	51152	85.80	51176	89.47
13/32	.4062	1 15/16	3 5/16	51153	94.16	51177	97.82
27/64	.4219	2	3⅜	51154	102.39	51178	106.17
7/16	.4375	2 1/16	3 7/16	51155	96.90	51179	100.56
29/64	.4531	2⅛	3 9/16	51156	123.10	51180	126.76
15/32	.4687	2⅛	3⅝	51157	127.90	51181	131.62
31/64	.4844	2 3/16	3 11/16	51158	129.16	51182	132.82
½	.5000	2¼	3¾	51159	119.10	51183	122.81
9/16	.5625	2½	4	51160	184.65	51184	188.76
5/8	.6250	2¾	4¼	51161	225.54	51185	230.18
¾	.7500	3⅛	5	51162	297.44	51186	303.50

Screw Machine Length Drills

High Speed Steel – 118° Point
General Purpose
Bright Finish or TiN Coated

Developed primarily for use in screw machines, these short length drills provide maximum rigidity resulting in increased hole accuracy and extended tool life. Recommended for drilling a wide variety of materials including non-ferrous materials and low tensile strength steels.

SHANK DIAMETERS	Drill Size	Shank Diameter
	Up to 1″	Same as drill dia.
	Over 1″ to 1¼″	1″
	Over 1¼″ to 1½″	1¼″
	Over 1½″	1½″

List No. 1435 Fractional
List No. 1436 Letter
List No. 1437 Wire Gage

List No. 1435G Fractional - TiN Coated
List No. 1437G Wire Gage - TiN Coated

STANDARD PACKAGE

Fractional Sizes
1/16″ thru 3/8″ — 12 each
25/64″ thru 1/2″ — 6 each
All other sizes — 1 each

Letter Sizes
A thru V — 12 each
W thru Z — 6 each

Wire Gages
#1 thru #60 — 12 each

Titanium Nitride (TiN) Coating increases tool surface hardness, wear resistance, heat resistance, chip flow and resists chip welding. Enhanced hole quality at higher speeds and feeds.

SIZE FRACTIONAL	SIZE WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	BRIGHT EDP NO.	BRIGHT LIST PRICE	TiN COAT EDP NO.	TiN COAT LIST PRICE
	60	.0400	1/2	1 3/8	15101	$1.29	—	—
	59	.0410	1/2	1 3/8	15102	1.29	—	—
	58	.0420	1/2	1 3/8	15103	1.29	—	—
	57	.0430	1/2	1 3/8	15104	1.29	—	—
	56	.0465	1/2	1 3/8	15105	1.29	—	—
	55	.0520	5/8	1 5/8	15107	1.29	—	—
	54	.0550	5/8	1 5/8	15108	1.29	—	—
	53	.0595	5/8	1 5/8	15109	1.29	—	—
1/16		.0625	5/8	1 5/8	15110	1.27	95110	$2.42
	52	.0635	1 1/16	1 11/16	15111	1.29	—	—
	51	.0670	1 1/16	1 11/16	15112	1.29	—	—
	50	.0700	1 1/16	1 11/16	15113	1.29	—	—
	49	.0730	1 1/16	1 11/16	15114	1.29	—	—
	48	.0760	1 1/16	1 11/16	15115	1.29	—	—
5/64		.0781	1 1/16	1 11/16	15116	1.27	95116	2.42
	47	.0785	3/4	1 3/4	15117	1.29	—	—
	46	.0810	3/4	1 3/4	15118	1.29	—	—
	45	.0820	3/4	1 3/4	15119	1.29	—	—
	44	.0860	3/4	1 3/4	15120	1.29	—	—
	43	.0890	3/4	1 3/4	15121	1.29	—	—
	42	.0935	3/4	1 3/4	15122	1.29	—	—
3/32		.0937	3/4	1 3/4	15123	1.27	95123	2.42
	41	.0960	1 3/16	1 13/16	15124	1.29	—	—
	40	.0980	1 3/16	1 13/16	15125	1.29	95125	2.62
	39	.0995	1 3/16	1 13/16	15126	1.29	95126	2.62
	38	.1015	1 3/16	1 13/16	15127	1.29	95127	2.62
	37	.1040	1 3/16	1 13/16	15128	1.29	95128	2.62
	36	.1065	1 3/16	1 13/16	15129	1.29	95129	2.62
7/64		.1094	1 3/16	1 13/16	15130	1.27	95130	2.44
	35	.1100	7/8	1 7/8	15131	1.29	95131	2.62
	34	.1110	7/8	1 7/8	15132	1.29	95132	2.62
	33	.1130	7/8	1 7/8	15133	1.29	95133	2.62
	32	.1160	7/8	1 7/8	15134	1.29	95134	2.62
	31	.1200	7/8	1 7/8	15135	1.29	95135	2.62
1/8		.1250	7/8	1 7/8	15136	1.27	95136	2.44
	30	.1285	15/16	1 15/16	15137	1.31	95137	2.64
	29	.1360	15/16	1 15/16	15138	1.31	95138	2.64
	28	.1405	15/16	1 15/16	15139	1.31	95139	2.84
9/64		.1406	15/16	1 15/16	15140	1.22	95140	2.65
	27	.1440	1	2 1/16	15141	1.42	95141	2.84
	26	.1470	1	2 1/16	15142	1.42	95142	2.84
	25	.1495	1	2 1/16	15143	1.42	95143	2.84

(continued)

Screw Machine Length Drills (continued)

List Nos. 1435, 1436

FRACTIONAL	SIZE LETTER	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	BRIGHT EDP NO.	BRIGHT LIST PRICE	TiN COAT EDP NO.	TiN COAT LIST PRICE
		24	.1520	1	2 1/16	15144	$1.48	95144	$2.84
		23	.1540	1	2 1/16	15145	1.48	95145	2.84
5/32			.1562	1	2 1/16	15146	1.32	95146	2.65
		22	.1570	1 1/16	2 1/8	15147	1.48	95147	2.84
		21	.1590	1 1/16	2 1/8	15148	1.48	95148	2.84
		20	.1610	1 1/16	2 1/8	15149	1.58	95149	2.84
		19	.1660	1 1/16	2 1/8	15150	1.58	95150	2.84
		18	.1695	1 1/16	2 1/8	15151	1.58	95151	2.84
11/64			.1719	1 1/16	2 1/8	15152	1.46	95152	2.65
		17	.1730	1 1/8	2 3/16	15153	1.79	95153	3.22
		16	.1770	1 1/8	2 3/16	15154	1.79	95154	3.22
		15	.1800	1 1/8	2 3/16	15155	1.79	95155	3.22
		14	.1820	1 1/8	2 3/16	15156	1.79	95156	3.22
		13	.1850	1 1/8	2 3/16	15157	1.79	95157	3.22
3/16			.1875	1 1/8	2 3/16	15158	1.54	95158	3.00
		12	.1890	1 3/16	2 1/4	15159	1.79	95159	3.86
		11	.1910	1 3/16	2 1/4	15160	1.79	95160	3.86
		10	.1935	1 3/16	2 1/4	15161	1.79	95161	3.86
		9	.1960	1 3/16	2 1/4	15162	1.79	95162	3.86
		8	.1990	1 3/16	2 1/4	15163	1.79	95163	3.86
		7	.2010	1 3/16	2 1/4	15164	1.79	95164	3.86
13/64			.2031	1 3/16	2 1/4	15165	1.65	95165	3.61
		6	.2040	1 1/4	2 3/8	15166	2.03	95166	4.15
		5	.2055	1 1/4	2 3/8	15167	2.03	95167	4.15
		4	.2090	1 1/4	2 3/8	15168	2.03	95168	4.15
		3	.2130	1 1/4	2 3/8	15169	2.03	95169	4.15
7/32			.2187	1 1/4	2 3/8	15170	1.94	95170	3.88
		2	.2210	1 5/16	2 7/16	15171	2.18	95171	4.33
		1	.2280	1 5/16	2 7/16	15172	2.18	95172	4.33
	A		.2340	1 5/16	2 7/16	15173	2.57	—	—
15/64			.2344	1 5/16	2 7/16	15174	1.95	95174	4.04
	B		.2380	1 3/8	2 1/2	15175	2.57	—	—
	C		.2420	1 3/8	2 1/2	15176	2.57	—	—
	D		.2460	1 3/8	2 1/2	15177	2.57	—	—
1/4	E		.2500	1 3/8	2 1/2	15178	2.08	95178	4.04
	F		.2570	1 7/16	2 5/8	15180	2.89	—	—
	G		.2610	1 7/16	2 5/8	15181	3.02	—	—
17/64			.2656	1 7/16	2 5/8	15182	2.46	95182	5.22
	H		.2660	1 1/2	2 11/16	15183	3.02	—	—
	I		.2720	1 1/2	2 11/16	15184	3.02	—	—
	J		.2770	1 1/2	2 11/16	15185	3.25	—	—
	K		.2810	1 1/2	2 11/16	15186	3.50	—	—
9/32			.2812	1 1/2	2 11/16	15187	2.66	95187	5.44
	L		.2900	1 9/16	2 3/4	15188	3.50	—	—
	M		.2950	1 9/16	2 3/4	15189	3.83	—	—
19/64			.2969	1 9/16	2 3/4	15190	2.83	95190	5.63
	N		.3020	1 5/8	2 13/16	15191	3.83	—	—
5/16			.3125	1 5/8	2 13/16	15192	3.06	95192	5.89
	O		.3160	1 11/16	2 15/16	15193	3.83	—	—
	P		.3230	1 11/16	2 15/16	15194	4.26	—	—
21/64			.3281	1 11/16	2 15/16	15195	3.36	95195	6.23
	Q		.3320	1 11/16	3	15196	4.26	—	—
	R		.3390	1 11/16	3	15197	4.26	—	—
11/32			.3437	1 11/16	3	15198	3.79	95198	6.71
	S		.3480	1 3/4	3 1/16	15199	4.89	—	—
	T		.3580	1 3/4	3 1/16	15200	5.73	—	—
23/64			.3594	1 3/4	3 1/16	15201	4.39	95201	9.05
	U		.3680	1 13/16	3 1/8	15202	5.73	—	—
3/8			.3750	1 13/16	3 1/8	15203	4.62	95203	9.31
	V		.3770	1 7/8	3 1/4	15204	6.17	—	—
	W		.3860	1 7/8	3 1/4	15205	6.43	—	—
25/64			.3906	1 7/8	3 1/4	15206	5.19	95206	11.98

(continued)

Screw Machine Length Drills (continued)

List Nos. 1435, 1436

SIZE FRACTIONAL	SIZE LETTER	DEC. EQUIV.	FLUTE LENGTH	OAL	BRIGHT EDP NO.	BRIGHT LIST PRICE	TiN COAT EDP NO.	TiN COAT LIST PRICE
	X	.3970	1 15/16	3 5/16	15207	$7.49	—	—
	Y	.4040	1 15/16	3 5/16	15208	8.91	—	—
13/32		.4062	1 15/16	3 5/16	15209	5.47	95209	$12.30
	Z	.4130	2	3 3/8	15210	8.91	—	—
27/64		.4219	2	3 3/8	15211	5.95	95211	12.84
7/16		.4375	2 1/16	3 7/16	15212	6.11	95212	13.01
29/64		.4531	2 1/8	3 9/16	15213	7.22	95213	14.26
15/32		.4687	2 1/8	3 5/8	15214	7.69	95214	14.78
31/64		.4844	2 3/16	3 11/16	15215	7.91	95215	15.03
1/2		.5000	2 1/4	3 3/4	15216	7.91	95216	15.03
33/64		.5156	2 3/8	3 7/8	15217	19.09	—	—
17/32		.5313	2 3/8	3 7/8	15218	19.96	—	—
35/64		.5469	2 1/2	4	15219	20.77	—	—
9/16		.5625	2 1/2	4	15220	20.77	—	—
37/64		.5781	2 5/8	4 1/8	15221	21.71	—	—
19/32		.5938	2 5/8	4 1/8	15222	21.71	—	—
39/64		.6094	2 3/4	4 1/4	15223	24.94	—	—
5/8		.6250	2 3/4	4 1/4	15224	24.04	—	—
41/64		.6406	2 7/8	4 1/2	15225	27.54	—	—
21/32		.6562	2 7/8	4 1/2	15226	30.58	—	—
43/64		.6719	2 7/8	4 5/8	15227	27.54	—	—
11/16		.6875	2 7/8	4 5/8	15228	30.58	—	—
45/64		.7031	3	4 3/4	15229	33.12	—	—
23/32		.7188	3	4 3/4	15230	33.12	—	—
47/64		.7344	3 1/8	5	15231	35.65	—	—
3/4		.7500	3 1/8	5	15232	35.02	—	—
49/64		.7657	3 1/4	5 1/8	15233	38.18	—	—
25/32		.7812	3 1/4	5 1/8	15234	38.18	—	—
51/64		.7969	3 3/8	5 1/4	15235	40.82	—	—
13/16		.8125	3 3/8	5 1/4	15236	40.16	—	—
53/64		.8281	3 1/2	5 3/8	15237	42.62	—	—
27/32		.8438	3 1/2	5 3/8	15238	42.62	—	—
55/64		.8594	3 1/2	5 1/2	15239	44.08	—	—
7/8		.8750	3 1/2	5 1/2	15240	43.74	—	—
57/64		.8906	3 5/8	5 5/8	15241	45.76	—	—
29/32		.9062	3 5/8	5 5/8	15242	45.76	—	—
59/64		.9219	3 3/4	5 3/4	15243	50.49	—	—
15/16		.9375	3 3/4	5 3/4	15244	50.49	—	—
61/64		.9531	3 7/8	5 7/8	15245	54.82	—	—
31/32		.9688	3 7/8	5 7/8	15246	54.82	—	—
63/64		.9844	4	6	15247	58.11	—	—
1		1.0000	4	6	15248	56.89	—	—
1 1/16		1.0625	4	6 1/4	15249	71.01	—	—
1 1/8		1.1250	4	6 3/8	15250	80.43	—	—
1 3/16		1.1875	4 1/4	6 5/8	15251	84.67	—	—
1 1/4		1.2500	4 3/8	6 3/4	15252	83.51	—	—
1 5/16		1.3125	4 3/8	7	15253	123.42	—	—
1 3/8		1.3750	4 1/2	7 1/8	15254	131.57	—	—
1 7/16		1.4375	4 3/4	7 3/8	15255	140.63	—	—
1 1/2		1.5000	4 7/8	7 1/2	15256	148.73	—	—
1 9/16		1.5625	4 7/8	7 3/4	15257	168.04	—	—
1 5/8		1.6250	4 7/8	7 3/4	15258	188.54	—	—
1 11/16		1.6875	5 1/8	8	15259	215.57	—	—
1 3/4		1.7500	5 1/8	8	15260	223.34	—	—
1 13/16		1.8125	5 3/8	8 1/4	15261	244.99	—	—
1 7/8		1.8750	5 3/8	8 1/4	15262	252.02	—	—
1 15/16		1.9375	5 5/8	8 1/2	15263	267.32	—	—
2		2.0000	5 5/8	8 1/2	15264	279.75	—	—

Aircraft Type C Heavy Duty Screw Machine Length Drills

Straight Shank – High Speed Steel
135° Split Point – Treated (Black Oxide)
Heavy Duty

Heavy duty construction. 135° self-centering split point eliminates "walking" and reduces thrust. Short length provides maximum rigidity for increased hole accuracy and extended tool life. Recommended for drilling a wide range of low to medium tensile strength materials.

List No. 1398
NAS-907, Type C

STANDARD PACKAGE

Fractional Sizes
3/64" thru 3/8" — 12 each
25/64" thru 1/2" — 6 each

Letter Sizes
A - V — 12 each
W - Z — 6 each

Wire Gage Sizes
#1 thru #60 — 12 each

Sizes #53 and smaller furnished with 135° regular point

SIZE FRACTIONAL	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
	60	.0400	1/2	1 3/8	14880	$1.49
	59	.0410	1/2	1 3/8	14881	1.49
	58	.0420	1/2	1 3/8	14882	1.49
	57	.0430	1/2	1 3/8	14883	1.49
	56	.0465	1/2	1 3/8	14884	1.49
3/64		.0469	1/2	1 3/8	14901	1.52
	55	.0520	5/8	1 5/8	14885	1.49
	54	.0550	5/8	1 5/8	14886	1.49
	53	.0595	5/8	1 5/8	14887	1.49
1/16		.0625	5/8	1 5/8	14902	1.39
	52	.0635	11/16	1 11/16	14888	1.47
	51	.0670	11/16	1 11/16	14889	1.47
	50	.0700	11/16	1 11/16	14890	1.47
	49	.0730	11/16	1 11/16	14891	1.47
	48	.0760	11/16	1 11/16	14892	1.47
5/64		.0781	11/16	1 11/16	14903	1.39
	47	.0785	11/16	1 11/16	14893	1.47
	46	.0810	3/4	1 3/4	14894	1.47
	45	.0820	3/4	1 3/4	14895	1.47
	44	.0860	3/4	1 3/4	14896	1.47
	43	.0890	3/4	1 3/4	14897	1.47
	42	.0935	3/4	1 3/4	14898	1.47
3/32		.0937	3/4	1 3/4	14904	1.39
	41	.0960	13/16	1 13/16	14899	1.47
	40	.0980	13/16	1 13/16	14905	1.41
	39	.0995	13/16	1 13/16	14906	1.41
	38	.1015	13/16	1 13/16	14907	1.41
	37	.1040	13/16	1 13/16	14908	1.41
	36	.1065	13/16	1 13/16	14909	1.41
7/64		.1094	13/16	1 13/16	14910	1.39
	35	.1100	7/8	1 7/8	14911	1.41
	34	.1110	7/8	1 7/8	14912	1.41
	33	.1130	7/8	1 7/8	14913	1.41
	32	.1160	7/8	1 7/8	14914	1.41
	31	.1200	7/8	1 7/8	14915	1.41
1/8		.1250	7/8	1 7/8	14916	1.41
	30	.1285	15/16	1 15/16	14917	1.41
	29	.1360	15/16	1 15/16	14918	1.41
	28	.1405	15/16	1 15/16	14919	1.41
9/64		.1406	15/16	1 15/16	14920	1.41
	27	.1440	1	2 1/16	14921	1.56
	26	.1470	1	2 1/16	14922	1.56
	25	.1495	1	2 1/16	14923	1.56
	24	.1520	1	2 1/16	14924	1.56
	23	.1540	1	2 1/16	14925	1.56
5/32		.1562	1	2 1/16	14926	$1.56
	22	.1570	1 1/16	2 1/8	14927	1.56
	21	.1590	1 1/16	2 1/8	14928	1.56
	20	.1610	1 1/16	2 1/8	14929	1.64
	19	.1660	1 1/16	2 1/8	14930	1.64
	18	.1695	1 1/16	2 1/8	14931	1.64
11/64		.1719	1 1/16	2 1/8	14932	1.64
	17	.1730	1 1/8	2 3/16	14933	1.98
	16	.1770	1 1/8	2 3/16	14934	1.98
	15	.1800	1 1/8	2 3/16	14935	1.98
	14	.1820	1 1/8	2 3/16	14936	1.98
	13	.1850	1 1/8	2 3/16	14937	1.98
3/16		.1875	1 1/8	2 3/16	14938	1.82
	12	.1890	1 3/16	2 1/4	14939	1.98
	11	.1910	1 3/16	2 1/4	14940	1.98
	10	.1935	1 3/16	2 1/4	14941	1.98
	9	.1960	1 3/16	2 1/4	14942	1.98
	8	.1990	1 3/16	2 1/4	14943	1.98
	7	.2010	1 3/16	2 1/4	14944	1.98
13/64		.2031	1 3/16	2 1/4	14945	1.89
	6	.2040	1 1/4	2 3/8	14946	2.35
	5	.2055	1 1/4	2 3/8	14947	2.35
	4	.2090	1 1/4	2 3/8	14948	2.35
	3	.2130	1 1/4	2 3/8	14949	2.35
7/32		.2187	1 1/4	2 3/8	14950	2.30
	2	.2210	1 5/16	2 7/16	14951	2.52
	1	.2280	1 5/16	2 7/16	14952	2.52
	A	.2340	1 5/16	2 7/16	14953	2.66
15/64		.2344	1 5/16	2 7/16	14954	2.32
	B	.2380	1 3/8	2 1/2	14955	2.66
	C	.2420	1 3/8	2 1/2	14956	2.67
	D	.2460	1 3/8	2 1/2	14957	2.67
1/4	E	.2500	1 3/8	2 1/2	14958	2.60
	F	.2570	1 7/16	2 5/8	14959	2.94
	G	.2610	1 7/16	2 5/8	14960	3.13
17/64		.2656	1 7/16	2 5/8	14963	2.94
	H	.2660	1 1/2	2 11/16	14964	3.13
	I	.2720	1 1/2	2 11/16	14965	3.13
	J	.2770	1 1/2	2 11/16	14966	3.37
	K	.2810	1 1/2	2 11/16	14967	3.60
9/32		.2812	1 1/2	2 11/16	14968	3.16
	L	.2900	1 9/16	2 3/4	14969	3.60
	M	.2950	1 9/16	2 3/4	14970	3.72
19/64		.2969	1 9/16	2 3/4	14971	3.75

(continued)

Aircraft Type C Screw Machine Length Drills (continued)

List No. 1398

SIZE FRACTIONAL	LETTER	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
	N	.3020	1 5/8	2 13/16	14972	$3.94
5/16		.3125	1 5/8	2 13/16	14973	3.78
	O	.3160	1 11/16	2 15/16	14974	3.97
	P	.3230	1 11/16	2 15/16	14975	4.44
21/64		.3281	1 11/16	2 15/16	14976	4.13
	Q	.3320	1 11/16	3	14977	4.45
	R	.3390	1 11/16	3	14978	4.47
11/32		.3437	1 11/16	3	14979	4.73
	S	.3480	1 3/4	3 1/16	14980	5.11
	T	.3580	1 3/4	3 1/16	14981	5.94
23/64		.3594	1 3/4	3 1/16	14982	5.36
	U	.3680	1 13/16	3 1/8	14983	5.96
3/8		.3750	1 13/16	3 1/8	14984	5.72

SIZE FRACTIONAL	LETTER	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
	V	.3770	1 7/8	3 1/4	14985	$6.34
	W	.3860	1 7/8	3 1/4	14986	6.66
25/64		.3906	1 7/8	3 1/4	14987	6.34
	X	.3970	1 15/16	3 5/16	14988	7.70
	Y	.4040	1 15/16	3 5/16	14989	9.14
13/32		.4062	1 15/16	3 5/16	14990	6.60
	Z	.4130	2	3 3/8	14991	9.15
27/64		.4219	2	3 3/8	14992	7.23
7/16		.4375	2 1/16	3 7/16	14993	7.41
29/64		.4531	2 1/8	3 9/16	14994	8.70
15/32		.4687	2 1/8	3 5/8	14995	9.30
31/64		.4844	2 3/16	3 11/16	14996	9.50
1/2		.5000	2 1/4	3 3/4	14997	9.50

Cobalt Screw Machine Length Drills

135° Split Point — Heavy Duty

Sizes #53 and smaller 135° Regular Point

Heavy duty construction. 135° self-centering split point eliminates "walking" and reduces thrust. Short length provides maximum rigidity for increased hole accuracy and extended tool life.

Cobalt steel offers increased hardness, toughness, wear resistance and heat resistance. Recommended for drilling tough, high tensile strength materials and materials that generate higher cutting temperatures including high alloy steels, ferrous castings, titanium, inconel, stainless steels and other difficult-to-drill materials.

List No. 2435

STANDARD PACKAGE

Fractional Sizes
1/16" thru 3/8" — 12 each
25/64" thru 19/32" — 6 each
39/64" thru 3/4" — 1 each

Wire Gage Sizes
#1 thru #60 — 12 each

Letter Sizes
A thru V — 12 each
W thru Z — 6 each

SIZE FRACTIONAL	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
	60	.0400	1/2	1 3/8	13149	$2.39
	59	.0410	1/2	1 3/8	13150	2.35
	58	.0420	1/2	1 3/8	13151	2.30
	57	.0430	1/2	1 3/8	13152	2.25
	56	.0465	1/2	1 3/8	13153	2.25
	55	.0520	5/8	1 5/8	13154	2.25
	54	.0550	5/8	1 5/8	13155	2.25
	53	.0595	5/8	1 5/8	13156	2.25
1/16		.0625	5/8	1 5/8	13157	1.96
	52	.0635	11/16	1 11/16	13158	1.94
	51	.0670	11/16	1 11/16	13159	1.94
	50	.0700	11/16	1 11/16	13160	1.94
	49	.0730	11/16	1 11/16	13161	1.94
	48	.0760	11/16	1 11/16	13162	1.94
5/64		.0781	11/16	1 11/16	13163	1.91
	47	.0785	3/4	1 3/4	13164	1.94
	46	.0810	3/4	1 3/4	13165	1.96
	45	.0820	3/4	1 3/4	13166	1.96
	44	.0860	3/4	1 3/4	13167	1.96
	43	.0890	3/4	1 3/4	13168	1.96
	42	.0935	3/4	1 3/4	13169	1.96
3/32		.0937	3/4	1 3/4	13170	1.91

SIZE FRACTIONAL	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
	41	.0960	13/16	1 13/16	13171	$1.97
	40	.0980	13/16	1 13/16	13172	2.05
	39	.0995	13/16	1 13/16	13173	2.05
	38	.1015	13/16	1 13/16	13174	2.05
	37	.1040	13/16	1 13/16	13175	2.26
	36	.1065	13/16	1 13/16	13176	2.26
7/64		.1094	13/16	1 13/16	13177	2.16
	35	.1100	7/8	1 7/8	13178	2.26
	34	.1110	7/8	1 7/8	13179	2.26
	33	.1130	7/8	1 7/8	13180	2.35
	32	.1160	7/8	1 7/8	13181	2.35
	31	.1200	7/8	1 7/8	13182	2.35
1/8		.1250	7/8	1 7/8	13183	2.60
	30	.1285	15/16	1 15/16	13184	2.35
	29	.1360	15/16	1 15/16	13185	2.47
	28	.1405	15/16	1 15/16	13186	2.47
9/64		.1406	15/16	1 15/16	13187	2.53
	27	.1440	1	2 1/16	13188	2.72
	26	.1470	1	2 1/16	13189	2.72
	25	.1495	1	2 1/16	13190	2.72
	24	.1520	1	2 1/16	13191	2.92
	23	.1540	1	2 1/16	13192	2.92

(continued)

Cobalt Screw Machine Length Drills (continued)

List No. 2435

SIZE FRACTIONAL	SIZE LETTER	SIZE WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
5/32			.1562	1	2 1/16	13193	$2.73
		22	.1570	1 1/16	2 1/8	13194	3.06
		21	.1590	1 1/16	2 1/8	13195	3.06
		20	.1610	1 1/16	2 1/8	13196	3.06
		19	.1660	1 1/16	2 1/8	13197	3.06
		18	.1695	1 1/16	2 1/8	13198	3.06
11/64			.1719	1 1/16	2 1/8	13199	3.10
		17	.1730	1 1/8	2 3/16	13200	3.57
		16	.1770	1 1/8	2 3/16	13201	3.70
		15	.1800	1 1/8	2 3/16	13202	3.73
		14	.1820	1 1/8	2 3/16	13203	3.73
		13	.1850	1 1/8	2 3/16	13204	3.73
3/16			.1875	1 1/8	2 3/16	13205	3.57
		12	.1890	1 3/16	2 1/4	13206	3.79
		11	.1910	1 3/16	2 1/4	13207	3.79
		10	.1935	1 3/16	2 1/4	13208	3.89
		9	.1960	1 3/16	2 1/4	13209	3.89
		8	.1990	1 3/16	2 1/4	13210	3.89
		7	.2010	1 3/16	2 1/4	13211	3.89
13/64			.2031	1 3/16	2 1/4	13212	4.16
		6	.2040	1 1/4	2 3/8	13213	4.96
		5	.2055	1 1/4	2 3/8	13214	4.96
		4	.2090	1 1/4	2 3/8	13215	4.96
		3	.2130	1 1/4	2 3/8	13216	5.55
7/32			.2187	1 1/4	2 3/8	13217	4.58
		2	.2210	1 5/16	2 7/16	13218	5.55
		1	.2280	1 5/16	2 7/16	13219	5.55
	A		.2349	1 5/16	2 7/16	13220	5.21
15/64			.2344	1 5/16	2 7/16	13221	4.91
	B		.2380	1 3/8	2 1/2	13222	5.52
	C		.2420	1 3/8	2 1/2	13223	5.57
	D		.2460	1 3/8	2 1/2	13224	5.59
1/4	E		.2500	1 3/8	2 1/2	13225	5.13
	F		.2570	1 7/16	2 5/8	13226	5.84
	G		.2610	1 7/16	2 5/8	13227	5.86
17/64			.2656	1 7/16	2 5/8	13228	5.84
	H		.2660	1 1/2	2 11/16	13229	5.79
	I		.2720	1 1/2	2 11/16	13230	6.21
	J		.2770	1 1/2	2 11/16	13231	6.24
	K		.2810	1 1/2	2 11/16	13232	6.26

SIZE FRACTIONAL	SIZE LETTER	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
9/32		.2812	1 1/2	2 11/16	13233	$6.35
	L	.2900	1 9/16	2 3/4	13234	7.35
	M	.2950	1 9/16	2 3/4	13235	7.36
19/64		.2969	1 9/16	2 3/4	13236	7.35
	N	.3020	1 5/8	2 13/16	13237	7.89
5/16		.3125	1 5/8	2 13/16	13238	7.90
	O	.3160	1 11/16	2 15/16	13239	8.73
	P	.3230	1 11/16	2 15/16	13240	8.77
21/64		.3281	1 11/16	2 15/16	13241	8.72
	Q	.3320	1 11/16	2 15/16	13242	9.42
	R	.3390	1 11/16	2 15/16	13243	9.45
11/32		.3437	1 11/16	3	13244	9.48
	S	.3480	1 3/4	3 1/16	13245	11.79
	T	.3580	1 3/4	3 1/16	13246	11.78
23/64		.3594	1 3/4	3 1/16	13247	11.05
	U	.3680	1 13/16	3 1/8	13248	11.81
3/8		.3750	1 13/16	3 1/8	13249	10.89
	V	.3770	1 7/8	3 1/4	13250	13.01
	W	.3860	1 7/8	3 1/4	13251	13.03
25/64		.3906	1 7/8	3 1/4	13252	12.46
	X	.3970	1 15/16	3 5/16	13253	13.06
	Y	.4040	1 15/16	3 5/16	13254	13.10
13/32		.4062	1 15/16	3 5/16	13255	12.88
	Z	.4130	2	3 3/8	13256	14.95
27/64		.4219	2	3 3/8	13257	14.27
7/16		.4375	2 1/16	3 7/16	13258	14.65
29/64		.4531	2 1/8	3 9/16	13259	17.59
15/32		.4687	2 1/8	3 5/8	13260	17.88
31/64		.4844	2 3/16	3 11/16	13261	19.06
1/2		.5000	2 1/4	3 3/4	13262	16.65
37/64		.5781	2 5/8	4 1/8	13267*	50.41
19/32		.5938	2 5/8	4 1/8	13268*	50.43
41/64		.6406	2 7/8	4 1/2	13271*	58.50
45/64		.7031	3	4 3/4	13275*	70.39
23/32		.7188	3	4 3/4	13276*	75.10

*Available While Supplies Last

CUTTING FLUIDS SELECTION

Coolants and lubricants offer many benefits including reduced friction and heat, enhanced chip removal, improved accuracy and surface finish, higher speeds and feeds, corrosion protection and increased tool life.

Proper selection and application of cutting fluids is critical to optimizing machining applications. **Please consult your cutting fluids supplier for advice on your specific machining application.**

½" Reduced Shank Silver & Deming Drills

118° Point – High Speed Steel

Expand the size range capacity of 1/2" drill chucks. Recommended for drilling a wide range of materials of low to medium tensile strength.

List No. 1424R
Round Shank

List No. 1424
3-Flat Shank for positive hold

List No. 1424S
3-Flat Shank for positive hold.

118° Self-Centering Split Point reduces "wandering" and thrust.

Black & Gold "MorseKut" Finish enhances performance and abrasion resistance.

STANDARD PACKAGE **All sizes — 1 each**

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	LIST 1424R EDP NO.	1424R LIST PRICE	LIST 1424 EDP NO.	1424 LIST PRICE	LIST 1424S EDP NO.	1424S LIST PRICE
33/64	.5156	3⅛	6	17031	$20.80	—	—	19031	$23.92
17/32	.5312	3⅛	6	17032	20.80	—	—	19032	23.92
35/64	.5469	3⅛	6	17033	22.11	—	—	19033	25.43
9/16	.5625	3⅛	6	17034	22.11	—	—	19034	25.43
37/64	.5781	3⅛	6	17035	23.75	—	—	19035	27.32
19/32	.5938	3⅛	6	17036	23.75	—	—	19036	27.32
39/64	.6094	3⅛	6	17037	24.87	15077*	$28.60	19037	28.60
5/8	.6250	3⅛	6	17038	24.87	—	—	19038	28.60
41/64	.6406	3⅛	6	17039	26.53	—	—	19039	30.50
21/32	.6562	3⅛	6	17040	26.53	—	—	19040	30.50
43/64	.6719	3⅛	6	17041	27.60	15079*	31.72	19041	31.72
11/16	.6875	3⅛	6	17042	27.60	—	—	19042	31.72
45/64	.7031	3⅛	6	17043	27.94	—	—	19043	32.13
23/32	.7188	3⅛	6	17044	27.94	—	—	19044	32.13
47/64	.7344	3⅛	6	17045	30.45	—	—	19045	35.01
3/4	.7500	3⅛	6	17046	30.45	—	—	19046	35.01
49/64	.7656	3⅛	6	17047	32.49	—	—	19047	37.35
25/32	.7812	3⅛	6	17048	32.49	—	—	19048	37.35
51/64	.7969	3⅛	6	17049	40.57	—	—	19049	46.65
13/16	.8125	3⅛	6	17050	34.12	—	—	19050	39.24
53/64	.8281	3⅛	6	17051	41.89	15084*	48.17	19051	48.17
27/32	.8438	3⅛	6	17052	35.30	—	—	19052	40.59
55/64	.8594	3⅛	6	17053	43.56	15085*	50.09	19053	50.09
7/8	.8750	3⅛	6	17054	36.65	—	—	19054	42.15
57/64	.8902	3⅛	6	17055	45.48	—	—	19055	52.29
29/32	.9062	3⅛	6	17056	38.29	15066*	44.03	19056	44.03
59/64	.9219	3⅛	6	17057	48.67	15087*	55.97	19057	55.97
15/16	.9375	3⅛	6	17058	40.98	15067*	47.12	19058	47.12
61/64	.9531	3⅛	6	17059	51.41	15088*	59.12	19059	59.12
31/32	.9688	3⅛	6	17060	43.25	15068*	49.74	19060	49.74
63/64	.9844	3⅛	6	17061	57.28	—	—	19061	65.87
1	1.0000	3⅛	6	17062	48.19	—	—	19062	55.42
1 1/64	1.0156	3⅛	6	17063	66.94	—	—	19063	76.97
1 1/32	1.0312	3⅛	6	17064	61.57	15095*	70.80	19064	70.80
1 3/64	1.0469	3⅛	6	17065	61.57	—	—	—	—
1 1/16	1.0625	3⅛	6	17066	56.55	15070*	65.06	19065	65.06
1 5/64	1.0781	3⅛	6	17067	63.57	—	—	—	—
1 3/32	1.0937	3⅛	6	17068	65.63	15096*	75.47	19066	75.47
1 7/64	1.1094	3⅛	6	17069	68.49	—	—	—	—
1 1/8	1.1250	3⅛	6	17070	67.60	15071*	70.52	19067	70.52
1 9/64	1.1406	3⅛	6	17071	73.32	—	—	—	—
1 5/32	1.1562	3⅛	6	17072	73.48	15097*	80.09	19068	80.09
1 11/64	1.1719	3⅛	6	17073	74.79	—	—	—	—
1 3/16	1.1875	3⅛	6	17074	74.41	15072*	80.51	19069	80.51
1 13/64	1.2031	3⅛	6	17075	79.55	—	—	—	—
1 7/32	1.2188	3⅛	6	17076	79.32	15098*	86.35	19070	86.35
1 15/64	1.2344	3⅛	6	17077	84.82	—	—	—	—
1 1/4	1.2500	3⅛	6	17078	84.14	15073*	91.44	19071	91.44
1 9/32	1.2812	3⅛	6	17080	91.34	—	—	—	—
1 5/16	1.3125	3⅛	6	17082	96.88	—	—	19072	100.80
1 21/64	1.3281	3⅛	6	17083*	100.15	—	—	—	—

*Available While Supplies Last

(continued)

½″ Reduced Shank Silver & Deming Drills (continued)

List No. 1424, 1424R, 1424S

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	LIST 1424R EDP NO.	1424R LIST PRICE	LIST 1424 EDP NO.	1424 LIST PRICE	LIST 1424S EDP NO.	1424S LIST PRICE
1 11/32	1.3438	3⅛	6	17084	$105.13	—	—	—	—
1⅜	1.3750	3⅛	6	17086	111.01	15091*	$115.80	19073	$115.80
1 25/64	1.3906	3⅛	6	17087*	111.98	—	—	—	—
1 13/32	1.4062	3⅛	6	17088	115.64	—	—	—	—
1 7/16	1.4375	3⅛	6	17090	118.89	15092*	127.43	19074	127.43
1 15/32	1.4687	3⅛	6	17092	127.14	—	—	—	—
1 31/64	1.4844	3⅛	6	17093*	123.66	—	—	—	—
1½	1.5000	3⅛	6	17094	130.47	—	—	19075	140.19

*Available While Supplies Last

Cobalt ½″ Reduced Shank Silver & Deming Drills

130° Helical Point

Heavy duty construction. Cobalt steel offers increased hardness, toughness, wear resistance and heat resistance. Recommended for drilling tough, high tensile strength materials and materials that generate higher cutting temperatures including high alloy steels, ferrous castings, titanium, Inconel, stainless steels and other difficult-to-drill materials.

STANDARD PACKAGE All sizes — 1 each

List No. 2424

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
21/32	.6562	3⅛	6	15269*	$34.17
25/32	.7812	3⅛	6	15273*	42.20
27/32	.8437	3⅛	6	15275*	44.09
⅞	.8750	3⅛	6	15276*	50.48
15/16	.9375	3⅛	6	15278*	52.13
1 3/16	1.1875	3⅛	6	15283*	85.36

*Available While Supplies Last

Ambore™ Mighty Bite™ Hole Enlarger

4 Flute

Specifically designed to enlarge holes, preventing hogging usually experienced when using S&D drills. The four flute design offers a good surface finish, improved hole accuracy and allows for increased metal removal rates.

Manufactured with premium tool steel, unique gold and black finish, close tolerance, and 3-flat reduced shanks.

List No. 1458

Will not drill solid material.

STANDARD PACKAGE All sizes — 1 each

SIZE	MIN. STARTING HOLE SIZE	DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
⅜	¼	.3750	⅜	1⅞	4 5/16	16170	$33.21
½	5/16	.5000	½	1⅞	4 5/16	16171	43.38
9/16	⅜	.5625	½	1⅞	4 5/16	16172	56.52
⅝	25/64	.6250	½	1⅞	4 5/16	16173	63.03
11/16	7/16	.6875	½	1⅞	4 5/16	16174	70.47
¾	15/32	.7500	½	1⅞	4 5/16	16175	76.77

¼″ Reduced Shank Metalworking Drills

118° Notched Point — High Speed Steel

Regularly furnished with 118° notched points for use in sheet metal, metal or wood, with portable drills having 1/4″ chucks.

Screw machine length for enhanced rigidity, self-centering.

STANDARD PACKAGE 1/4″ thru 3/8″ — 12 each
13/32″ thru 1/2″ — 6 each

List No. 1414

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
1/4	.2500	1 3/8	2 1/2	15021	$4.10
9/32	.2812	1 1/4	2 11/16	15022	7.32
5/16	.3125	1 3/8	2 13/16	15023	6.65
11/32	.3438	1 9/16	3	15024	7.89
3/8	.3750	1 11/16	3 1/8	15025	8.42
13/32	.4062	1 7/8	3 5/16	15026	10.24
7/16	.4375	2	3 7/16	15027	12.14
15/32	.4688	2 1/8	3 5/8	15028	13.05
1/2	.5000	2 1/4	3 3/4	15029	13.05

⅜″ Reduced Shank Jobber Length Drills

118° Point – High Speed Steel Treated (Black Oxide)

For 3/8″ chuck power drills in portable applications.

List No. 1422

STANDARD PACKAGE All sizes — 6 each

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
25/64	.3906	3 3/4	5 1/8	15001	$11.13
13/32	.4062	3 7/8	5 1/4	15002	11.13
27/64	.4219	3 15/16	5 3/8	15003	11.89
7/16	.4375	4 1/16	5 1/2	15004	11.89

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
29/64	.4531	4 3/16	5 5/8	15005	$14.13
15/32	.4687	4 5/16	5 3/4	15006	14.13
31/64	.4844	4 3/8	5 7/8	15007	14.28
1/2	.5000	4 1/2	6	15008	14.28

SPECIAL TAPS FAST QUOTE SERVICE

Call Morse Cutting Tools for all of your special tap needs.
To expedite your quote please provide the following information:

TAP SIZE _____ CLASS of FIT or H LIMIT _____ # of FLUTES _____

TYPE of TAP _____ SURFACE TREATMENT _____

MATERIAL to be THREADED _____ HARDNESS _____

BLIND or THROUGH HOLE _____ LENGTH of THREAD _____

# of HOLES to TAP _____ TAPPING EQUIPMENT USED _____

CURRENT TAP USED _____ TAPPING PROBLEM _____

Taper Length Drills

Straight Shank – High Speed Steel
118° Point – Treated (Black Oxide)
General Purpose

Taper length drills have approximately the same flute lengths and overall lengths as taper shank drills, for deeper hole drilling. Shanks are the same diameter as the drill body. Recommended for drilling a wide range of materials.

List No. 1314 Fractional
List No. 1322 Wire Gage

STANDARD PACKAGE

Fractional Sizes
3/64" thru 15/64" — 12 each
1/4" thru 3/8" — 6 each
25/64" and over — 1 each

Wire Gage Sizes
#1 thru #60 — 12 each

SIZE FRACTIONAL	SIZE WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	1314, 1322 EDP NO.	1314, 1322 LIST PRICE
	60	.0400	1⅛	2¼	11051	$3.59
	59	.0410	1⅛	2¼	11052	3.59
	58	.0420	1⅛	2¼	11053	3.59
	57	.0430	1⅛	2¼	11054	3.59
	56	.0465	1⅛	2¼	11055	3.59
3/64		.0469	1⅛	2¼	10553	2.75
	55	.0520	1¾	3	11056	3.59
	54	.0550	1¾	3	11057	3.59
	53	.0595	1¾	3	11058	3.59
1/16		.0625	1¾	3	10554	2.96
	52	.0635	2	3¾	11059	3.59
	51	.0670	2	3¾	11060	3.59
	50	.0700	2	3¾	11061	3.59
	49	.0730	2	3¾	11062	3.59
	48	.0760	2	3¾	11063	3.59
5/64		.0781	2	3¾	10555	3.44
	47	.0785	2¼	4¼	11064	4.62
	46	.0810	2¼	4¼	11065	4.62
	45	.0820	2¼	4¼	11066	4.62
	44	.0860	2¼	4¼	11067	4.64
	43	.0890	2¼	4¼	11068	4.64
	42	.0935	2¼	4¼	11069	4.62
3/32		.0938	2¼	4¼	10556	4.12
	41	.0960	2½	4⅝	11070	5.45
	40	.0980	2½	4⅝	11071	5.45
	39	.0995	2½	4⅝	11072	5.45
	38	.1015	2½	4⅝	11073	6.24
	37	.1040	2½	4⅝	11074	6.24
	36	.1065	2½	4⅝	11075	6.24
7/64		.1094	2½	4⅝	10557	5.17
	35	.1100	2¾	5⅛	11076	8.34
	34	.1110	2¾	5⅛	11077	8.34
	33	.1130	2¾	5⅛	11078	8.34
	32	.1160	2¾	5⅛	11079	8.34
	31	.1200	2¾	5⅛	11080	8.34
1/8		.1250	2¾	5⅛	10558	5.32
	30	.1285	3	5⅜	11081	8.58
	29	.1360	3	5⅜	11082	8.58
	28	.1405	3	5⅜	11083	8.58
9/64		.1406	3	5⅜	10559	7.10
	27	.1440	3	5⅜	11084	8.49
	26	.1470	3	5⅜	11085	8.49
	25	.1495	3	5⅜	11086	8.49

(continued)

Taper Length Drills (continued)

List No. 1314, 1322

SIZE FRACTIONAL	SIZE WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	1314, 1322 EDP NO.	1314, 1322 LIST PRICE
	24	.1520	3	5⅜	11087	$8.49
	23	.1540	3	5⅜	11088	8.49
5/32		.1562	3	5⅜	10560	6.47
	22	.1570	3⅜	5¾	11089	8.49
	21	.1590	3⅜	5¾	11090	8.49
	20	.1610	3⅜	5¾	11091	8.49
	19	.1660	3⅜	5¾	11092	8.49
	18	.1695	3⅜	5¾	11093	8.49
11/64		.1719	3⅜	5¾	10561	7.56
	17	.1730	3⅜	5¾	11094	8.49
	16	.1770	3⅜	5¾	11095	8.49
	15	.1800	3⅜	5¾	11096	8.49
	14	.1820	3⅜	5¾	11097	8.49
	13	.1850	3⅜	5¾	11098	8.49
3/16		.1875	3⅜	5¾	10562	6.47
	12	.1890	3⅝	6	11099	9.36
	11	.1910	3⅝	6	11100	9.36
	10	.1935	3⅝	6	11101	9.36
	9	.1960	3⅝	6	11102	9.36
	8	.1990	3⅝	6	11103	9.36
	7	.2010	3⅝	6	11104	9.36
13/64		.2031	3⅝	6	10563	8.61
	6	.2040	3⅝	6	11105	9.36
	5	.2055	3⅝	6	11106	9.36
	4	.2090	3⅝	6	11107	9.36
	3	.2130	3⅝	6	11108	9.36
7/32		.2188	3⅝	6	10564	9.24
	2	.2210	3¾	6⅛	11109	9.69
	1	.2280	3¾	6⅛	11110	9.69
15/64		.2344	3¾	6⅛	10565	9.24
1/4		.2500	3¾	6⅛	10566	7.56
17/64		.2656	3⅞	6¼	10567	9.67
9/32		.2812	3⅞	6¼	10568	9.24
19/64		.2969	4	6⅜	10569	10.55
5/16		.3125	4	6⅜	10570	9.24
21/64		.3281	4⅛	6½	10571	10.80
11/32		.3438	4⅛	6½	10572	10.55
23/64		.3594	4¼	6¾	10573	12.43
3/8		.3750	4¼	6¾	10574	12.43
25/64		.3906	4⅜	7	10575	13.07
13/32		.4062	4⅜	7	10576	12.97
27/64		.4219	4⅝	7¼	10577	14.30
7/16		.4375	4⅝	7¼	10578	14.56
29/64		.4531	4¾	7½	10579	16.15
15/32		.4688	4¾	7½	10580	17.13
31/64		.4844	4¾	7¾	10581	18.75
1/2		.5000	4¾	7¾	10582	17.88
33/64		.5156	4¾	8	10583	23.95
17/32		.5312	4¾	8	10584	23.95
35/64		.5469	4⅞	8¼	10585	25.17
9/16		.5625	4⅞	8¼	10586	25.18
37/64		.5781	4⅞	8¾	10587	29.43
19/32		.5938	4⅞	8¾	10588	29.43
39/64		.6094	4⅞	8¾	10589	30.46
5/8		.6250	4⅞	8¾	10590	30.46
41/64		.6406	5⅛	9	10591	34.71

(continued)

Taper Length Drills (continued)

List No. 1314

SIZE FRACTIONAL	DEC. EQUIV.	FLUTE LENGTH	OAL	1314 EDP NO.	1314 LIST PRICE
21/32	.6562	5 1/8	9	10592	$34.71
43/64	.6719	5 3/8	9 1/4	10593	40.76
11/16	.6875	5 3/8	9 1/4	10594	41.27
45/64	.7031	5 5/8	9 1/2	10595	42.92
23/32	.7188	5 5/8	9 1/2	10596	42.92
47/64	.7344	5 7/8	9 3/4	10597	46.16
3/4	.7500	5 7/8	9 3/4	10598	46.16
49/64	.7656	6	9 7/8	10599	50.01
25/32	.7812	6	9 7/8	10600	50.01
51/64	.7969	6 1/8	10	10601	53.98
13/16	.8125	6 1/8	10	10602	53.98
53/64	.8281	6 1/8	10	10603	56.83
27/32	.8438	6 1/8	10	10604	56.83
55/64	.8594	6 1/8	10	10605	59.68
7/8	.8750	6 1/8	10	10606	59.68
57/64	.8906	6 1/8	10	10607	62.18
29/32	.9062	6 1/8	10	10608	62.18
59/64	.9219	6 1/8	10 3/4	10609	67.68
15/16	.9375	6 1/8	10 3/4	10610	67.68
61/64	.9531	6 3/8	11	10611	74.65
31/32	.9688	6 3/8	11	10612	74.65
63/64	.9844	6 3/8	11	10613	77.81
1	1.0000	6 3/8	11	10614	77.81
1 1/64	1.0156	6 1/2	11 1/8	10615	93.15
1 1/32	1.0312	6 1/2	11 1/8	10616	93.15
1 3/64	1.0469	6 5/8	11 1/4	10617	$96.36
1 1/16	1.0625	6 5/8	11 1/4	10618	96.36
1 5/64	1.0781	6 7/8	11 1/2	10619	103.37
1 3/32	1.0938	6 7/8	11 1/2	10620	103.37
1 7/64	1.1094	7 1/8	11 3/4	10621	107.27
1 1/8	1.1250	7 1/8	11 3/4	10622	107.27
1 9/64	1.1406	7 1/4	11 7/8	10623	116.77
1 5/32	1.1562	7 1/4	11 7/8	10624	116.77
1 11/64	1.1719	7 3/8	12	10625	125.73
1 3/16	1.1875	7 3/8	12	10626	125.73
1 13/64	1.2031	7 1/2	12 1/8	10627	129.47
1 7/32	1.2188	7 1/2	12 1/8	10628	129.47
1 15/64	1.2344	7 7/8	12 1/2	10629	134.65
1 1/4	1.2500	7 7/8	12 1/2	10630	134.65
1 9/32	1.2812	8 1/2	14 1/8	10631	160.67
1 5/16	1.3125	8 5/8	14 1/4	10632	160.67
1 11/32	1.3438	8 3/4	14 3/8	10633	172.33
1 3/8	1.3750	8 7/8	14 1/2	10634	172.33
1 13/32	1.4062	9	14 5/8	10635	206.55
1 7/16	1.4375	9 1/8	14 3/4	10636	187.77
1 15/32	1.4688	9 1/4	14 7/8	10637	210.51
1 1/2	1.5000	9 3/8	15	10638	210.51
1 9/16	1.5625	9 5/8	15 1/4	10639	235.56
1 5/8	1.6250	9 7/8	15 5/8	10640	265.98
1 3/4	1.7500	10 1/2	16 1/4	10641	352.56

SPECIAL TAPS FAST QUOTE SERVICE

Call Morse Cutting Tools for all of your special tap needs.
To expedite your quote please provide the following information:

TAP SIZE _____ CLASS of FIT or H LIMIT _____ # of FLUTES _____

TYPE of TAP _____ SURFACE TREATMENT _____

MATERIAL to be THREADED _____ HARDNESS _____

BLIND or THROUGH HOLE _____ LENGTH of THREAD _____

# of HOLES to TAP _____ TAPPING EQUIPMENT USED _____

CURRENT TAP USED _____ TAPPING PROBLEM _____

Automotive Taper Length Drills

Straight Shank — High Speed Steel 118° Point — Treated (Black Oxide)

Designed for high production drilling of a wide variety of materials. Tanged shank allows for use with ASA split sleeve drivers.

List No. 1314A – Tanged Shank

STANDARD PACKAGE 1/8" thru 15/64" — 12 each
1/4" thru 3/8" — 6 each
25/64" and over — 1 each

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
1/8	.1250	2 3/4	5 1/8	10808	$6.39
9/64	.1406	3	5 3/8	10809	8.64
5/32	.1562	3	5 3/8	10810	7.90
11/64	.1719	3 3/8	5 3/4	10811	10.14
3/16	.1875	3 3/8	5 3/4	10812	7.90
13/64	.2031	3 5/8	6	10813	10.56
7/32	.2187	3 5/8	6	10814	12.34
15/64	.2344	3 3/4	6 1/8	10815	11.22
1/4	.2500	3 3/4	6 1/8	10816	8.58
17/64	.2656	3 7/8	6 1/4	10817	11.17
9/32	.2812	3 7/8	6 1/4	10818	10.61
19/64	.2969	4	6 3/8	10819	13.44
5/16	.3125	4	6 3/8	10820	10.61
21/64	.3281	4 1/8	6 1/2	10821	12.47
11/32	.3437	4 1/8	6 1/2	10822	12.00
23/64	.3594	4 1/4	6 3/4	10823	14.09
3/8	.3750	4 1/4	6 3/4	10824	14.09
25/64	.3906	4 3/8	7	10825	15.26
13/32	.4062	4 3/8	7	10826	14.87
27/64	.4219	4 5/8	7 1/4	10827	$16.15
7/16	.4375	4 5/8	7 1/4	10828	16.55
29/64	.4531	4 3/4	7 1/2	10829	18.35
15/32	.4687	4 3/4	7 1/2	10830	19.34
31/64	.4844	4 3/4	7 3/4	10831	23.72
1/2	.5000	4 3/4	7 3/4	10832	20.28
33/64	.5156	4 3/4	8	10833	26.57
17/32	.5312	4 3/4	8	10834	25.95
35/64	.5469	4 7/8	8 1/4	10835	30.26
9/16	.5625	4 7/8	8 1/4	10836	27.40
37/64	.5781	4 7/8	8 3/4	10837	36.86
19/32	.5937	4 7/8	8 3/4	10838	33.51
39/64	.6094	4 7/8	8 3/4	10839	36.00
5/8	.6250	4 7/8	8 3/4	10840	36.86
41/64	.6406	5 1/8	9	10841	41.73
21/32	.6562	5 1/8	9	10842	38.40
43/64	.6719	5 3/8	9 1/4	10843	43.76
11/16	.6875	5 3/8	9 1/4	10844	46.18

Heavy Duty Taper Length Drills

Straight Shank — High Speed Steel 118° Point — Treated (Black Oxide)

Heavy duty construction. Recommended for tough drilling applications including alloy steels, steel forgings and other medium to high tensile strength materials. Flute length 20% longer for deeper holes and more regrinds. Tanged shank allows use with ASA split sleeve drivers.

List No. 1320 – Tanged Shank

STANDARD PACKAGE 1/8" thru 15/64" — 12 each
1/4" thru 3/8" — 6 each
25/64" and over — 1 each

SIZE	SHANK DIA.	FITS DRILL DRIVER NO.	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
1/8	1/8	1	.1250	3 3/8	5 1/8	11008	$7.81
9/64	9/64	1	.1406	3 5/8	5 3/8	11009*	9.31
5/32	5/32	1	.1562	3 3/4	5 3/8	11010	8.64
11/64	11/64	1	.1719	4 1/8	5 3/4	11011*	10.60
3/16	3/16	1	.1875	4 1/8	5 3/4	11012	8.75
13/64	13/64	1	.2031	4 3/8	6	11013	11.61
7/32	7/32	1	.2188	4 3/8	6	11014	11.41
15/64	15/64	1	.2344	4 13/16	6 1/8	11015	12.06
1/4	1/4	1	.2500	4 13/16	6 1/8	11016	10.77
9/32	9/32	1	.2812	5	6 1/4	11018*	12.23
19/64	19/64	1	.2969	5 1/8	6 3/8	11019*	13.90
5/16	5/16	1	.3125	5 1/8	6 3/8	11020	11.95
21/64	21/64	2	.3281	5 1/4	6 1/2	11021*	14.00
11/32	11/32	2	.3438	5 1/4	6 1/2	11022*	13.63
23/64	23/64	2	.3594	5 3/8	6 3/4	11023*	16.15
3/8	3/8	2	.3750	5 3/8	6 3/4	11024	16.15
25/64	25/64	2	.3906	5 5/8	7	11025	19.98
13/32	13/32	2	.4062	5 5/8	7	11026	$18.16
27/64	27/64	2	.4219	5 11/16	7 1/4	11027*	20.34
7/16	7/16	2	.4375	5 11/16	7 1/4	11028	20.82
29/64	29/64	2	.4531	5 3/4	7 1/2	11029*	22.57
15/32	15/32	2	.4688	5 3/4	7 1/2	11030*	24.39
31/64	31/64	2	.4844	5 3/4	7 3/4	11031	26.19
1/2	1/2	2	.5000	5 3/4	7 3/4	11032	25.82
33/64	1/2	2	.5156	6	8	11033	36.49
17/32	1/2	2	.5312	6	8	11034	35.81
9/16	1/2	2	.5625	6 1/4	8 1/4	11036	38.58
37/64	1/2	2	.5781	6 1/2	8 3/4	11037	44.97
19/32	1/2	2	.5938	6 1/2	8 3/4	11038*	40.88
5/8	1/2	2	.6250	6 1/2	8 3/4	11040	45.66
21/32	5/8	3	.6562	6 3/4	9	11041	50.86
11/16	5/8	3	.6875	6 7/8	9 1/4	11042	54.78
3/4	3/4	3	.7500	7 3/8	9 3/4	11044	63.46

* Available While Supplies Last

Metric
Taper Length Drills

Straight Shank — High Speed Steel
118° Point — Treated (Black Oxide)

Taper length drills have approximately the same flute lengths and overall lengths as taper shank drills, for deeper hole drilling. Shanks are the same diameter as the drill body. Recommended for drilling a wide range of materials.

List No. 1317

STANDARD PACKAGE
1.6mm thru 6.5mm — 12 each
6.8mm thru 9.5mm — 6 each
9.8mm thru 20.0mm — 1 each

SIZE MM	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
1.60	.0630	2	3¾	17401*	$3.68
1.70	.0669	2	3¾	17403*	3.68
1.80	.0709	2	3¾	17405*	3.68
1.85	.0728	2	3¾	17406*	3.68
1.90	.0748	2	3¾	17407*	3.68
1.95	.0768	2	3¾	17408*	3.68
2.00	.0787	2¼	4¼	17409	4.47
2.05	.0807	2¼	4¼	17410*	4.47
2.10	.0827	2¼	4¼	17411*	4.47
2.15	.0846	2¼	4¼	17412*	4.47
2.20	.0866	2¼	4¼	17413*	4.47
2.25	.0886	2¼	4¼	17414*	4.47
2.35	.0925	2¼	4¼	17416	4.47
2.40	.0945	2½	4⅝	17417*	5.52
2.45	.0965	2½	4⅝	17418*	5.52
2.60	.1024	2½	4⅝	17420*	5.52
2.70	.1063	2½	4⅝	17421*	5.52
2.80	.1102	2¾	5⅛	17422*	5.77
3.00	.1181	2¾	5⅛	17424	5.77
3.10	.1220	2¾	5⅛	17425	5.77
3.20	.1260	3	5⅜	17426*	6.96
3.40	.1339	3	5⅜	17428*	6.96
3.60	.1417	3	5⅜	17430*	6.96
3.70	.1457	3	5⅜	17431*	6.96
3.80	.1496	3	5⅜	17432*	6.96
3.90	.1535	3	5⅜	17433*	6.96
4.00	.1575	3⅜	5¾	17434	6.96
4.10	.1614	3⅜	5¾	17435*	6.96
4.30	.1693	3⅜	5¾	17437*	6.96
4.40	.1732	3⅜	5¾	17438*	6.96
4.50	.1772	3⅜	5¾	17439	6.96
4.70	.1850	3⅜	5¾	17441*	6.96
4.80	.1890	3⅝	6	17442*	8.17
5.00	.1968	3⅝	6	17444	8.17
5.20	.2047	3⅝	6	17446*	8.17
5.40	.2126	3⅝	6	17448*	8.17
5.60	.2205	3¾	6⅛	17450*	8.17
5.90	.2323	3¾	6⅛	17453*	8.17
6.00	.2362	3¾	6⅛	17454	8.17
6.10	.2402	3¾	6⅛	17456*	$8.17
6.30	.2480	3¾	6⅛	17458*	8.17
6.50	.2559	3⅞	6¼	17460	9.94
6.80	.2677	3⅞	6¼	17461	9.95
7.00	.2756	3⅞	6¼	17462	9.95
7.20	.2835	4	6⅜	17463*	10.11
8.00	.3150	4⅛	6½	17466	11.52
8.20	.3228	4⅛	6½	17467*	11.52
8.50	.3346	4⅛	6½	17468	11.52
9.00	.3543	4¼	6¾	17470	13.62
9.20	.3622	4¼	6¾	17471*	13.62
9.80	.3858	4⅜	7	17473*	13.62
10.00	.3937	4⅜	7	17474	13.62
10.20	.4016	4⅜	7	17475	13.62
10.50	.4134	4⅝	7¼	17476	15.33
10.80	.4252	4⅝	7¼	17477*	15.63
11.00	.4331	4⅝	7¼	17478	15.70
11.20	.4409	4¾	7½	17479	17.29
12.50	.4921	4¾	7¾	17484*	19.25
12.80	.5039	4¾	8	17485*	24.71
13.20	.5197	4¾	8	17487*	24.82
13.50	.5315	4¾	8	17488*	26.05
13.80	.5433	4⅞	8¼	17489*	26.05
14.25	.5610	4⅞	8¼	17491*	26.11
14.50	.5709	4⅞	8¾	17492*	30.42
14.75	.5807	4⅞	8¾	17493*	30.46
15.00	.5906	4⅞	8¾	17494	31.52
15.50	.6102	4⅞	8¾	17496*	31.52
15.75	.6201	4⅞	8¾	17497*	31.52
16.00	.6299	5⅛	9	17498	35.92
16.25	.6398	5⅛	9	17499*	35.92
16.75	.6594	5⅜	9¼	17501*	42.14
17.00	.6693	5⅜	9¼	17502	42.14
17.25	.6791	5⅜	9¼	17503*	42.71
18.00	.7087	5⅝	9½	17505	45.05
18.50	.7283	5⅞	9¾	17506*	49.28
19.00	.7480	5⅞	9¾	17507	49.34
19.50	.7677	6	9⅞	17508*	51.46
20.00	.7874	6⅛	10	17509	56.21

*Available While Supplies Last

High Helix Taper Length Drills

Straight Shank — High Speed Steel
118° Point — Bright Finish

High Helix drills are recommended for deep hole drilling in low tensile strength materials such as aluminum, magnesium, zinc, copper, soft steels and some plastics. Wide polished flutes and a high helix angle enhance chip ejection.

List No. 1325

STANDARD PACKAGE

Fractional Sizes
1/16" thru 15/64" — 12 each
1/4" thru 3/8" — 6 each
25/64" and over — 1 each

Wire Gage Sizes
#1 thru #60 — 12 each

SIZE FRACTIONAL	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
	60	.0400	1⅛	2¼	11201	$5.99
	59	.0410	1⅛	2¼	11202	7.96
	58	.0420	1⅛	2¼	11203	6.72
	57	.0430	1⅛	2¼	11204	6.72
	56	.0465	1⅛	2¼	11205	6.11
	55	.0520	1¾	3	11206	6.11
	54	.0550	1¾	3	11207	6.11
	53	.0595	1¾	3	11208	6.11
1/16		.0625	1¾	3	11209	3.62
	52	.0635	2	3¾	11210	6.58
	51	.0670	2	3¾	11211	6.58
	50	.0700	2	3¾	11212	6.58
	49	.0730	2	3¾	11213	6.58
	48	.0760	2	3¾	11214	7.23
5/64		.0781	2	3¾	11215	4.31
	47	.0785	2¼	4¼	11216	7.38
	46	.0810	2¼	4¼	11217	7.38
	45	.0820	2¼	4¼	11218	7.38
	44	.0860	2¼	4¼	11219	7.38
	43	.0890	2¼	4¼	11220	7.38
	42	.0935	2¼	4¼	11221	7.38
3/32		.0937	2¼	4¼	11222	4.95
	41	.0960	2½	4⅝	11223	6.51
	40	.0980	2½	4⅝	11224	6.51
	39	.0995	2½	4⅝	11225	6.51
	38	.1015	2½	4⅝	11226	7.35
	37	.1040	2½	4⅝	11227	8.08
	36	.1065	2½	4⅝	11228	7.35
7/64		.1094	2½	4⅝	11229	6.74
	35	.1100	2¾	5⅛	11230	9.83
	34	.1110	2¾	5⅛	11231	9.83
	33	.1130	2¾	5⅛	11232	10.81
	32	.1160	2¾	5⅛	11233	9.83
	31	.1200	2¾	5⅛	11234	9.83
1/8		.1250	2¾	5⅛	11235	8.37
	30	.1285	3	5⅜	11236	11.21
	29	.1360	3	5⅜	11237	10.19
	28	.1405	3	5⅜	11238	10.19
9/64		.1406	3	5⅜	11239	9.02
	27	.1440	3	5⅜	11240	10.19
	26	.1470	3	5⅜	11241	10.19
	25	.1495	3	5⅜	11242	10.19
	24	.1520	3	5⅜	11243	10.19
	23	.1540	3	5⅜	11244	10.19
5/32		.1562	3	5⅜	11245	9.02

SIZE FRACTIONAL	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
	22	.1570	3⅜	5¾	11246	$11.31
	21	.1590	3⅜	5¾	11247	10.29
	20	.1610	3⅜	5¾	11248	10.29
	19	.1660	3⅜	5¾	11249	10.29
	18	.1695	3⅜	5¾	11250	11.09
11/64		.1719	3⅜	5¾	11251	10.23
	17	.1730	3⅜	5¾	11252	12.19
	16	.1770	3⅜	5¾	11253	11.09
	15	.1800	3⅜	5¾	11254	11.09
	14	.1820	3⅜	5¾	11255	12.19
	13	.1850	3⅜	5¾	11256	11.09
3/16		.1875	3⅜	5¾	11257	10.23
	12	.1890	3⅝	6	11258	12.19
	11	.1910	3⅝	6	11259	12.19
	10	.1935	3⅝	6	11260	11.10
	9	.1960	3⅝	6	11261	12.19
	8	.1990	3⅝	6	11262	12.19
	7	.2010	3⅝	6	11263	11.10
13/64		.2031	3⅝	6	11264	11.11
	6	.2040	3⅝	6	11265	12.19
	5	.2055	3⅝	6	11266	12.19
	4	.2090	3⅝	6	11267	12.19
	3	.2130	3⅝	6	11268	12.19
7/32		.2187	3⅝	6	11269	11.11
	2	.2210	3¾	6⅛	11270	11.66
	1	.2280	3¾	6⅛	11271	12.83
15/64		.2344	3¾	6⅛	11272	12.02
1/4		.2500	3¾	6⅛	11273	12.02
17/64		.2656	3⅞	6¼	11274	12.54
9/32		.2812	3⅞	6¼	11275	12.54
19/64		.2969	4	6⅜	11276	12.94
5/16		.3125	4	6⅜	11277	12.94
21/64		.3281	4⅛	6½	11278	14.24
11/32		.3437	4⅛	6½	11279	14.24
23/64		.3594	4¼	6¾	11280	15.82
3/8		.3750	4¼	6¾	11281	16.99
25/64		.3906	4⅜	7	11282	17.34
13/32		.4062	4⅜	7	11283	17.34
27/64		.4219	4⅝	7¼	11284	21.65
7/16		.4375	4⅝	7¼	11285	21.65
29/64		.4531	4¾	7½	11286	25.07
15/32		.4687	4¾	7½	11287	22.79
31/64		.4844	4¾	7¾	11288	24.52
1/2		.5000	4¾	7¾	11289	26.97

Parabolic Flute Taper Length Drills

Straight Shank — High Speed Steel
Split Point — Tanged Shank (⅛″ & Larger)

Parabolic Flute drills feature a unique flute design that greatly enhances chip flow, coolant flow to the drill point and heat dissipation in deep hole drilling greater than three diameters deep. Recommended for drilling aluminum and other low to medium tensile strength materials.

Titanium Nitride (TiN) Coating increases tool surface hardness, wear resistance, heat resistance, chip flow and resists chip welding. Enhanced hole quality at higher speeds and feeds.

List No. 1356 — Bright Finish

List No. 1356G — TiN Coated

STANDARD PACKAGE

Fractional Sizes
1/16″ thru 15/64″ — 12 each
1/4″ thru 3/8″ — 6 each
25/64″ and over —1 each

Wire Gage Sizes
#1 thru #40 — 12 each

SIZE FRACTIONAL	SIZE WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	1356 EDP NO.	1356 LIST PRICE	1356G EDP NO.	1356G LIST PRICE
1/16		.0625	1 3/4	3	13385	$5.58	93385	$6.95
5/64		.0781	2	3 3/4	13386	5.58	93386	6.95
3/32		.0938	2 1/4	4 1/4	13387	5.89	93387	7.45
	40	.0980	2 1/2	4 5/8	13461	7.85	93461	9.44
	39	.0995	2 1/2	4 5/8	13460	7.85	93460	9.44
	38	.1015	2 1/2	4 5/8	13459	8.98	93459	10.60
	37	.1040	2 1/2	4 5/8	13458	8.98	93458	10.60
	36	.1065	2 1/2	4 5/8	13457	8.98	93457	10.60
7/64		.1094	2 1/2	4 5/8	13388	7.28	93388	8.87
	35	.1100	2 3/4	5 1/8	13456	12.01	93456	15.58
	34	.1110	2 3/4	5 1/8	13455	12.01	93455	15.58
	33	.1130	2 3/4	5 1/8	13454	12.01	93454	15.58
	32	.1160	2 3/4	5 1/8	13453	12.01	93453	15.58
	31	.1200	2 3/4	5 1/8	13452	12.30	93452	15.86
1/8		.1250	3 3/8	5 1/8	13389	7.55	93389	11.04
	30	.1285	3	5 3/8	13451	12.30	93451	15.86
	29	.1360	3	5 3/8	13450	12.30	93450	15.86
	28	.1405	3	5 3/8	13449	12.30	93449	15.86
9/64		.1406	3 5/8	5 3/8	13390	10.01	93390	13.54
	27	.1440	3	5 3/8	13448	12.20	93448	15.77
	26	.1470	3	5 3/8	13447	12.20	93447	15.77
	25	.1495	3	5 3/8	13446	12.20	93446	15.77
	24	.1520	3	5 3/8	13445	12.20	93445	15.77
	23	.1540	3	5 3/8	13444	12.20	93444	15.77
5/32		.1562	3 3/4	5 3/8	13391	9.16	93391	12.67
	22	.1570	3 3/8	5 3/4	13443	12.20	93443	15.77
	21	.1590	3 3/8	5 3/4	13442	12.20	93442	15.77
	20	.1610	3 3/8	5 3/4	13441	12.20	93441	15.77
	19	.1660	3 3/8	5 3/4	13440	12.20	93440	15.77
	18	.1695	3 3/8	5 3/4	13439	12.20	93439	15.77
11/64		.1719	4 1/8	5 3/4	13392	10.69	93392	14.23
	17	.1730	3 3/8	5 3/4	13438	12.20	93438	15.77
	16	.1770	3 3/8	5 3/4	13437	12.20	93437	15.77
	15	.1800	3 3/8	5 3/4	13436	12.20	93436	15.77
	14	.1820	3 3/8	5 3/4	13435	12.20	93435	15.77
	13	.1850	3 3/8	5 3/4	13434	12.20	93434	15.77
3/16		.1875	4 1/8	5 3/4	13393	9.15	93393	12.66
	12	.1890	3 5/8	6	13433	13.46	93433	20.27
	11	.1910	3 5/8	6	13432	13.46	93432	20.27
	10	.1935	3 5/8	6	13431	13.46	93431	20.27
	9	.1960	3 5/8	6	13430	13.46	93430	20.27
	8	.1990	3 5/8	6	13429	13.46	93429	20.87
	7	.2010	3 5/8	6	13428	13.46	93428	20.87
13/64		.2031	4 3/8	6	13394	12.19	93394	19.57
	6	.2040	3 5/8	6	13427	13.46	93427	20.87

(continued)

Parabolic Flute Taper Length Drills (continued)

List No. 1356, 1356G

SIZE FRAC-TIONAL	SIZE WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	1356 EDP NO.	1356 LIST PRICE	1356G EDP NO.	1356G LIST PRICE
	5	.2055	3⅝	6	13426	$13.46	93426	$20.87
	4	.2090	3⅝	6	13425	13.46	93425	20.87
	3	.2130	3⅝	6	13424	13.46	93424	20.87
7/32		.2188	4⅜	6	13395	13.03	93395	20.71
	2	.2210	3¾	6⅛	13423	13.94	93423	26.05
	1	.2280	3¾	6⅛	13422	13.94	93422	26.05
15/64		.2344	4 13/16	6⅛	13396	13.05	93396	25.15
1/4		.2500	4 13/16	6⅛	13397	12.90	93397	25.00
17/64		.2656	5	6¼	13398	15.01	93398	27.14
9/32		.2812	5	6¼	13399	17.97	93399	35.56
19/64		.2969	5⅛	6⅜	13400	17.97	93400	35.56
5/16		.3125	5⅛	6⅜	13401	17.97	93401	35.56
21/64		.3281	5¼	6½	13402	20.37	93402	37.99
11/32		.3438	5¼	6½	13403	20.17	93403	37.79
23/64		.3594	5⅜	6¾	13404	23.88	93404	45.55
3/8		.3750	5⅜	6¾	13405	23.88	93405	45.55
25/64		.3906	5⅝	7	13406	23.88	93406	45.55
13/32		.4062	5⅝	7	13407	33.04	93407	59.42
27/64		.4219	5 11/16	7¼	13408	32.93	93408	59.32
7/16		.4375	5 11/16	7¼	13409	43.13	93409	69.68
29/64		.4531	5¾	7½	13410	43.13	93410	69.68
15/32		.4688	5¾	7½	13411	43.13	93411	69.68
31/64		.4844	5¾	7¾	13412	44.98	93412	71.57
1/2		.5000	5¾	7¾	13413	44.98	93413	71.57

Cobalt Heavy Duty Taper Length Drills

Straight Shank — Cobalt

Heavy duty construction. Cobalt steel offers increased hardness, toughness, wear resistance and heat resistance. Recommended for drilling tough, high tensile strength materials and materials that generate higher cutting temperatures including high alloy steels, ferrous castings, titanium, inconel, stainless steels and other difficult-to-drill materials.

List No. 2314 - Fractional
3/32″ thru 1/2″ — 135° Split Point
9/16″ thru 63/64″ — 118° Notched Point*

List No. 2322 - Wire Gage
#1 thru #39 — 135° Point*

STANDARD PACKAGE

Fractional Sizes
3/32″ thru 15/64″ — 12 each
1/4″ thru 3/8″ — 6 each
25/64″ thru 63/64″ — 1 each

Wire Gage Sizes*
#1 thru #39 — 12 each

SIZE FRAC-TIONAL	SIZE WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	2314, 2322 EDP NO.	2314, 2322 LIST PRICE
3/32		.0938	2¼	4¼	10764	$9.59
	39	.0995	2½	4⅝	10889*	12.65
	38	.1015	2½	4⅝	10888*	12.65
	37	.1040	2½	4⅝	10887*	12.65
	35	.1100	2¾	5⅛	10885*	13.04
	34	.1110	2¾	5⅛	10884*	13.04
1/8		.1250	2¾	5⅛	10766	10.33
	28	.1405	3	5⅜	10878*	14.03

*Available While Supplies Last

(continued)

Cobalt Heavy Duty Taper Length Drills (continued)

List No. 2314, 2322

SIZE FRACTIONAL	SIZE WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	OAL	2314, 2322 EDP NO.	2314, 2322 LIST PRICE
9/64		.1406	3	5 3/8	10767	$12.75
	27	.1440	3	5 3/8	10877*	15.83
	23	.1540	3	5 3/8	10873*	15.83
5/32		.1562	3	5 3/8	10707	13.36
	22	.1570	3 3/8	5 3/4	10872*	15.83
	20	.1610	3 3/8	5 3/4	10870*	15.83
	19	.1660	3 3/8	5 3/4	10869*	15.83
11/64		.1719	3 3/8	5 3/4	10708	15.71
	17	.1730	3 3/8	5 3/4	10867*	15.83
	15	.1800	3 3/8	5 3/4	10865*	15.83
	13	.1850	3 3/8	5 3/4	10863*	17.36
3/16		.1875	3 3/8	5 3/4	10709	13.17
	11	.1910	3 5/8	6	10861*	17.36
	9	.1960	3 5/8	6	10859*	17.36
	7	.2010	3 5/8	6	10857*	17.36
13/64		.2031	3 5/8	6	10710	17.80
	6	.2040	3 5/8	6	10856*	17.36
	5	.2055	3 5/8	6	10855*	17.36
	4	.2090	3 5/8	6	10854*	17.36
7/32		.2188	3 5/8	6	10711	18.95
	2	.2210	3 3/4	6 1/8	10852*	17.36
	1	.2280	3 3/4	6 1/8	10851*	17.36
15/64		.2344	3 3/4	6 1/8	10712	18.95
1/4		.2500	3 3/4	6 1/8	10713	15.38
17/64		.2656	3 7/8	6 1/4	10714	20.00
9/32		.2812	3 7/8	6 1/4	10715	20.00
19/64		.2969	4	6 3/8	10716	20.44
5/16		.3125	4	6 3/8	10717	20.88
21/64		.3281	4 1/8	6 1/2	10718	24.49
11/32		.3438	4 1/8	6 1/2	10719	24.49
23/64		.3594	4 1/4	6 3/4	10720	27.35
3/8		.3750	4 1/4	6 3/4	10721	26.92
25/64		.3906	4 3/8	7	10722	27.89
13/32		.4062	4 3/8	7	10723	28.57
27/64		.4219	4 5/8	7 1/4	10724	31.63
7/16		.4375	4 5/8	7 1/4	10725	34.29
29/64		.4531	4 3/4	7 1/2	10726	34.69
15/32		.4688	4 3/4	7 1/2	10727	35.60
31/64		.4844	4 3/4	7 3/4	10728	37.98
1/2		.5000	4 3/4	7 3/4	10729	36.27
9/16		.5625	4 7/8	8 1/4	10733*	47.82
53/64		.8281	6 1/8	10	10750*	108.49
57/64		.8906	6 1/8	10	10754*	119.55
29/32		.9062	6 1/8	10	10755*	119.55
61/64		.9531	6 3/8	11	10758*	142.89
31/32		.9688	6 3/8	11	10759*	142.89
63/64		.9844	6 3/8	11	10760*	148.84

*Available While Supplies Last

Carbide Tipped Taper Length Drills

118˚ Point — Straight Shank

Excellent wear resistance. Recommended for drilling cast iron, non-ferrous metals, composites, hard plastics, fiberglass and other abrasive non-ferrous materials. Tanged shank allows for use with ASA split sleeve drives.

NOT FOR USE IN STEEL

List No. 5314 – Tanged Shank

STANDARD PACKAGE All Sizes — 1 each

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
1/8	.1250	2 3/4	5 1/8	50208	$28.02
9/64	.1406	3	5 3/8	50209	28.60
5/32	.1562	3	5 3/8	50210	28.60
3/16	.1875	3 3/8	5 3/4	50212	29.58
13/64	.2031	3 5/8	6	50213	31.21
7/32	.2187	3 5/8	6	50214	31.21
15/64	.2344	3 3/4	6 1/8	50215	35.35
1/4	.2500	3 3/4	6 1/8	50216	36.48
9/32	.2812	3 7/8	6 1/4	50218	40.85
19/64	.2969	4	6 3/8	50219	42.79
5/16	.3125	4	6 3/8	50220	42.79
21/64	.3281	4 1/8	6 1/2	50221*	48.56
11/32	.3437	4 1/8	6 1/2	50222	48.56
23/64	.3594	4 1/4	6 3/4	50223	53.15
3/8	.3750	4 1/4	6 3/4	50224	53.15
13/32	.4062	4 3/8	7	50226	57.07
27/64	.4219	4 5/8	7 1/4	50227*	65.58
7/16	.4375	4 5/8	7 1/4	50228	65.58
29/64	.4531	4 3/4	7 1/2	50229*	72.46
15/32	.4687	4 3/4	7 1/2	50230	72.46
31/64	.4844	4 3/4	7 3/4	50231	75.96
1/2	.5000	4 3/4	7 3/4	50232	75.96
17/32	.5312	4 3/4	8	50234	80.09
35/64	.5469	4 7/8	8 1/4	50235*	$84.24
9/16	.5625	4 7/8	8 1/4	50236	84.24
37/64	.5781	4 7/8	8 3/4	50237	89.04
19/32	.5937	4 7/8	8 3/4	50238	89.04
39/64	.6094	4 7/8	8 3/4	50239	102.57
5/8	.6250	4 7/8	8 3/4	50240	102.57
41/64	.6406	5 1/8	9	50241	104.33
21/32	.6562	5 1/8	9	50242	104.33
43/64	.6719	5 3/8	9 1/4	50243	105.53
11/16	.6875	5 3/8	9 1/4	50244	105.53
45/64	.7031	5 5/8	9 1/2	50245*	107.38
23/32	.7187	5 5/8	9 1/2	50246	108.47
47/64	.7344	5 7/8	9 3/4	50247	109.13
3/4	.7500	5 7/8	9 3/4	50248	110.75
25/32	.7812	6	9 7/8	50250	126.27
51/64	.7969	6 1/8	10	50251*	126.82
13/16	.8125	6 1/8	10	50252	126.82
53/64	.8281	6 1/8	10	50253*	126.82
27/32	.8437	6 1/8	10	50254	126.82
55/64	.8594	6 1/8	10	50255	134.11
7/8	.8750	6 1/8	10	50256	134.11
29/32	.9062	6 1/8	10	50258*	138.80
15/16	.9375	6 1/8	10 3/4	50260	140.76
1	1.0000	6 3/8	11	50264	152.01

*** Available While Supplies Last**

Extra Long Straight Shank Drills

Straight Shank — High Speed Steel 118° Point

For general purpose drilling in applications where extra reach is required.

List No. 1315

STANDARD PACKAGE All sizes — 1 each

5½″ Flute, 8″ Overall Length

SIZE	DEC. EQUIV.	EDP NO.	LIST PRICE
1/8	.1250	10902	$13.81
9/64	.1406	10905	14.57
5/32	.1562	10909	14.57
11/64	.1719	10912	15.66
3/16	.1875	10915	15.66
13/64	.2031	10920	16.50
7/32	.2188	10923	17.32
15/64	.2344	10927	17.45
1/4	.2500	10928	17.45
17/64	.2656	10932	18.10
9/32	.2812	10935	18.15
19/64	.2969	10936	18.72
5/16	.3125	10941	19.31
21/64	.3281	10942	$19.57
11/32	.3438	10305	19.65
23/64	.3594	10306	20.48
3/8	.3750	10951	20.59
25/64	.3906	10952	22.32
13/32	.4062	10309	22.69
27/64	.4219	10310	23.94
7/16	.4375	10961	24.00
29/64	.4531	10311	27.02
15/32	.4688	10307	27.09
31/64	.4844	10967	26.86
1/2	.5000	10308	26.91

(continued)

Extra Long Straight Shank Drills (continued)

List No. 1315

7½″ Flute, 10″ Overall Length

SIZE	DEC. EQUIV.	EDP NO.	LIST PRICE
1/8	.1250	10903	$18.88
9/64	.1406	10906*	18.95
5/32	.1562	10910	20.34
3/16	.1875	10917	21.16
7/32	.2188	10925	22.40
15/64	.2344	10929	23.19
1/4	.2500	10930	23.27
17/64	.2656	10933*	22.89
9/32	.2812	10937	23.00
5/16	.3125	10943	25.30
11/32	.3438	10947	$26.70
3/8	.3750	10953	27.62
25/64	.3906	10956*	28.14
13/32	.4062	10957	28.14
7/16	.4375	10962	30.66
15/32	.4688	10966	34.38
1/2	.5000	10969	34.58

*Available While Supplies Last

9″ Flute, 12″ Overall Length

SIZE	DEC. EQUIV.	EDP NO.	LIST PRICE
1/8	.1250	10904	$21.78
5/32	.1562	10911	23.34
11/64	.1719	10914*	21.96
3/16	.1875	10918	23.88
7/32	.2188	10926	26.02
1/4	.2500	10931	27.06
9/32	.2812	10938	28.28
5/16	.3125	10944	27.89
11/32	.3438	10948	29.42
23/64	.3594	10950*	28.27
3/8	.3750	10954	28.97
13/32	.4062	10958	$35.15
7/16	.4375	10963	36.75
15/32	.4688	10983	40.80
1/2	.5000	10971	39.34
17/32	.5312	10974	50.29
9/16	.5625	10975	52.20
19/32	.5938	10977	55.52
5/8	.6250	10978	58.02
21/32	.6562	10301	61.55
11/16	.6875	10313	64.92
23/32	.7188	10302	70.38
3/4	.7500	10303	72.90

*Available While Supplies Last

14″ Flute, 18″ Overall Length

SIZE	DEC. EQUIV.	EDP NO.	LIST PRICE
1/4	.2500	10653	$46.54
9/32	.2812	10990	50.15
19/64	.2969	10655*	46.00
5/16	.3125	10945	46.00
11/32	.3438	10657	53.03
3/8	.3750	10955	50.43
13/32	.4062	10660	57.36
27/64	.4219	10661*	56.93
7/16	.4375	10964	57.80
15/32	.4688	10663	$70.78
31/64	.4844	10664*	67.89
1/2	.5000	10972	71.67
35/64	.5469	10667*	80.48
39/64	.6094	10304*	87.37
1 3/16	1.1875	10998*	229.55
1 1/4	1.2500	10899*	252.50

*Available While Supplies Last

Aircraft Extension Drills

Straight Shank — High Speed Steel
135˚ Split Point — Treated (Black Oxide)

List No. 1390 6″ Overall Length
List No. 1391 12″ Overall Length

Drilling in mild steel where extra length is required.
135˚ split point is self-centering, and reduces thrust.

Sizes #53 and smaller furnished with 135˚ Regular Point

STANDARD PACKAGE

Fractional Sizes
3/64″ thru 11/32″ — 12 each
23/64″ thru 1/2″ — 1 each

Letter Sizes
A thru V — 6 each
W thru Z — 1 each

Wire Gage Sizes
#1 thru #60 — 12 each

SIZE FRACTIONAL	SIZE WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	1390 EDP NO.	1390 LIST PRICE	1391 EDP NO.	1391 LIST PRICE
	60*	.0400	1 1/16	16673	$8.65	16789	$14.42
	59*	.0410	1 1/16	16672	8.65	16788	15.86
	58*	.0420	1 1/16	16671	8.65	16787	14.42
	57*	.0430	3/4	16670	8.65	16786	12.82
	56*	.0465	3/4	16669	7.16	16785	14.11
3/64*		.0469	3/4	16600	8.01	16700	14.49
	55*	.0520	7/8	16668	7.16	16784	14.11
	54*	.0550	7/8	16667	7.16	16783	12.82
	53*	.0595	7/8	16666	7.16	16782	14.11
1/16		.0625	7/8	16601	3.64	16701	9.85
	52	.0635	7/8	16665	3.62	16781	9.85
	51	.0670	1	16664	3.62	16780	10.84
	50	.0700	1	16663	3.62	16779	9.85
	49	.0730	1	16662	3.62	16778	10.84
	48	.0780	1	16661	3.62	16777	10.84
5/64		.0781	1	16602	3.64	16702	9.85
	47	.0785	1	16660	3.62	16776	9.85
	46	.0810	1 1/8	16659	3.62	16775	10.84
	45	.0820	1 1/8	16658	3.62	16774	9.85
	44	.0860	1 1/8	16657	3.62	16773	9.85
	43	.0890	1 1/4	16656	3.62	16772	10.84
	42	.0935	1 1/4	16655	2.86	16771	9.85
3/32		.0938	1 1/4	16603	2.86	16703	9.85
	41	.0960	1 3/8	16654	2.86	16770	9.85
	40	.0980	1 3/8	16653	2.83	16769	9.85
	39	.0995	1 3/8	16652	3.35	16768	10.30
	38	.1015	1 7/16	16651	3.23	16767	11.33
	37	.1040	1 7/16	16650	3.23	16766	11.33
	36	.1065	1 7/16	16649	3.23	16765	10.30
7/64		.1094	1 1/2	16604	3.23	16704	8.63
	35	.1100	1 1/2	16648	3.13	16764	11.33
	34	.1110	1 1/2	16647	3.13	16763	11.33
	33	.1130	1 1/2	16646	3.13	16762	10.30
	32	.1160	1 5/8	16645	3.13	16761	10.00
	31	.1200	1 5/8	16644	3.13	16760	10.00
1/8		.1250	1 5/8	16605	3.06	16705	8.63
	30	.1285	1 5/8	16643	3.13	16759	10.00
	29	.1360	1 3/4	16642	3.83	16758	10.00
	28	.1405	1 3/4	16641	3.83	16757	10.00
9/64		.1406	1 3/4	16606	3.66	16706	8.63
	27	.1440	1 7/8	16640	3.83	16756	10.00
	26	.1470	1 7/8	16639	3.83	16755	11.00
	25	.1495	1 7/8	16638	3.83	16754	10.00
	24	.1520	2	16637	3.83	16753	11.00
	23	.1540	2	16636	3.83	16752	11.00
5/32		.1562	2	16607	3.63	16707	8.63
	22	.1570	2	16635	3.83	16751	10.00
	21	.1590	2 1/8	16634	3.83	16750	10.00
	20	.1610	2 1/8	16633	3.83	16749	10.00

*Note: NOT Split Point

(continued)

Aircraft Extension Drills (continued)

List Nos. 1390 and 1391

SIZE FRACTIONAL	SIZE LETTER	WIRE GAGE	DEC. EQUIV.	FLUTE LENGTH	1390 EDP NO.	1390 LIST PRICE	1391 EDP NO.	1391 LIST PRICE
		19	.1660	2 1/8	16632	$4.24	16748	$10.92
		18	.1695	2 1/8	16631	4.24	16747	10.92
11/64			.1719	2 1/8	16608	4.01	16708	9.76
		17	.1730	2 3/16	16630	4.24	16746	10.92
		16	.1770	2 3/16	16629	4.24	16745	10.92
		15	.1800	2 3/16	16628	4.24	16744	10.92
		14	.1820	2 3/16	16627	4.24	16743	12.01
		13	.1850	2 5/16	16626	4.24	16742	10.92
3/16			.1875	2 5/16	16609	4.01	16709	9.73
		12	.1890	2 5/16	16625	4.24	16741	10.92
		11	.1910	2 5/16	16624	4.24	16740	10.92
		10	.1935	2 7/16	16623	4.57	16739	10.92
		9	.1960	2 7/16	16622	4.87	16738	10.92
		8	.1990	2 7/16	16621	4.97	16737	11.07
		7	.2010	2 7/16	16620	5.04	16736	12.19
13/64			.2031	2 7/16	16610	4.91	16710	12.42
		6	.2040	2 1/2	16619	5.04	16735	12.19
		5	.2055	2 1/2	16618	5.04	16734	12.19
		4	.2090	2 1/2	16617	5.04	16733	13.40
		3	.2130	2 1/2	16616	5.04	16732	12.19
7/32			.2187	2 1/2	16611	4.91	16711	11.20
		2	.2210	2 5/8	16615	5.65	16731	14.40
		1	.2280	2 5/8	16614	5.65	16730	13.09
	A*		.2340	2 5/8	—	—	16790	14.06
15/64			.2344	2 5/8	16612	5.34	16712	11.99
	B*		.2380	2 3/4	16675	6.87	16791	14.06
	C*		.2420	2 3/4	—	—	16792	14.06
	D*		.2460	2 3/4	—	—	16793	14.06
1/4	E		.2500	2 3/4	16613	5.34	16713	11.99
	G*		.2610	2 7/8	—	—	16795	16.72
17/64			.2656	2 7/8	16584	12.28	16714	14.29
	H*		.2660	2 7/8	16680	14.55	16796	16.72
	I*		.2720	2 7/8	16681	14.55	—	—
	J*		.2770	2 7/8	16682	14.55	16798	16.72
	K*		.2810	2 15/16	16683	14.55	16799	16.72
9/32			.2812	2 15/16	16585	12.99	16715	15.10
	L*		.2900	2 15/16	16684	16.53	16800	17.65
	M*		.2950	3 1/16	16685	16.53	16801	17.67
19/64			.2969	3 1/16	16586	14.68	16716	17.13
	N*		.3020	3 1/16	—	—	16802	19.88
5/16			.3125	3 3/16	16587	16.54	16717	19.27
	O*		.3160	3 3/16	16687	19.47	16803	20.62
	P*		.3230	3 5/16	16688	19.47	16804	20.65
21/64			.3281	3 5/16	16588	19.04	16718	20.15
	Q*		.3320	3 7/16	16689	19.62	—	—
	R*		.3390	3 7/16	—	—	16806	22.54
11/32			.3437	3 7/16	16589	17.44	16719	20.15
	S*		.3480	3 1/2	—	—	16807	23.60
	T*		.3580	3 1/2	16692	21.63	16808	23.62
23/64			.3594	3 1/2	16590	19.23	16720	22.38
	U*		.3680	3 5/8	—	—	16809	23.64
3/8			.3750	3 5/8	16591	20.31	16721	23.64
	V*		.3770	3 5/8	16694	24.14	16810	25.01
	W*		.3860	3 3/4	—	—	16811	25.02
25/64			.3906	3 3/4	16592	21.46	16722	24.95
	X*		.3970	3 3/4	16696	24.14	16812	26.48
	Y*		.4040	3 7/8	16697	24.18	16813	26.50
13/32			.4062	3 7/8	16593	23.61	16723	24.95
	Z*		.4130	3 7/8	16698	25.89	16814	27.96
27/64			.4219	3 15/16	16594	23.00	16724	26.76
7/16			.4375	4 1/16	16595	24.15	16725	28.08
29/64			.4531	4 3/16	16596	25.53	16726	29.72
15/32			.4687	4 5/16	16597	27.45	16727	31.92
31/64			.4844	4 3/8	16598	27.47	16728	31.95
1/2			.5000	4 1/2	16599	28.97	16729	33.71

*Available While Supplies Last

Coolant Hole Drills

Straight Shank — High Speed Steel
118° Notched Point — Treated (Black Oxide)
Taper Length

Heavy duty construction. Low 14° helix angle is recommended for harder materials and improved chip ejection in horizontal applications. Coolant fed to the drill point reduces friction and heat, enhances chip ejection, permits higher feed rates and extends tool life. Recommended for all production work, especially deep hole drilling, in a wide variety of materials.

List No. 1479

STANDARD PACKAGE All Sizes — 1 each

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
7/16	.4375	4 5/8	7 1/4	16305*	$281.21
15/32	.4688	4 7/8	7 1/2	16307*	284.49
1/2	.5000	5	7 3/4	16309*	287.68
17/32	.5312	5 1/4	8	16311*	306.05
9/16	.5625	5 3/8	8 1/4	16313*	314.02
19/32	.5938	5 5/8	8 1/2	16315*	325.99
5/8	.6250	5 3/4	8 3/4	16317*	334.58
21/32	.6562	5 7/8	9	16319*	334.58
11/16	.6875	6	9 1/4	16321*	343.74
23/32	.7188	6 3/16	9 1/2	16323*	352.38
3/4	.7500	6 3/8	9 3/4	16325*	368.51
25/32	.7812	6 1/2	9 7/8	16327*	412.86
51/64	.7969	6 1/8	10	16328*	301.27
13/16	.8125	6 5/8	10	16329*	387.86
27/32	.8438	6 3/4	10 1/4	16331*	423.91
7/8	.8750	7	10 1/2	16333*	423.91
29/32	.9062	7	10 5/8	16335*	$600.33
15/16	.9375	7	10 3/4	16337*	484.87
31/32	.9688	7 1/8	10 7/8	16339*	508.53
1	1.0000	7 3/16	11	16341*	526.85
1 1/32	1.0312	7 5/16	11 1/8	16342*	682.90
1 1/16	1.0625	7 3/8	11 1/4	16343*	640.03
1 3/32	1.0938	7 5/8	11 1/2	16344*	665.55
1 1/8	1.1250	7 7/8	11 3/4	16345*	643.29
1 5/32	1.1562	8	11 7/8	16346*	818.99
1 3/16	1.1875	8 1/8	12	16347*	728.34
1 7/32	1.2188	8 1/8	12 1/8	16348*	840.74
1 1/4	1.2500	8 1/2	12 1/2	16349*	846.77
1 5/16	1.3125	9 1/4	14 1/4	16350*	1022.28
1 3/8	1.3750	9 1/2	14 1/2	16351*	1122.44
1 7/16	1.4375	9 5/8	14 3/4	16352*	1173.86
1 1/2	1.5000	9 7/8	15	16353*	1200.61

*Available While Supplies Last

Core Drills

Straight Shank — High Speed Steel
118° Point — Treated (Black Oxide)
Taper Length

Used to enlarge a hole previously drilled, cored or punched. **Will not drill solid material. Original hole must be at least 60% of core drill size.**

List No. 1452 — 3 Flute

3-flute core drills offer increased chip capacity for deeper holes and holes requiring medium to large amounts of enlarging.

List No. 1456 — 4 Flute

4-flute core drills provide better surface finish in holes requiring small to medium amounts of enlarging. More flutes also permit higher feed rates.

STANDARD PACKAGE All sizes — 1 each

List No. 1452 — 3 Flute

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
1/4	.2500	3 3/4	6 1/8	16051	$31.25
9/32	.2812	3 7/8	6 1/4	16052	31.52
5/16	.3125	4	6 3/8	16053	33.59
11/32	.3438	4 1/8	6 1/2	16054	34.21
3/8	.3750	4 1/4	6 3/4	16055	36.94
13/32	.4062	4 3/8	7	16056	38.66
7/16	.4375	4 5/8	7 1/4	16057	40.53
15/32	.4688	4 3/4	7 1/2	16058	43.20
1/2	.5000	4 3/4	7 3/4	16059	48.07

List No. 1456 — 4 Flute

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
1/2	.5000	4 3/4	7 3/4	16151	$46.55
9/16	.5625	4 7/8	8 1/4	16153	51.33
5/8	.6250	4 7/8	8 3/4	16155	59.64
11/16	.6875	5 3/8	9 1/4	16157	68.31
3/4	.7500	5 7/8	9 3/4	16159	78.70
13/16	.8125	6 1/8	10	16161	98.01
7/8	.8750	6 1/8	10	16163	106.77
15/16	.9375	6 1/8	10 3/4	16165	127.07
1	1.0000	6 3/8	11	16167	132.97

Carbide Tipped Core Drills

Straight Shank — Taper Length

Used to enlarge a hole previously drilled, cored or punched in cast iron and other abrasive non-ferrous materials.

NOT FOR USE IN STEEL

Will not drill solid material. Original hole must be at least 70% of the core drill size.

List No. 5456 — 4 Flute

STANDARD PACKAGE All Sizes — 1 each

SIZE	DEC. EQUIV.	LENGTH OF CARBIDE TIP	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
1/2	.5000	3/4	4 3/8	8 1/4	53232*	$132.48
9/16	.5625	3/4	4 3/8	8 1/4	53236*	133.00
5/8	.6250	3/4	4 3/8	8 1/4	53240*	139.68
21/32	.6562	3/4	4 3/8	8 1/4	53242*	141.31
11/16	.6875	7/8	4 3/8	8 1/4	53244*	142.62
3/4	.7500	7/8	4 3/8	8 1/4	53248*	142.62
13/16	.8125	7/8	4 7/8	9 1/2	53252*	149.82
27/32	.8438	7/8	4 7/8	9 1/2	53254*	157.80
7/8	.8750	7/8	4 7/8	9 1/2	53256*	157.80
15/16	.9375	7/8	4 7/8	9 1/2	53260*	158.76
31/32	.9688	7/8	4 7/8	9 1/2	53262*	164.68
1	1.0000	7/8	4 7/8	9 1/2	53264*	167.75
1 1/32	1.0312	7/8	4 7/8	9 1/2	53302*	169.05
1 1/16	1.0625	7/8	4 7/8	9 1/2	53304*	171.47
1 3/32	1.0937	1	4 7/8	10 1/2	53306*	201.69
1 1/8	1.1250	1	4 7/8	10 1/2	53308*	211.63
1 5/32	1.1562	1	4 7/8	10 1/2	53310*	217.98
1 3/16	1.1875	1	4 7/8	10 1/2	53312*	224.41
1 1/4	1.2500	1	4 7/8	10 1/2	53316*	226.07
1 9/32	1.2812	1	4 7/8	10 1/2	53318*	242.21
1 5/16	1.3125	1	4 7/8	10 1/2	53320*	248.88
1 11/32	1.3437	1	4 7/8	10 1/2	53322*	254.11
1 3/8	1.3750	1	4 7/8	10 1/2	53324*	260.34
1 13/32	1.4062	1	4 7/8	10 1/2	53326*	266.35
1 7/16	1.4375	1	4 7/8	10 1/2	53328*	274.11
1 15/32	1.4687	1	4 7/8	10 1/2	53330*	282.18
1 1/2	1.5000	1	4 7/8	10 1/2	53332*	288.30

*** Available While Supplies Last**

Taper Shank Drills

Morse Taper Shank — High Speed Steel
118° Point — Treated (Black Oxide)
General Purpose

Recommended for production work in wide variety of materials. Black Oxide Surface Treatment increases wear resistance, reduces galling and chip welding, improves chip flow and increases drill lubricant retention. Standard series shanks furnished unless otherwise specified.

List No. 1302

STANDARD PACKAGE All sizes — 1 each

Standard Morse Taper Shank Drills

SIZE	MORSE TAPER NO.	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
1/8	1	.1250	1 7/8	5 1/8	10008	$10.97
9/64	1	.1406	2 1/8	5 3/8	10009	12.55
5/32	1	.1562	2 1/8	5 3/8	10010	11.85
11/64	1	.1719	2 1/2	5 3/4	10011	13.99
3/16	1	.1875	2 1/2	5 3/4	10012	11.33
13/64	1	.2031	2 3/4	6	10013	12.53
7/32	1	.2188	2 3/4	6	10014	12.55
15/64	1	.2344	2 7/8	6 1/8	10015	14.76
1/4	1	.2500	2 7/8	6 1/8	10016	13.13
17/64	1	.2656	3	6 1/4	10017	13.99
9/32	1	.2812	3	6 1/4	10018	14.04
19/64	1	.2969	3 1/8	6 3/8	10019	16.85
5/16	1	.3125	3 1/8	6 3/8	10020	13.50
21/64	1	.3281	3 1/4	6 1/2	10021	18.65
11/32	1	.3438	3 1/4	6 1/2	10022	19.76
23/64	1	.3594	3 1/2	6 3/4	10023	21.82
3/8	1	.3750	3 1/2	6 3/4	10024	21.79
25/64	1	.3906	3 5/8	7	10025	22.53
13/32	1	.4062	3 5/8	7	10026	21.82
27/64	1	.4219	3 7/8	7 1/4	10027	23.25
7/16	1	.4375	3 7/8	7 1/4	10028	23.57
29/64	1	.4531	4 1/8	7 1/2	10029	25.89
15/32	1	.4688	4 1/8	7 1/2	10030	27.08
31/64	2	.4844	4 3/8	8 1/4	10031	30.85
1/2	2	.5000	4 3/8	8 1/4	10032	29.35
33/64	2	.5156	4 5/8	8 1/2	10033	33.55
17/32	2	.5312	4 5/8	8 1/2	10034	33.03
35/64	2	.5469	4 7/8	8 3/4	10035	36.57
9/16	2	.5625	4 7/8	8 3/4	10036	35.84
37/64	2	.5781	4 7/8	8 3/4	10037	38.90
19/32	2	.5938	4 7/8	8 3/4	10038	38.20
39/64	2	.6094	4 7/8	8 3/4	10039	40.61
5/8	2	.6250	4 7/8	8 3/4	10040	39.17
41/64	2	.6406	5 1/8	9	10041	44.70
21/32	2	.6562	5 1/8	9	10042	43.26
43/64	2	.6719	5 3/8	9 1/4	10043	48.00
11/16	2	.6875	5 3/8	9 1/4	10044	45.48
45/64	2	.7031	5 5/8	9 1/2	10045	49.93
23/32	2	.7188	5 5/8	9 1/2	10046	48.21
47/64	2	.7344	5 7/8	9 3/4	10047	53.04
3/4	2	.7500	5 7/8	9 3/4	10048	53.07
49/64	2	.7656	6	9 7/8	10049	63.74
25/32	2	.7812	6	9 7/8	10050	63.42
51/64	3	.7969	6 1/8	10 3/4	10051	69.84
13/16	3	.8125	6 1/8	10 3/4	10052	65.62
53/64	3	.8281	6 1/8	10 3/4	10053	$72.82
27/32	3	.8438	6 1/8	10 3/4	10054	70.64
55/64	3	.8594	6 1/8	10 3/4	10055	75.34
7/8	3	.8750	6 1/8	10 3/4	10056	72.82
57/64	3	.8906	6 1/8	10 3/4	10057	77.06
29/32	3	.9062	6 1/8	10 3/4	10058	77.01
59/64	3	.9219	6 1/8	10 3/4	10059	77.98
15/16	3	.9375	6 1/8	10 3/4	10060	73.10
61/64	3	.9531	6 3/8	11	10061	80.09
31/32	3	.9688	6 3/8	11	10062	79.55
63/64	3	.9844	6 3/8	11	10063	85.03
1	3	1.0000	6 3/8	11	10064	81.68
1 1/64	3	1.0156	6 1/2	11 1/8	10065	94.06
1 1/32	3	1.0312	6 1/2	11 1/8	10066	88.97
1 3/64	3	1.0469	6 5/8	11 1/4	10067	98.82
1 1/16	3	1.0625	6 5/8	11 1/4	10068	94.04
1 5/64	4	1.0781	6 7/8	12 1/2	10069	113.99
1 3/32	4	1.0938	6 7/8	12 1/2	10070	109.86
1 7/64	4	1.1094	7 1/8	12 3/4	10071	118.52
1 1/8	4	1.1250	7 1/8	12 3/4	10072	115.33
1 9/64	4	1.1406	7 1/4	12 7/8	10073	125.63
1 5/32	4	1.1562	7 1/4	12 7/8	10074	119.49
1 11/64	4	1.1719	7 3/8	13	10075	127.05
1 3/16	4	1.1875	7 3/8	13	10076	125.63
1 13/64	4	1.2031	7 1/2	13 1/8	10077	135.94
1 7/32	4	1.2188	7 1/2	13 1/8	10078	133.88
1 15/64	4	1.2344	7 7/8	13 1/2	10079	148.29
1 1/4	4	1.2500	7 7/8	13 1/2	10080	141.37
1 17/64	4	1.2656	8 1/2	14 1/8	10081	170.93
1 9/32	4	1.2812	8 1/2	14 1/8	10082	169.50
1 19/64	4	1.2969	8 5/8	14 1/4	10083	181.98
1 5/16	4	1.3125	8 5/8	14 1/4	10084	172.22
1 21/64	4	1.3281	8 3/4	14 3/8	10085	188.16
1 11/32	4	1.3438	8 3/4	14 3/8	10086	181.96
1 23/64	4	1.3594	8 7/8	14 1/2	10087	192.22
1 3/8	4	1.3750	8 7/8	14 1/2	10088	184.69
1 25/64	4	1.3906	9	14 5/8	10089	197.68
1 13/32	4	1.4062	9	14 5/8	10090	197.76
1 27/64	4	1.4219	9 1/8	14 3/4	10091	204.58
1 7/16	4	1.4375	9 1/8	14 3/4	10092	199.69
1 29/64	4	1.4531	9 1/4	14 7/8	10093	215.10
1 15/32	4	1.4688	9 1/4	14 7/8	10094	212.94
1 31/64	4	1.4844	9 3/8	15	10095	220.75
1 1/2	4	1.5000	9 3/8	15	10096	212.31
1 17/32	5	1.5312	9 3/8	16 3/8	10097	245.40

(continued)

Standard Morse Taper Shank Drills — List No. 1302 (continued)

SIZE	MORSE TAPER NO.	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
19/16	5	1.5625	9 5/8	16 5/8	10098	$257.16
119/32	5	1.5938	9 7/8	16 7/8	10099	277.76
1 5/8	5	1.6250	10	17	10100	277.76
121/32	5	1.6562	10 1/8	17 1/8	10101	298.67
111/16	5	1.6875	10 1/8	17 1/8	10102	306.17
123/32	5	1.7188	10 1/8	17 1/8	10103	321.30
1 3/4	5	1.7500	10 1/8	17 1/8	10104	327.89
125/32	5	1.7812	10 1/8	17 1/8	10105	340.60
113/16	5	1.8125	10 1/8	17 1/8	10106	349.46
127/32	5	1.8438	10 1/8	17 1/8	10107	364.92
1 7/8	5	1.8750	10 3/8	17 3/8	10108	365.67
129/32	5	1.9062	10 3/8	17 3/8	10109	381.60
115/16	5	1.9375	10 3/8	17 3/8	10110	393.42
131/32	5	1.9688	10 3/8	17 3/8	10111	402.02
2	5	2.0000	10 3/8	17 3/8	10112	408.64
2 1/32	5	2.0312	10 3/8	17 3/8	10113	429.09
2 1/16	5	2.0625	10 1/4	17 3/8	10114	432.39
2 3/32	5	2.0938	10 1/4	17 3/8	10115*	457.46
2 1/8	5	2.1250	10 1/4	17 3/8	10116	$457.49
2 5/32	5	2.1562	10 1/4	17 3/8	10117	487.08
2 3/16	5	2.1875	10 1/4	17 3/8	10118	496.39
2 7/32	5	2.2188	10 1/8	17 3/8	10119	514.34
2 1/4	5	2.2500	10 1/8	17 3/8	10120	518.28
2 5/16	5	2.3125	10 1/8	17 3/8	10121	559.00
2 3/8	5	2.3750	10 1/8	17 3/8	10122	574.93
2 7/16	5	2.4375	11 1/4	18 3/4	10123	726.12
2 1/2	5	2.5000	11 1/4	18 3/4	10124	749.66
2 9/16	5	2.5625	11 7/8	19 1/2	10125	818.51
2 5/8	5	2.6250	11 7/8	19 1/2	10126	878.01
211/16	5	2.6875	12 3/4	20 3/8	10127	940.85
2 3/4	5	2.7500	12 3/4	20 3/8	10128	976.99
213/16	5	2.8125	13 3/8	21 1/8	10129*	1062.76
2 7/8	5	2.8750	13 3/8	21 1/8	10130	1122.23
215/16	5	2.9375	14	21 3/4	10131*	1181.71
3	5	3.0000	14	21 3/4	10132	1234.40

* Available While Supplies Last

Alternate Morse Taper Shank Drills — List No. 1302

SIZE	MORSE TAPER NO.	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
3/8	2	.3750	3 1/2	7 3/8	10201	$28.32
13/32	2	.4062	3 5/8	7 1/2	10203	30.02
27/64	2	.4219	3 7/8	7 3/4	10204	29.47
7/16	2	.4375	3 7/8	7 3/4	10205	31.18
15/32	2	.4688	4 1/8	8	10207*	33.71
31/64	1	.4844	4 3/8	7 3/4	10208*	33.71
1/2	1	.5000	4 3/8	7 3/4	10209	32.05
33/64	1	.5156	4 5/8	8	10210	36.99
17/32	1	.5312	4 5/8	8	10211	36.99
35/64	1	.5469	4 7/8	8 1/4	10212	39.46
9/16	1	.5625	4 7/8	8 1/4	10213	40.39
41/64	3	.6406	5 1/8	9 3/4	10214	56.15
21/32	3	.6562	5 1/8	9 3/4	10215	56.96
43/64	3	.6719	5 3/8	10	10216*	60.31
11/16	3	.6875	5 3/8	10	10217	62.43
45/64	3	.7031	5 5/8	10 1/4	10218*	65.29
23/32	3	.7188	5 5/8	10 1/4	10219	66.96
3/4	3	.7500	5 7/8	10 1/2	10221	71.46
25/32	3	.7812	6	10 5/8	10223	78.60
51/64	2	.7969	6 1/8	10	10224	72.32
13/16	2	.8125	6 1/8	10	10225	71.97
27/32	2	.8438	6 1/8	10	10227	76.95
55/64	2	.8594	6 1/8	10	10228	80.23
7/8	2	.8750	6 1/8	10	10229	79.09
1	4	1.0000	6 3/8	12	10232	113.49
1 1/16	4	1.0625	6 5/8	12 1/4	10234	132.26
1 5/64	3	1.0781	6 7/8	11 1/2	10235	128.11
1 3/32	3	1.0938	6 7/8	11 1/2	10236	122.06
1 7/64	3	1.1094	7 1/8	11 3/4	10237	129.92
1 1/8	3	1.1250	7 1/8	11 3/4	10238	126.80
1 9/64	3	1.1406	7 1/4	11 7/8	10239	$138.14
1 5/32	3	1.1562	7 1/4	11 7/8	10240	138.18
111/64	3	1.1719	7 3/8	12	10241	142.60
1 3/16	3	1.1875	7 3/8	12	10242	141.03
113/64	3	1.2031	7 1/2	12 1/8	10243	153.06
1 7/32	3	1.2188	7 1/2	12 1/8	10244	151.36
115/64	3	1.2344	7 7/8	12 1/2	10245	166.85
1 1/4	3	1.2500	7 7/8	12 1/2	10246	166.16
133/64	4	1.5156	9 3/8	15	10247	268.74
135/64	4	1.5469	9 5/8	15 1/4	10249	285.94
1 9/16	4	1.5625	9 5/8	15 1/4	10250	284.32
137/64	4	1.5781	9 7/8	15 1/2	10251	278.26
119/32	4	1.5938	9 7/8	15 1/2	10252	303.86
139/64	4	1.6094	10	15 5/8	10253	315.58
1 5/8	4	1.6250	10	15 5/8	10254	310.90
141/64	4	1.6406	10 1/8	15 3/4	10255	340.17
121/32	4	1.6562	10 1/8	15 3/4	10256	338.73
143/64	4	1.6719	10 1/8	15 3/4	10257	353.10
111/16	4	1.6875	10 1/8	15 3/4	10258	348.40
145/64	4	1.7031	10 1/8	15 3/4	10259	363.67
123/32	4	1.7188	10 1/8	15 3/4	10260	346.66
147/64	4	1.7344	10 3/8	16 1/4	10261	360.63
1 3/4	4	1.7500	10 3/8	16 1/4	10262	351.21
125/32	4	1.7812	10 3/8	16 1/4	10263	372.27
127/32	4	1.8438	10 3/8	16 1/4	10265	386.52
1 7/8	4	1.8750	10 1/2	16 1/2	10266	402.52
129/32	4	1.9062	10 1/2	16 1/2	10267	415.42
115/16	4	1.9375	10 5/8	16 5/8	10268	421.38
131/32	4	1.9688	10 5/8	16 5/8	10269	434.48
2	4	2.0000	10 5/8	16 5/8	10270	439.70

*Available While Supplies Last

Cobalt Heavy Duty Taper Shank Drills

Morse Taper Shank – Cobalt 135° Notched Point

List No. 2302

STANDARD PACKAGE All sizes — 1 each

Heavy duty construction. 135° notched point for reduced thrust. Cobalt steel offers increased hardness, toughness, wear resistance and heat resistance. Recommended for drilling tough, high tensile strength materials and materials that generate higher cutting temperatures including high alloy steels, ferrous castings, titanium, inconel, stainless steels and other difficult-to-drill materials.

SIZE	MORSE TAPER NO.	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
1/4	1	.2500	2 7/8	6 1/8	17001	$27.96
9/32	1	.2812	3	6 1/4	17002	30.00
5/16	1	.3125	3 1/8	6 3/8	17003	30.00
11/32	1	.3438	3 1/4	6 1/2	17004	35.10
3/8	2	.3750	3 1/2	7 3/8	17005	41.84
13/32	2	.4062	3 5/8	7 1/2	17006	42.86
7/16	2	.4375	3 7/8	7 3/4	17007	45.92
15/32	2	.4688	4 1/8	8	17008	49.39
1/2	2	.5000	4 3/8	8 1/4	17009	51.02
17/32	2	.5312	4 5/8	8 1/2	17010	59.18
9/16	2	.5625	4 7/8	8 3/4	17011	61.63
19/32	2	.5938	4 7/8	8 3/4	17012	65.31
5/8	2	.6250	4 7/8	8 3/4	17013	69.39
21/32	3	.6562	5 1/8	9 3/4	17014	79.59
11/16	3	.6875	5 3/8	10	17015	84.08
23/32	3	.7188	5 5/8	10 1/4	17016	$91.43
3/4	3	.7500	5 7/8	10 1/2	17017	97.35
25/32	3	.7812	6	10 5/8	17018	102.65
13/16	3	.8125	6 1/8	10 3/4	17019	106.12
7/8	3	.8750	6 1/8	10 3/4	17020	122.45
15/16	3	.9375	6 1/8	10 3/4	17021	142.86
1	3	1.0000	6 3/8	11	17022	161.22
1 1/16	4	1.0625	6 5/8	12 1/4	17023	210.20
1 1/8	4	1.1250	7 1/8	12 3/4	17024	230.61
1 3/16	4	1.1875	7 3/8	13	17025	257.14
1 1/4	4	1.2500	7 7/8	13 1/2	17026	289.80
1 7/16	4	1.4375	9 1/8	14 3/4	17029*	291.12

*Available While Supplies Last

Carbide Tipped Taper Shank Drills

Morse Taper Shank – 118° Point

List No. 5302

STANDARD PACKAGE All sizes — 1 each

Excellent wear resistance. Recommended for drilling cast iron, non-ferrous metals, composities, hard plastics, fiberglass and other abrasive non-ferrous materials.

NOT FOR USE IN STEEL.

SIZE	MORSE TAPER NO.	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
1/4	1	.2500	2 7/8	6 1/8	50109*	$45.32
17/64	1	.2656	3	6 1/4	50110*	46.29
9/32	1	.2812	3	6 1/4	50111*	46.29
19/64	1	.2969	3 1/8	6 3/8	50112*	46.29
5/16	1	.3125	3 1/8	6 3/8	50113	46.29
21/64	1	.3281	3 1/4	6 1/2	50114	58.86
11/32	1	.3438	3 1/4	6 1/2	50115	58.86
23/64	1	.3594	3 1/2	6 3/4	50116*	58.86
3/8	1	.3750	3 1/2	6 3/4	50117	58.86
25/64	1	.3906	3 5/8	7	50118*	68.26
13/32	1	.4062	3 5/8	7	50119	68.26
27/64	1	.4219	3 7/8	7 1/4	50120	68.26
7/16	1	.4375	3 7/8	7 1/4	50121	68.26
29/64	1	.4531	4 1/8	7 1/2	50122*	82.88
15/32	1	.4688	4 1/8	7 1/2	50123*	82.88
1/2	2	.5000	4 3/8	8 1/4	50125	82.88
33/64	2	.5156	4 5/8	8 1/2	50126	85.18
17/32	2	.5312	4 5/8	8 1/2	50127	$85.18
35/64	2	.5469	4 7/8	8 3/4	50128*	86.36
9/16	2	.5625	4 7/8	8 3/4	50129	86.36
37/64	2	.5781	4 7/8	8 3/4	50130	90.41
19/32	2	.5938	4 7/8	8 3/4	50131	90.41
39/64	2	.6094	4 7/8	8 3/4	50132*	104.74
5/8	2	.6250	4 7/8	8 3/4	50133	104.74
41/64	2	.6406	5 1/8	9	50134*	106.47
21/32	2	.6562	5 1/8	9	50135	106.47
43/64	2	.6719	5 3/8	9 1/4	50136*	107.68
11/16	2	.6875	5 3/8	9 1/4	50137	107.68
45/64	2	.7031	5 5/8	9 1/2	50138*	110.63
23/32	2	.7188	5 5/8	9 1/2	50139	110.63
3/4	2	.7500	5 7/8	9 3/4	50141	112.81
49/64	2	.7656	6	9 7/8	50142*	120.03
25/32	2	.7812	6	9 7/8	50143	120.03

*Available While Supplies Last

(continued)

Carbide Tipped Taper Shank Drills (continued)

List No. 5302

SIZE	MORSE TAPER NO.	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
51/64	3	.7969	6 1/8	10 3/4	50144*	$121.22
13/16	3	.8125	6 1/8	10 3/4	50145	121.22
53/64	3	.8281	6 1/8	10 3/4	50146*	121.33
27/32	3	.8438	6 1/8	10 3/4	50147	121.33
55/64	3	.8594	6 1/8	10 3/4	50148*	128.11
7/8	3	.8750	6 1/8	10 3/4	50149	128.11
29/32	3	.9062	6 1/8	10 3/4	50151	132.35
15/16	3	.9375	6 1/8	10 3/4	50153	$134.76
61/64	3	.9531	6 3/8	11	50154*	141.31
31/32	3	.9688	6 3/8	11	50155	141.31
63/64	3	.9844	6 3/8	11	50156*	145.03
1	3	1.0000	6 3/8	11	50157	145.03
1 1/16	3	1.0625	6 5/8	11 1/4	50159	188.94
1 1/8	4	1.1250	7 1/8	12 3/4	50161	231.28
1 3/16	4	1.1875	7 3/8	13	50163*	239.69
1 1/4	4	1.2500	7 7/8	13 1/2	50165	256.84

* Available While Supplies Last

Nu-Clear Chipbreaker Taper Shank Drills

Morse Taper Shank — High Speed Steel 118° Point — Treated (Black Oxide)

Designed to eliminate the hazards and production restrictions caused by stringy chips by curling and breaking up the chips in most materials. Modified flute geometry does not require web thinning, when re-sharpening, for the entire functional flute life of the drill.

List No. 1309

STANDARD PACKAGE All sizes — 1 each

SIZE	MORSE TAPER NO.	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
1/2	2	.5000	4 3/8	8 1/4	10432*	$37.28
33/64	2	.5156	4 5/8	8 1/2	10433*	41.52
17/32	2	.5312	4 5/8	8 1/2	10434*	42.43
35/64	2	.5469	4 7/8	8 3/4	10435*	44.17
9/16	2	.5625	4 7/8	8 3/4	10436*	45.11
19/32	2	.5938	4 7/8	8 3/4	10438*	47.36
5/8	2	.6250	4 7/8	8 3/4	10440*	51.02
41/64	2	.6406	5 1/8	9	10441*	55.07
21/32	2	.6562	5 1/8	9	10442*	55.93
43/64	2	.6719	5 3/8	9 1/4	10443*	60.58
11/16	2	.6875	5 3/8	9 1/4	10444*	61.42
23/32	2	.7188	5 5/8	9 1/2	10446*	66.07
47/64	2	.7344	5 7/8	9 3/4	10447*	70.15
3/4	2	.7500	5 7/8	9 3/4	10448*	71.48
25/32	2	.7812	6	9 7/8	10449*	77.50
13/16	3	.8125	6 1/8	10 3/4	10450*	84.34
27/32	3	.8438	6 1/8	10 3/4	10451*	88.77
7/8	3	.8750	6 1/8	10 3/4	10452*	91.13
29/32	3	.9062	6 1/8	10 3/4	10453*	$94.77
15/16	3	.9375	6 1/8	10 3/4	10454*	99.36
31/32	3	.9688	6 3/8	11	10455*	107.45
1	3	1.0000	6 3/8	11	10456*	112.87
1 1/16	3	1.0625	6 5/8	11 1/4	10457*	133.92
1 1/8	4	1.1250	7 1/8	12 3/4	10458*	156.66
1 1/4	4	1.2500	7 7/8	13 1/2	10460*	198.50
1 5/16	4	1.3125	8 5/8	14 1/4	10461*	241.49
1 3/8	4	1.3750	8 7/8	14 1/2	10462*	255.94
1 7/16	4	1.4375	9 1/8	14 3/4	10463*	271.41
1 1/2	4	1.5000	9 3/8	15	10464*	288.75
1 9/16	5	1.5625	9 5/8	16 5/8	10465*	423.64
1 5/8	5	1.6250	10	17	10466*	389.92
2	5	2.0000	10 3/8	17 3/8	10472*	519.57

* Available While Supplies Last

Coolant Hole Drills Taper Shank

Morse Taper Shank — High Speed Steel
118° Notched Point — Treated (Black Oxide)

Heavy duty construction. Coolant fed to the drill point reduces friction and heat, enhances chip ejection, permits higher feed rates and extends tool life. Recommended for all production work, especially deep hole drilling, in a wide variety of materials.

List No. 1480

STANDARD PACKAGE All sizes — 1 each

SIZE	MORSE TAPER NO.	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
1/2	3	.5000	4 3/8	9	16361*	$673.54
17/32	3	.5312	4 5/8	9 1/4	16362*	454.52
9/16	3	.5625	4 7/8	9 1/2	16363*	413.20
19/32	3	.5938	4 7/8	9 1/2	16364*	406.04
5/8	3	.6250	4 7/8	9 1/2	16365*	406.04
21/32	3	.6562	5 1/8	9 3/4	16366*	412.84
11/16	3	.6875	5 3/8	10	16367*	375.31
23/32	3	.7188	5 5/8	10 1/4	16368*	413.58
3/4	3	.7500	5 7/8	10 1/2	16369*	423.48
25/32	3	.7812	6	10 5/8	16370*	444.55
13/16	3	.8125	6 1/8	10 3/4	16371*	389.51
27/32	3	.8438	6 1/8	10 3/4	16372*	486.48
7/8	3	.8750	6 1/8	10 3/4	16373*	455.23
29/32	3	.9062	6 1/8	10 3/4	16374*	465.26
15/16	3	.9375	6 1/8	10 3/4	16375*	427.65
31/32	3	.9688	6 3/8	11	16376*	534.50
1	3	1.0000	6 3/8	11	16377*	535.74
1 1/32	3	1.0312	6 1/2	11 1/8	16378*	$572.96
1 1/16	3	1.0625	6 5/8	11 1/4	16379*	531.78
1 3/32	4	1.0938	6 7/8	12 1/2	16380*	864.01
1 1/8	4	1.1250	7 1/8	12 3/4	16381*	871.46
1 5/32	4	1.1562	7 1/4	12 7/8	16382*	888.75
1 3/16	4	1.1875	7 3/8	13	16383*	833.36
1 7/32	4	1.2188	7 1/2	13 1/8	16384*	948.27
1 1/4	4	1.2500	7 7/8	13 1/2	16385*	951.47
1 9/32	4	1.2812	8 1/2	14 1/8	16386*	1169.58
1 5/16	4	1.3125	8 5/8	14 1/4	16387*	1044.42
1 11/32	4	1.3438	8 3/4	14 3/8	16388*	1335.54
1 3/8	4	1.3750	8 7/8	14 1/2	16389*	1047.21
1 13/32	4	1.4062	9	14 5/8	16390*	1186.98
1 7/16	4	1.4375	9 1/8	14 3/4	16391*	1301.31
1 15/32	4	1.4688	9 1/4	14 7/8	16392*	1331.39
1 1/2	4	1.5000	9 3/8	15	16393*	1353.44

* Available While Supplies Last

Core Drills Taper Shank

Morse Taper Shank — High Speed Steel
118° Point — Treated (Black Oxide)

Used to enlarge a hole previously drilled, cored, or punched. Will not drill solid material. Original hole must be at least 60% of the core drill size.

List No. 1454 — 4 Flute

STANDARD PACKAGE All sizes — 1 each

SIZE	MORSE TAPER NO.	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
1/2	2	.5000	4 3/8	8 1/4	16076	$44.97
17/32	2	.5312	4 5/8	8 1/2	16077	47.23
9/16	2	.5625	4 7/8	8 3/4	16078	50.83
19/32	2	.5938	4 7/8	8 3/4	16079	55.72
5/8	2	.6250	4 7/8	8 3/4	16080	59.01
21/32	2	.6562	5 1/8	9	16081	63.14
11/16	2	.6875	5 3/8	9 1/4	16082	67.56
23/32	2	.7188	5 5/8	9 1/2	16083	72.96
3/4	2	.7500	5 7/8	9 3/4	16084	77.91
25/32	2	.7812	6	9 7/8	16085	83.72
13/16	3	.8125	6 1/8	10 3/4	16086	95.05
27/32	3	.8438	6 1/8	10 3/4	16087	99.38
7/8	3	.8750	6 1/8	10 3/4	16088	103.67
29/32	3	.9062	6 1/8	10 3/4	16089	108.65
15/16	3	.9375	6 1/8	10 3/4	16090	112.22
31/32	3	.9688	6 3/8	11	16091	125.78
1	3	1.0000	6 3/8	11	16092	129.02
1 1/32	3	1.0312	6 1/2	11 1/8	16093	141.50
1 1/16	3	1.0625	6 5/8	11 1/4	16094	147.16
1 3/32	4	1.0938	6 7/8	12 1/2	16095	181.55
1 1/8	4	1.1250	7 1/8	12 3/4	16096	175.15
1 5/32	4	1.1562	7 1/4	12 7/8	16097	181.64
1 3/16	4	1.1875	7 3/8	13	16098	189.95
1 7/32	4	1.2188	7 1/2	13 1/8	16099	213.57
1 1/4	4	1.2500	7 7/8	13 1/2	16100	$212.40
1 9/32	4	1.2812	8 1/2	14 1/8	16101	244.72
1 5/16	4	1.3125	8 5/8	14 1/4	16102	279.52
1 11/32	4	1.3438	8 3/4	14 3/8	16103	263.66
1 3/8	4	1.3750	8 7/8	14 1/2	16104	270.46
1 13/32	4	1.4062	9	14 5/8	16105	304.91
1 7/16	4	1.4375	9 1/8	14 3/4	16106	296.63
1 15/32	4	1.4688	9 1/4	14 7/8	16107	335.46
1 1/2	4	1.5000	9 3/8	15	16108	314.22
1 17/32	5	1.5312	9 3/8	16 3/8	16109	359.93
1 9/16	5	1.5625	9 5/8	16 5/8	16110	376.16
1 19/32	5	1.5938	9 7/8	16 7/8	16111	403.11
1 5/8	5	1.6250	10	17	16112	415.99
1 21/32	5	1.6562	10 1/8	17 1/8	16113	475.35
1 11/16	5	1.6875	10 1/8	17 1/8	16114	448.31
1 23/32	5	1.7188	10 1/8	17 1/8	16115	491.92
1 3/4	5	1.7500	10 1/8	17 1/8	16116	476.64
1 13/16	5	1.8125	10 1/8	17 1/8	16117	562.08
1 7/8	5	1.8750	10 3/8	17 3/8	16118	611.02
1 15/16	5	1.9375	10 3/8	17 3/8	16119	651.05
2	5	2.0000	10 3/8	17 3/8	16120	628.19
2 1/4	5	2.2500	10 1/4	17 3/8	16122*	775.63
2 3/8	5	2.3750	10 1/4	17 3/8	16123*	871.75

* Available While Supplies Last

Carbide Tipped Core Drills Taper Shank

Morse Taper Shank

Used to enlarge a hole previously drilled, cored or punched in cast iron and other abrasive non-ferrous materials.

NOT FOR USE IN STEEL

List No. 5454 — 4 Flute

Will not drill solid material. Original hole must be at least 70% of the core drill size.

STANDARD PACKAGE All sizes — 1 each

SIZE	MORSE TAPER NO.	DEC. EQUIV.	LENGTH OF CARBIDE TIP	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
½	2	.5000	¾	4⅜	8¼	53032*	$132.48
17/32	2	.5312	¾	4⅜	8¼	53034*	133.00
9/16	2	.5625	¾	4⅜	8¼	53036*	133.00
19/32	2	.5938	¾	4⅜	8¼	53038*	139.66
⅝	2	.6250	¾	4⅜	8¼	53040*	139.66
21/32	2	.6562	¾	4⅜	8¼	53042*	141.31
11/16	2	.6875	⅞	4⅜	8¼	53044*	142.62
¾	2	.7500	⅞	4⅜	8¼	53048*	142.62
25/32	2	.7812	⅞	4⅜	8¼	53050*	145.68
13/16	3	.8125	⅞	4⅞	9½	53052*	149.82
⅞	3	.8750	⅞	4⅞	9½	53056*	157.80
29/32	3	.9062	⅞	4⅞	9½	53058*	158.78
15/16	3	.9375	⅞	4⅞	9½	53060*	158.78
31/32	3	.9688	⅞	4⅞	9½	53062*	163.46
1	3	1.0000	⅞	4⅞	9½	53064*	167.75
1 1/32	3	1.0312	⅞	4⅞	9½	53102*	169.05
1 1/16	3	1.0625	⅞	4⅞	9½	53104*	171.47
1 3/32	4	1.0938	1	4⅞	10½	53106*	201.69
1⅛	4	1.1250	1	4⅞	10½	53108*	211.63
1 5/32	4	1.1562	1	4⅞	10½	53110*	217.98
1 3/16	4	1.1875	1	4⅞	10½	53112*	224.41
1 7/32	4	1.2188	1	4⅞	10½	53114*	225.18
1¼	4	1.2500	1	4⅞	10½	53116*	226.07
1 9/32	4	1.2812	1	4⅞	10½	53118*	242.21
1 5/16	4	1.3125	1	4⅞	10½	53120*	248.88
1 11/32	4	1.3438	1	4⅞	10½	53122*	254.11
1⅜	4	1.3750	1	4⅞	10½	53124*	260.34
1 13/32	4	1.4062	1	4⅞	10½	53126*	266.35
1 7/16	4	1.4375	1	4⅞	10½	53128*	274.11
1 15/32	4	1.4688	1	4⅞	10½	53130*	282.18
1½	4	1.5000	1	4⅞	10½	53132*	288.30

*** Available While Supplies Last**

CUTTING FLUIDS SELECTION

Coolants and lubricants offer many benefits including reduced friction and heat, enhanced chip removal, improved accuracy and surface finish, higher speeds and feeds, corrosion protection and increased tool life.

Proper selection and application of cutting fluids is critical to optimizing machining applications. **Please consult your cutting fluids supplier for advice on your specific machining application.**

Carbide Tipped Drills For Hardened Steel

For drilling hardened steel of 35 to 65 Rockwell C hardness without the need to anneal the workpiece

* Sizes 3/32 thru 13/64 are solid carbide full length. All remaining sizes are carbide tipped.

List No. 5420

120° Spade Type Point features short heavy constuction for increased rigidity in tougher shallow hole applications up to 2 diameters deep. Drill body diameter is smaller than tip diameter to prevent galling.

List No. 5423

118° Point with two straight flutes. Drill body diameter is smaller than tip diameter to prevent galling.

STANDARD PACKAGE All sizes — 1 each

List No. 5420

SIZE	DEC. EQUIV.	OAL	EDP NO.	LIST PRICE
3/32	.0938	2	52006	$25.84
7/64	.1094	2	52007	26.31
1/8	.1250	2	52008	26.31
9/64	.1406	2	52009	28.58
5/32	.1562	2	52010	32.87
11/64	.1719	3	52011	34.99
3/16	.1875	3	52012	41.52
13/64	.2031	3	52013	46.68
7/32	.2188	3½	52014	47.21
15/64	.2344	3½	52015	47.99
1/4	.2500	4	52016	49.30
17/64	.2656	4	52017	50.03
9/32	.2812	4	52018	51.62
19/64	.2969	4	52019	52.58
5/16	.3125	4	52020	53.89
21/64	.3281	4	52021	56.50
11/32	.3438	4	52022	58.51
23/64	.3594	4	52023	60.30
3/8	.3750	4	52024	62.28
25/64	.3906	4	52025	63.85
13/32	.4062	4	52026	72.44
27/64	.4219	4	52027	75.14
7/16	.4375	4½	52028	84.35
29/64	.4531	4½	52029*	87.85
15/32	.4688	4½	52030	91.92
31/64	.4844	4½	52031*	100.83
1/2	.5000	5	52032	108.96

* Available While Supplies Last

List No. 5423

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	SHANK DIA.	EDP NO.	LIST PRICE
3/16	.1875	1½	3½	11/64	52112	$43.31
7/32	.2188	1¾	3¾	13/64	52114	44.63
1/4	.2500	2	4	7/32	52116	46.15
9/32	.2812	2¼	4¼	1/4	52118	48.76
5/16	.3125	2½	4½	17/64	52120	51.05
11/32	.3438	2¾	4¾	19/64	52122	54.34
3/8	.3750	3	5	21/64	52124	58.49
13/32	.4062	3	5¼	23/64	52126	68.40
7/16	.4375	3	5½	25/64	52128	79.42
15/32	.4688	3¼	5¾	27/64	52130	87.18
1/2	.5000	3½	6	29/64	52132	102.34
17/32	.5312	3½	6	1/2	52134	117.33
9/16	.5625	3½	6	17/32	52136	121.33
19/32	.5938	4	7	9/16	52138	128.42
5/8	.6250	4	7	19/32	52140	132.33
21/32	.6562	4½	7½	5/8	52142	139.34
11/16	.6875	4½	7½	21/32	52144	143.25
23/32	.7188	4¾	8	11/16	52146*	150.45
3/4	.7500	4¾	8	23/32	52148	154.37

* Available While Supplies Last

Carbide Tipped Glass and Tile Drills

Excellent wear resistance for drilling glass, tile, procelain, ceramic and other hard fragile materials without chipping or cracking the material. Extra long carbide tip for many regrinds.

List No. 5467 — Spear Point

STANDARD PACKAGE All sizes — 1 each

SIZE	DEC. EQUIV.	OAL	SHANK DIA.	EDP NO.	LIST PRICE
1/8	.1250	2½	7/64	53551	$31.57
3/16	.1875	2½	5/32	53552	31.57
1/4	.2500	2½	7/32	53553	36.45
5/16	.3125	3	1/4	53554	46.85
3/8	.3750	3½	5/16	53555	52.19

SIZE	DEC. EQUIV.	OAL	SHANK DIA.	EDP NO.	LIST PRICE
7/16	.4375	3½	3/8	53556	$59.09
1/2	.5000	3½	7/16	53557	64.43
9/16	.5625	4	1/2	53558	90.44
5/8	.6250	4	9/16	53559	109.17

Carbide Tipped Masonry Drills

For drilling in brick, stone, concrete, slate, plaster and other masonry materials.

Regular Helix features wide flutes for fast dust removal especially in softer materials.

High Helix provides exceptional strength to minimize chipping of the carbide tip. Recommended for drilling in hard concrete aggregates and hard masonry products.

List No. 5463 Regular Helix

List No. 5464 High Helix

STANDARD PACKAGE All sizes — 1 each

SIZE	DEC. EQUIV.	OAL	SHANK DIA.	5463 EDP NO.	5463 LIST PRICE	5464 EDP NO.	5464 LIST PRICE
1/8	.1250	3	1/8	53401	$4.91	53451	$4.91
3/16	.1875	3	3/16	53402	5.00	53452	5.00
1/4	.2500	4	1/4	53403	5.00	53453	5.00
1/4	.2500	6	1/4	53404	5.19	53454	5.19
5/16	.3125	4	1/4	53405	5.10	53455	5.10
5/16	.3125	6	1/4	53406	6.13	53456	6.13
3/8	.3750	4	1/4	53407	6.07	53457	6.07
3/8	.3750	6	1/4	53408	6.52	53458	6.52
7/16	.4375	4	1/4	—	—	53459	7.66
7/16	.4375	6	1/4	—	—	53460	8.07
1/2	.5000	4	1/4	—	—	53462	8.88
1/2	.5000	6	1/4	53410	9.35	53463	9.35
1/2	.5000	6	3/8	53411	9.52	53464	9.52
9/16	.5625	6	3/8	53412	11.23	53465	11.23
5/8	.6250	6	1/2	53413	13.04	53466	13.04
11/16	.6875	6	1/2	53414	18.28	53467	18.28
3/4	.7500	6	1/2	53415	18.28	53468	18.28
7/8	.8750	6	1/2	53416	27.03	53469	27.03
1	1.000	6	1/2	53417	31.92	53470	31.92

Carbide Tipped Extra Length Masonry Drills

List No. 5466 High Helix

STANDARD PACKAGE All sizes — 1 each

SIZE	DEC. EQUIV.	SHANK DIA.	OVERALL LENGTH 13″ FLUTE LENGTH 8″ EDP NO.	LIST PRICE	OVERALL LENGTH 18″ FLUTE LENGTH 14″ EDP NO.	LIST PRICE
1/4	.2500	1/4	53501	$20.29	53521	$27.16
5/16	.3125	1/4	53502	23.13	53522	31.53
3/8	.3750	1/4	53503	25.43	53523	33.39
7/16	.4375	1/4	53504	27.94	53524	36.44
1/2	.5000	3/8	53505	31.87	53525	37.41
9/16	.5625	3/8	—	—	53526*	40.80
5/8	.6250	1/2	53507	40.80	53527	45.82
11/16	.6875	1/2	—	—	53528*	49.64
3/4	.7500	1/2	53509	46.81	53529	52.80
7/8	.8750	1/2	53510	57.82	53530	66.01
1	1.0000	1/2	53511	64.05	53531	72.22

* Available While Supplies Last

Double End Body Drills

High Speed Steel
135° Split Point — Treated (Black Oxide)

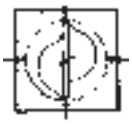
Designed for drilling auto and truck bodies and other thin sheet metal applications. 135° Self-centering split point eliminates "walking" of the drill point and reduces thrust for faster penetration.

List No. 1400

STANDARD PACKAGE All sizes — 12 each

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
7/64	.1094	9/16	1 7/8	15010	$2.17
1/8	.1250	9/16	1 7/8	15011	2.27
9/64	.1406	9/16	1 15/16	15012	2.59
5/32	.1562	9/16	2 1/16	15013	2.67
3/16	.1897	9/16	2 1/16	15014	3.15
7/32	.2188	11/16	2 1/2	15015	$4.48
1/4	.2500	3/4	2 1/2	15016	4.82
11	.1910	9/16	2 7/32	15017	3.90
20	.1610	9/16	2 1/16	15018	3.20
30	.1285	9/16	1 7/8	15019	2.28

DRILL-MILL™



M42 8% Cobalt

Specially designed to perform both drilling and milling operations with the same tool in vertical milling machine applications. Increased productivity with fewer tool changes.

DRILL-MILL performs: drilling, spotting countersinking, chamfering, slotting, side milling, profile milling and other drilling & milling operations

List No. 1980

90° Point Angle
2-Flute
30° Right Hand Helix

STANDARD PACKAGE All sizes — 1 each

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH* OF CUT	OAL*	EDP NO.	LIST PRICE
1/8	.1250	3/8	3/8	2 5/16	44619	$27.36
3/16	.1875	3/8	7/16	2 5/16	44620	27.36
1/4	.2500	3/8	5/8	2 7/16	44621	27.36
5/16	.3125	3/8	23/32	2 15/32	44622	30.76
3/8	.3750	3/8	3/4	2 1/2	44623	30.76
7/16	.4375	3/8	1 1/32	2 23/32	44624	40.46
1/2	.5000	1/2	1 1/4	3 1/4	44625	40.46
9/16	.5625	1/2	1 13/32	3 13/32	44626	52.63
5/8	.6250	5/8	1 5/8	3 3/4	44627	60.41
11/16	.6875	5/8	1 21/32	3 25/32	44628	71.31
3/4	.7500	3/4	1 11/16	3 15/16	44629	71.31
13/16	.8125	3/4	1 29/32	4 5/32	44630	91.01
7/8	.8750	3/4	1 15/16	4 3/16	44631	91.01
15/16	.9375	3/4	1 31/32	4 7/32	44632	114.65
1	1.0000	3/4	2	4 1/4	44633	114.65

*** Lengths include the 90° conical cutting point.**

Tap and Drill Kits

3 Series Available • NC, NF, Metric

ALL KITS INCLUDE

- 10 popular sized high speed steel hand taps.
- 10 popular sized high speed steel screw machine length drills.
- 128 page Machinist's Guide for Taps.
- Packaged in a durable plastic pouch.

List No. 8001

EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
37103	$112.00	37104	$120.73	37105	$137.55

SET NO. 103 NC TAPS		SET NO. 104 NF TAPS		SET NO. 105 METRIC TAPS	
NC TAPS	DRILLS	NF TAPS	DRILLS	METRIC TAPS	DRILLS
#4-40	#44	#4-48	#43	M3 x 0.5	2.50mm (#40-.0980)
#5-40	#39	#5-44	#38	M3.5 x 0.6	2.87mm (#33-.1130)
#6-32	#36	#6-40	#34	M4 x 0.7	3.28mm (#30-.1285)
#8-32	#30	#8-36	#29	M4.5 x 0.75	3.73mm (#26-.1470)
#10-24	#25	#10-32	#21	M5 x 0.8	4.22mm (#19-.1660)
¼-20	#7	¼-28	#3	M6 x 0.1	4.98mm (#9-.1960)
5/16-18	F	5/16-24	I	M7 x 0.1	5.95mm (15/64-.2344)
3/8-16	5/16	3/8-24	Q	M8 x 1.25	6.75mm (17/64-.2656)
7/16-14	U	7/16-20	W	M10 x 1.5	8.43mm (Q-.3320)
½-13	27/64	½-20	29/64	M12 x 1.75	10.28mm (Y-.4040)

S & D Drill Sets

In metal indexed stand

List No. 8040 — 3-Flat Shanks (List No. 1424S)

List No. 8040R — Round Shanks (List No. 1424R)

SET NO.	PIECES PER SET	SIZE RANGE	8040 EDP NO.	LIST PRICE	8040R EDP NO.	LIST PRICE
33F	33	½" to 1" by 64ths	18111	$1373.87	—	—
33R			—	—	18112	$1260.00

S & D Drill Sets

In metal indexed case

List No. 8040 — 3-Flat Shanks (List No. 1424S)

List No. 8040R — Round Shanks (List No. 1424R)

SET NO.	PIECES PER SET	SIZE RANGE	8040 EDP NO.	LIST PRICE	8040R EDP NO.	LIST PRICE
20HD	8	9/16-5/8-11/16-¾	18110	$356.00	—	—
20HR		13/16-7/8-15/16-1	—	—	18109	$347.99

Taper Shank Drill Sets

In metal indexed case

High Speed Steel

List No. 8000 (List No. 1302)

SET NO.	PIECES PER SET	SIZE RANGE	EDP NO.	LIST PRICE
33HD	16	33/64 to ¾ by 64ths	18001	$992.86
34HD		49/64 to 1 by 64ths	18002	1428.57

Drill Blank Sets

In metal indexed case

High Speed Steel
Hardened and Ground
List No. 1439

SET NO.	PIECES PER SET	SIZE RANGE	EDP NO.	LIST PRICE
1MC	29	1/16 to ½ by 64ths	15593	$209.61
3MC	60	Nos. 1 to 60	15595	173.86

Morse Drill Sets

Jobber Length

High Speed Steel — 118° Point
General Purpose

SET NO.	PIECES PER SET	SIZE RANGE	BRIGHT EDP NO.	TREATED EDP NO.	LIST PRICE
2HD	21	1/16 to 3/8 by 64ths	18143	18100	$64.63
5HD	29	1/16 to 1/2 by 64ths	18144	18101	135.26
6HD	15	1/16 to 1/2 by 32nds	18145	18102	73.67
8HD	60	Nos. 1 to 60	18146	18103	102.05
15HD	26	A to Z	18147	18104	136.85
22HD	13	1/16 to 1/4 by 64ths	18148	18105	26.74
24HD	20	Nos. 61 to 80	—	18106	39.29
26HD	25	1.0mm to 13.0mm by .5mms	—	18107	175.51
28HD	13	1.0mm to 7.0mm by .5mms	—	18108	36.76

List No. 8030
In Metal Indexed Case

TiN Coated

List No. 8030

In Metal Indexed Case

SET NO.	PIECES PER SET	SIZE RANGE	TiN COAT EDP NO.	TiN COAT LIST PRICE
5HG	29	1/16 to 1/2 by 64ths	18183	$339.43

Left Hand Jobber Length

High Speed Steel — 118° Point

List No. 8020

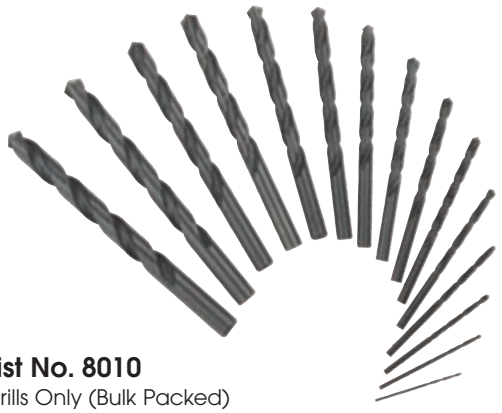
In Metal Indexed Case

SET NO.	PIECES PER SET	SIZE RANGE	EDP NO.	LIST PRICE
5LD	29	1/16 to 1/2 by 64ths	18005	$334.80

Jobber Length

High Speed Steel — 118° Point
Treated — Black Oxide
General Purpose — DRILLS ONLY

SET NO.	PIECES PER SET	SIZE RANGE	EDP NO.	LIST PRICE
2H	21	1/16 to 3/8 by 64ths	18050	$53.71
5H	29	1/16 to 1/2 by 64ths	18051	114.26
6H	15	1/16 to 1/2 by 32nds	18052	61.89
8H	60	Nos. 1 to 60	18053	87.01
15H	26	A to Z	18054	123.55
22H	13	1/16 to 1/4 by 64ths	18055	21.06



List No. 8010
Drills Only (Bulk Packed)

3-in-1 Combination Jobber Length

High Speed Steel — 118° Point

BRIGHT EDP NO.	BRIGHT LIST PRICE	TREATED EDP NO.	TREATED LIST PRICE
18004	$387.18	18003	$387.18

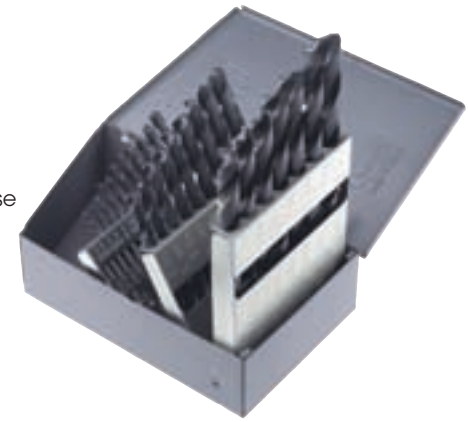
SET NO.	PCS. PER SET	SIZE RANGE
69HD	115	1/16 to 1/2 by 64ths A–Z and Nos. 1–60

List No. 8000
In Metal Indexed Case

Morse Drill Sets

3/8″ Reduced Shank Jobber Length

High Speed Steel – 118° Point
Treated – Black Oxide

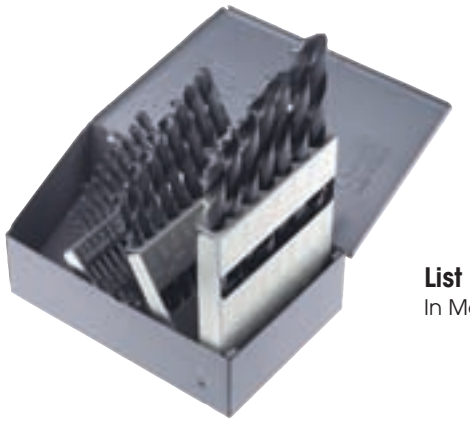


List No. 8035
In Metal Indexed Case

SET NO.	PIECES PER SET	SIZE RANGE	EDP NO.	LIST PRICE
5HT	29	1/16 to 1/2 by 64ths	18400	$160.78
6HT	15	1/16 to 1/2 by 32nds	18401	83.90

Heavy Duty Jobber Length

High Speed Steel — 135° Split Point
Treated (Black Oxide) — NAS 907, Type B



List No. 8080
In Metal Indexed Case

SET NO.	PIECES PER SET	SIZE RANGE	EDP NO.	LIST PRICE
5HS	29	1/16 to 1/2 by 64ths	18172	$143.31
8HS	60	Nos. 1 to 60	18174	212.24
22HS	13	1/16 to 1/4 by 64ths	18176	36.73

Ambore™ Heavy Duty Jobber Length

High Speed Steel — 135° Split Point
Gold and Black Finish

List No. 8080
In Metal Indexed Case

SET NO.	PIECES PER SET	SIZE RANGE	EDP NO.	LIST PRICE
5GS	29	1/16 to 1/2 by 64ths	18182	$160.56

Cobalt Heavy Duty Jobber Length

135° Split Point

List No. 8070
In Metal Indexed Case

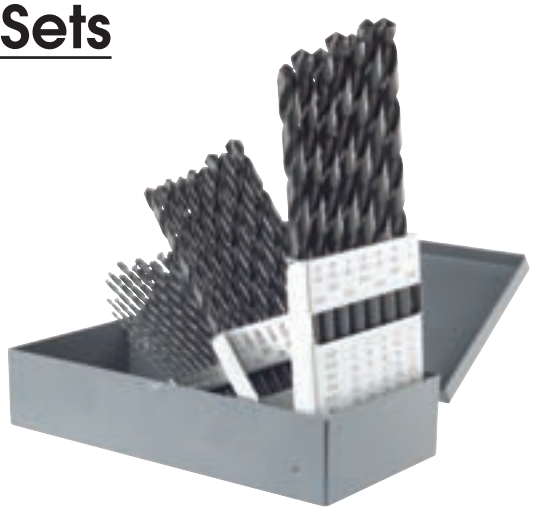
SET NO.	PIECES PER SET	SIZE RANGE	EDP NO.	LIST PRICE
5CD	29	1/16 to 1/2 by 64ths	18166	$245.85
6CD	15	1/16 to 1/2 by 32nds	18167	122.62
8CD	60	Nos.1 to 60	18168	191.19
15CD	26	A to Z	18169	252.41

Morse Drill Sets

Taper Length

High Speed Steel — 118° Point
Treated — Black Oxide
General Purpose
Straight Shank

SET NO.	PIECES PER SET	SIZE RANGE	EDP NO.	LIST PRICE
5TL	29	1/16 to 1/2 by 64ths	18184	$352.00



List No. 8095— In Metal Indexed Case

Screw Machine Length

High Speed Steel — Bright Finish
118° Point

SET NO.	PIECES PER SET	SIZE RANGE	EDP NO.	LIST PRICE
5SM	29	1/16 to 1/2 by 64ths	18177	$122.45
6SM	15	1/16 to 1/2 by 32nds	18178	73.47
22SM	13	1/16 to 1/4 by 64ths	18181	44.90

List No. 8090 — In Metal Indexed Case

Drill Counter Display

Morse Drill Counter Display

- All steel welded-outer shell with a clear, hinged polycarbonate front for high visibility and shatterproof durability. Concealed latch.
- Steel drill gauge on top assures correct sizing of drills.
- All compartments display drills vertically to use less counter space, and are rounded to make small drills readily accessible.
- Built-in pricing or inventory system eliminates need for cost sheets and keeps record of drills on hand.
- Ideal for your own counter, or offer it to your favorite accounts for their tool cribs.
- Compact, takes less counterspace.
- Display measures 14¼" high × 14" long × 12¾" wide. Wt. 14 lbs.

Fill it each week with Morse quality drills.

List No. 9020

CAPACITY	SIZE RANGE	EDP NO.	LIST PRICE
29 SIZES	1/16 to 1/2 by 64ths	08211	$264.90

Display Does Not Include Drills

Morse Carbide Burr Dispensers — List No. 9020

Ideal for your own counter or offer it to your favorite accounts for their tool cribs.

Carbide Burr Counter Display

- Displays 36 different styles of cuts and shapes vertically with ample storage space.
- Compact, takes less counterspace.
- Display measures: 14¼″ high × 14″ long × 12¾″ wide. Wt. 14 lbs.
- All steel welded outer shell with clear hinge polycarbonate front for high visibility and shatter proof durability.
- Concealed latch.

CAPACITY	EDP NO.	LIST PRICE
36 SIZES	08241	$295.71

Carbide Burr Dispenser

- For sizes SA-1, SC-1, SD-1, SE-1, SF-1, SG-1, SL-1, SA-3, SC-3, SD-3, SE-3, SF-3, SG-3, SL-3, SM-3, SL-4, SM-4, SA-5, SC-5, SD-5, SE-5, SF-5, SG-5, SM-5.
- All steel welded construction.
- Compact, display measures: 14⅝″ wide × 7⅜″ deep × 7¾″ high.
- Weight 10½ lbs.

CAPACITY	EDP NO.	LIST PRICE
24 SIZES	08212	$139.29

Huot Jobber Drill Indexes — List No. 9020

Fractional Size Indexes

INDEX NO.	SIZE RANGE	EDP NO.	LIST PRICE
2D	1⁄16″ thru 3⁄8″ × 64ths	08009	$9.75
5D	1⁄16″ thru 1⁄2″ × 64ths	08001	10.50
6D	1⁄16″ thru 1⁄2″ × 32nd	08002	9.75
22D	1⁄16″ thru 1⁄4″ × 64ths	08006	5.55

Letter Size Index

INDEX NO.	SIZE RANGE	EDP NO.	LIST PRICE
15D	A thru Z	08004	$10.50

Wire Gage Size Indexes

INDEX NO.	SIZE RANGE	EDP NO.	LIST PRICE
8D	No. 1 thru 60	08003	$10.35
24D	No. 61 thru 80	08008	6.63

3-in-1 Combination Index Fractional, Wire Gage & Letter Sizes

INDEX NO.	SIZE RANGE	EDP NO.	LIST PRICE
69D	1⁄16″ - 1⁄2″ x 64ths A-Z, 1-60	08014	$64.50

Metric Size Indexes

INDEX NO.	SIZE RANGE	EDP NO.	LIST PRICE
26D	1.0mm thru 13mm × 0.5mm	08017	$10.35
28D	1.0mm thru 7mm × 0.5mm	08018	8.61

Indexes, Display and Dispenser Do Not Include Drills or Burrs

Huot Indexes — List No. 9020

Screw Machine Drill Indexes

INDEX NO.	SIZE RANGE	EDP NO.	LIST PRICE
2DS	1⁄16″ thru 3⁄8″ × 64ths	08220	$17.91
5DS	1⁄16″ thru 1⁄2″ × 64ths	08213	13.50
22DS	1⁄16″ thru 1⁄4″ × 64ths	08215	10.50
8DS	No. 1 thru 60	08218	15.48
15DS	A thru Z	08219	20.25

Silver & Deming Drill Indexes

INDEX NO.	SIZE RANGE	EDP NO.	LIST PRICE
20D	9⁄16″ thru 1″ × 16ths	08020	$45.98

Drill and Burr Stands

- Hang it on a wall, use it on a bench or mount it on a drill press.
- Plated black zinc finish.

INDEX NO.	SIZE RANGE	EDP NO.	LIST PRICE
29SD	1⁄16″ thru 1⁄2″ × 64ths	08224	$7.20
60SD	No. 1 thru 60	08225	7.20
26SD	A thru Z	08226	7.35
33SD	1⁄2″ thru 1″ × 64ths	08227	64.50
24SB	Holds 24 Burrs	08228	12.60

26SD, 29SD, 60SD hold jobbers & screw machine drills.
33SD holds silver & deming 1⁄2″ shank drills.

Taper Shank Drill Indexes

INDEX NO.	SIZE RANGE	EDP NO.	LIST PRICE
33D	33⁄64″ thru 3⁄4″ × 64ths	08015	$114.00
34D	49⁄64″ thru 1″ × 64ths	08016	130.50

Taper Length Drill Indexes

INDEX NO.	SIZE RANGE	EDP NO.	LIST PRICE
36D	1⁄16″ thru 1⁄2″ × 64ths	08230	$41.10
37D	No. 1 thru 60	08231	44.85
38D	A thru Z	08232	41.10

Reamer Indexes

INDEX NO.	SIZE RANGE	EDP NO.	LIST PRICE
14R	over & under sizes 124–.126 to .499–.501 × 16ths	08221	$36.75
14DR	Dowel Pin .123–.4995	08222	36.75
25MR	metric 1.00 to 13.00 × 0.5mm	08223	52.50
29R	1⁄16″ thru 1⁄2″ × 64ths	08208	36.00
26R	A thru Z	08209	36.00
60R	No. 1 thru 60	08210	46.13

Screw Extractor Index

INDEX NO.	SIZE RANGE	EDP NO.	LIST PRICE
64	#1 thru #5 plus Drill Bits	08214	$6.75

Indexes and Stands Do Not Include Drills, Reamers or Extractors

Feeds and Speeds for High Speed Steel Drills, Reamers and Taps

MATERIAL	BRINELL HARDNESS (BHN)	DRILLS			REAMERS		TAPS —SPEED (SFM) THREADS PER INCH			
		SPEED (SFM)	POINT	FEED	SPEED (SFM)	FEED	3-7½	8-15	16-24	25-UP
Aluminum	99-101	200-250	118°	M	150-160	M	50	100	150	200
Aluminum bronze	170-187	60	118°	M	40-45	M	12	25	45	60
Bakelite	—	80	60°-90°	M	50-60	M	50	100	150	200
Brass	192-202	200-250	118°	H	150-160	H	50	100	150	200
Bronze, common	166-183	200-250	118°	H	150-160	H	40	80	100	150
Bronze, phosphor, 1/2 hard	187-202	175-180	118°	M	130-140	M	25	40	50	80
Bronze, phosphor, soft	149-163	200-250	118°	H	150-160	H	40	80	100	150
Cast iron, soft	126	140-150	90°	H	100-110	H	30	60	90	140
Cast iron, medium soft	196	80-110	118°	M	50-65	M	25	40	50	80
Cast iron, hard	293-302	45-50	118°	L	67-75	L	10	20	30	40
Cast iron, chilled*	402	15	150°	L	8-10	L	5	5	10	10
Cast steel	286-302	40-50*	118°	L	70-75	L	20	30	40	50
Celluloid	—	100	90°	M	75-80	M	50	100	150	200
Copper	80-85	70	100°	L	45-55	L	40	80	100	150
Drop forgings (steel)	170-196	60	118°	M	40-45	M	12	25	45	60
Duralumin	90-104	200	118°	M	150-160	M	50	100	150	200
Everdur	179-207	60	118°	L	40-45	L	20	30	40	50
Machinery steel	170-196	110	118°	H	67-75	H	35	50	60	85
Magnet steel, soft	241-302	35-40	118°	M	20-25	M	20	40	50	75
Magnet steel, hard*	321-512	15	150°	L	10	L	5	10	15	25
Manganese steel, 7-13*	187-217	15	150°	L	10	L	15	20	25	30
Manganese copper, 30 Mn.*	134	15	150°	L	10-12	L	—	—	—	—
Malleable iron	112-126	85-90	118°	H	—	H	20	30	40	50
Mild steel, .20-.30C	170-202	110-120	118°	H	75-85	H	40	55	70	90
Molybdenum steel	196-235	55	125°	M	35-45	M	20	30	35	45
Monel metal	149-170	50	118°	M	35-38	M	8	10	15	20
Nickel, pure*	187-202	75	118°	L	40	L	25	40	50	80
Nickel steel, 3½%	196-241	60	118°	L	40-45	L	8	10	15	20
Rubber, hard	—	100	60°-90°	L	70-80	L	50	100	150	200
Screw stock, C.R.	170-196	110	118°	H	75	H	20	30	40	50
Spring steel	402	20	150°	L	12-15	L	10	10	15	15
Stainless steel	146-149	50	118°	M	30	M	8	10	15	20
Stainless steel, C.R.*	460-477	20	118°	L	15	L	8	10	15	20
Steel, .40 to .50 C	170-196	80	118°	M	8-10	M	20	30	40	50
Tool, S.A.E., and Forging steel	149	75	118°	H	35-40	H	25	35	45	55
Tool, S.A.E., and Forging steel	241	50	125°	M	12	M	15	15	25	25
Tool, S.A.E., and Forging steel*	402	15	150°	L	10	L	8	10	15	20
Zinc alloy	112-126	200-250	118°	M	150-175	M	50	100	150	200

* Use specially constructed heavy duty drills.

Drill Feed per Revolution (IPR)						Reamer Feed
REFERENCE SYMBOL	DIAMETER OF DRILL					ALL DIAMETERS
	UNDER ⅛	⅛ to ¼	¼ to ½	½ to 1	OVER 1″	Use a feed equal to two or three times that recommended for Drills.
L – Light	.001	.002	.003	.005	.006	
M – Medium	.0015	.003	.006	.010	.012	
H – Heavy	.0025	.005	.010	.020	.025	

SPEEDS and FEEDS shown are suggested starting points only and may be increased or decreased depending on actual material and machining conditions. Start conservatively and increase until the machining cycle is optimized.

TAP SPEEDS may be **increased** for coated taps, spiral point taps, fine pitch taps and when the percentage of thread is decreased.

TAP SPEEDS may need to be **reduced** for spiral flute taps, coarse pitch taps, bottoming taps, difficult materials, longer thread lengths and when the percentage of thread is increased.

THREAD FORMING TAPS generally form threads more efficiently at higher speeds. Suggested speeds are 50% to 100% higher then the suggested speeds for cutting taps in similar applications.

PIPE TAPS speeds should be between one-half and three-quarters of the speeds of taps of comparable diameter and pitch.

Drill Terminology

Twist Drill — A rotary end cutting tool having one or more cutting lips, and having one or more helical or straight flutes for the passage of chips and the admission of a cutting fluid.

Axis — The imaginary straight line which forms the longitudinal center line of the drill.

Back Taper — A slight decrease in diameter from front to back in the body of the drill.

Body — The portion of the drill extending from the shank or neck to the outer corners of the cutting lips.

Body Diameter Clearance — That portion of the land that has been cut away so it will not rub against the walls of the hole.

Chip Packing — The failure of chips to pass through the flute during the cutting action, generally resulting in tool failure.

Chipping — The breakdown at a cutting lip or margin by loss of fragments broken away during the cutting action.

Chisel Edge — The edge at the end of the web that connects the cutting lips.

Chisel Edge Angle — The angle included between the chisel edge and the cutting lip, as viewed from the end of the drill.

Clearance — The space provided to eliminate undesirable contact between the drill and the work piece.

Clearance Diameter — The diameter over the cut away portion of the drill lands.

Drill Diameter — The diameter over the margins of the drill measured at the point.

Flutes — Helical or straight grooves cut or formed in the body of the drill to provide cutting lips, to permit removal of chips, and to allow cutting fluid to reach the cutting lips.

Flute Length — The length from the outer corners of the cutting lips to the extreme back end of the flutes. It includes the sweep of the tool used to generate the flutes and, therefore, does not indicate the usable length of flutes.

Heel — The trailing edge of the land.

Helical Flutes — Flutes which are formed in a helical path around the axis.

Helix Angle — The angle made by the leading edge of the land with a plane containing the axis of the drill.

Land — The peripheral portion of the body between adjacent flutes.

Land Clearance — See preferred term Body Diameter Clearance.

Land Width — The distance between the leading edge and the heel of the land measured at a right angle to the leading edge.

Length of Twist — See preferred term Flute Length

Lips — The cutting edges of a two flute drill extending from the chisel edge to the periphery. (Core Drills) — The cutting edges extending from the bottom of the chamfer to the periphery.

Lip Relief — The axial relief angle at the outer corner of the lip. It is measured by projection into a plane tangent to the periphery at the outer corner of the lip.

Margin — The cylindrical portion of the land which is not cut away to provide clearance.

Neck — The section of reduced diameter between the body and the shank of the drill.

Overall Length — The length from the extreme end of the shank to the outer corners of the cutting lips. It does not include the conical shank end often used on straight shank drills, nor does it include the conical cutting point used on both straight and taper shank drills. (Core Drills) — For drills with an external center on the cutting end, same as for two flute drills. For those with internal centers on the cutting end, the overall length is from the extreme ends of the tool.

Point — The cutting end of a drill, made up of the ends of the lands and the web, in form it resembles a cone, but departs from a true cone to furnish clearance behind the cutting lips.

Point Angle — The angle included between the cutting lips projected upon a plane parallel to the drill axis and parallel to the two cutting lips.

Relief — The result of the removal of tool material behind or adjacent to the cutting lip and leading edge of the land to provide clearance and prevent rubbing (heel drag).

Shank — The part of the drill by which it is held and driven.

Straight Flutes — Flutes which form lands lying in an axial plane.

Straight Shank Drills — Those having cylindrical shanks which may be the same or different diameter than the body of the drill. The shank may be made with or without driving flats, tang, grooves or thread.

Tang — The flattened end of a taper shank, intended to fit into a driving slot in a socket.

Tang Drive — Two opposite parallel driving flats on the extreme end of a straight shank.

Taper Shank Drills — Those having conical shanks suitable for direct fitting into tapered holes in machine spindles, driving sleeves or sockets. Tapered shanks generally have a tang.

Web — The central portion of the body that joins the lands. The extreme end of the web forms the chisel edge on a two-flute drill.

Web Thickness — The thickness of the web at the point, unless another specific location is indicated.

REAMERS

Straight Shank Chucking Reamers

High Speed Steel
Straight Flute — Right Hand Cut

45° Chamfer for reaming of most materials

List No. 1655

Diameter Tolerances
up to ½" — +.0002/-0
over ½" to ⅝" — +.0003/-0
over ⅝" to 1½" — +.0001/+.0004

STANDARD PACKAGE All sizes – 1 each

SIZE FRACTIONAL	SIZE WIRE GAGE AND DECIMAL	DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
	#60	.0400	.0390	½	2½	4	22101	$15.77
	59	.0410	.0390	½	2½	4	22102	15.77
	58	.0420	.0390	½	2½	4	22103	15.77
	57	.0430	.0390	½	2½	4	22104	15.77
	56	.0465	.0455	½	2½	4	22105	15.77
3/64		.0469	.0455	½	2½	4	22106	15.77
	55	.0520	.0510	½	2½	4	22107	15.77
	54	.0550	.0510	½	2½	4	22108	15.77
	53	.0595	.0585	½	2½	4	22109	15.77
1/16		.0625	.0585	½	2½	4	22110	14.19
	52	.0635	.0585	½	2½	4	22111	14.19
	51	.0670	.0660	¾	3	4	22112	12.69
	50	.0700	.0660	¾	3	4	22113	12.69
	49	.0730	.0660	¾	3	4	22114	12.69
	48	.0760	.0720	¾	3	4	22115	12.69
5/64		.0781	.0720	¾	3	4	22116	12.76
	47	.0785	.0720	¾	3	4	22117	12.69
	46	.0810	.0771	¾	3	4	22118	12.69
	45	.0820	.0771	¾	3	4	22119	12.69
	44	.0860	.0810	¾	3	4	22120	12.69
	43	.0890	.0810	¾	3	4	22121	12.69
	42	.0935	.0880	¾	3	4	22122	12.69
3/32		.0937	.0880	¾	3	4	22123	11.41
	41	.0960	.0928	⅞	3½	4	22124	12.81
	40	.0980	.0928	⅞	3½	4	22125	12.81
	39	.0995	.0928	⅞	3½	4	22126	12.81
	38	.1015	.0950	⅞	3½	4	22127	12.81
	37	.1040	.0950	⅞	3½	4	22128	12.81
	36	.1065	.1030	⅞	3½	4	22129	12.81
7/64		.1094	.1030	⅞	3½	4	22130	13.19
	35	.1100	.1030	⅞	3½	4	22131	13.19
	34	.1110	.1055	⅞	3½	4	22132	13.19
	33	.1130	.1055	⅞	3½	4	22133	13.19
	32	.1160	.1120	⅞	3½	4	22134	13.19
	31	.1200	.1120	⅞	3½	4	22135	13.19
	.1240	.1240	.1190	⅞	3½	4	22136	13.19
⅛		.1250	.1190	⅞	3½	4	22137	10.53
	.1260	.1260	.1190	⅞	3½	4	22138	13.19
	30	.1285	.1190	⅞	3½	4	22139	13.19
	29	.1360	.1275	1	4	4	22140	15.77
	28	.1405	.1350	1	4	4	22141	15.77
9/64		.1406	.1350	1	4	4	22142	15.77
	27	.1440	.1350	1	4	4	22143	15.77
	26	.1470	.1430	1	4	4	22144	15.77
	25	.1495	.1430	1	4	4	22145	15.77
	24	.1520	.1460	1	4	4	22146	15.77
	23	.1540	.1460	1	4	4	22147	15.77
5/32		.1562	.1510	1	4	6	22148	15.77
	22	.1570	.1510	1	4	6	22149	15.77

(continued)

Straight Shank Chucking Reamers (continued)

List No. 1655

FRACTIONAL	SIZE LETTER	WIRE GAGE AND DECIMAL	DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
		#21	.1590	.1530	1⅛	4½	6	22150	$16.83
		20	.1610	.1530	1⅛	4½	6	22151	16.83
		19	.1600	.1595	1⅛	4½	6	22152	16.83
		18	.1695	.1595	1⅛	4½	6	22153	16.83
11/64			.1719	.1645	1⅛	4½	6	22154	16.83
		17	.1730	.1645	1⅛	4½	6	22155	16.83
		16	.1770	.1704	1⅛	4½	6	22156	16.83
		15	.1800	.1755	1⅛	4½	6	22157	17.02
		14	.1820	.1755	1⅛	4½	6	22158	17.02
		13	.1850	.1805	1⅛	4½	6	22159	17.02
		.1865	.1865	.1805	1⅛	4½	6	22160	17.23
3/16			.1875	.1805	1⅛	4½	6	22161	15.16
		.1885	.1885	.1805	1⅛	4½	6	22162	17.23
		12	.1890	.1805	1⅛	4½	6	22163	16.83
		11	.1910	.1860	1¼	5	6	22164	18.86
		10	.1935	.1895	1¼	5	6	22165	18.86
		9	.1960	.1895	1¼	5	6	22166	18.86
		8	.1990	.1895	1¼	5	6	22167	18.86
		7	.2010	.1895	1¼	5	6	22168	18.86
13/64			.2031	.1945	1¼	5	6	22169	18.86
		6	.2040	.1945	1¼	5	6	22170	18.86
		5	.2055	.2016	1¼	5	6	22171	18.86
		4	.2090	.2016	1¼	5	6	22172	18.86
		3	.2130	.2075	1¼	5	6	22173	18.86
7/32			.2187	.2075	1¼	5	6	22174	18.86
		2	.2210	.2173	1½	6	6	22175	19.39
		1	.2280	.2173	1½	6	6	22176	19.39
	A		.2340	.2265	1½	6	6	22177	19.64
15/64			.2344	.2265	1½	6	6	22178	19.39
	B		.2380	.2329	1½	6	6	22179	20.41
	C		.2420	.2329	1½	6	6	22180	20.41
	D		.2460	.2329	1½	6	6	22181	20.41
		.2490	.2490	.2405	1½	6	6	22182	18.37
1/4	E		.2500	.2405	1½	6	6	22183	17.35
		.2510	.2510	.2405	1½	6	6	22185	18.39
	F		.2570	.2485	1½	6	6	22186	20.41
	G		.2610	.2485	1½	6	6	22187	20.90
17/64			.2656	.2485	1½	6	6	22188	22.77
	H		.2660	.2485	1½	6	6	22189	22.77
	I		.2720	.2485	1½	6	6	22190	22.77
	J		.2770	.2485	1½	6	6	22191	22.77
	K		.2810	.2485	1½	6	6	22192	22.77
9/32			.2812	.2485	1½	6	6	22193	21.61
	L		.2900	.2792	1½	6	6	22194	22.77
	M		.2950	.2792	1½	6	6	22195	22.77
19/64			.2969	.2792	1½	6	6	22196	22.77
	N		.3020	.2792	1½	6	6	22197	22.77
		.3115	.3115	.2792	1½	6	6	22198	21.61
5/16			.3125	.2792	1½	6	6	22199	20.51
		.3135	.3135	.2792	1½	6	6	22200	21.61
	O		.3160	.2792	1½	6	6	22201	22.84
	P		.3230	.2792	1½	6	6	22202	24.35
21/64			.3281	.2792	1½	6	6	22203	24.35
	Q		.3320	.2792	1½	6	6	22204	24.35
	R		.3390	.2792	1½	6	6	22205	24.35
11/32			.3437	.2792	1½	6	6	22206	24.35
	S		.3480	.3105	1¾	7	6	22207	24.57
	T		.3580	.3105	1¾	7	6	22208	24.57
23/64			.3594	.3105	1¾	7	6	22209	24.57

(continued)

Straight Shank Chucking Reamers (continued)

List No. 1655

FRACTIONAL	SIZE LETTER	SIZE DECIMAL	DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
	U		.3680	.3105	1¾	7	6	22210	$24.57
		.3740	.3740	.3105	1¾	7	6	22211	23.49
3/8			.3750	.3105	1¾	7	6	22212	23.49
		.3760	.3760	.3105	1¾	7	6	22213	23.33
	V		.3770	.3105	1¾	7	6	22214	26.73
	W		.3860	.3105	1¾	7	6	22215	26.73
25/64			.3906	.3105	1¾	7	6	22216	26.73
	X		.3970	.3105	1¾	7	6	22217	26.73
	Y		.4040	.3105	1¾	7	6	22218	27.72
13/32			.4062	.3105	1¾	7	6	22219	27.72
	Z		.4130	.3730	1¾	7	6	22220	27.72
27/64			.4219	.3730	1¾	7	6	22221	27.72
		.4365	.4365	.3730	1¾	7	6	22222	26.34
7/16			.4375	.3730	1¾	7	6	22223	26.34
		.4385	.4385	.3730	1¾	7	6	22224	26.34
29/64			.4531	.3730	1¾	7	6	22225	30.20
15/32			.4687	.3730	1¾	7	6	22226	30.20
31/64			.4844	.4355	2	8	6	22227	30.20
		.4990	.4990	.4355	2	8	6	22228	30.27
1/2			.5000	.4355	2	8	6	22229	28.67
		.5010	.5010	.4355	2	8	6	22230	28.67
17/32			.5312	.4355	2	8	6	22231	35.64
9/16			.5625	.4355	2	8	8	22232	35.64
19/32			.5937	.4355	2	8	8	22233	36.10
5/8			.6250	.5615	2¼	9	8	22234	41.74
21/32			.6562	.5615	2¼	9	8	22235	52.20
11/16			.6875	.5615	2¼	9	8	22236	47.03
23/32			.7187	.5615	2¼	9	8	22237	52.47
3/4			.7500	.6240	2½	9½	8	22238	52.77
25/32			.7812	.6240	2½	9½	8	22239	56.93
13/16			.8125	.6240	2½	9½	8	22240	56.93
27/32			.8437	.6240	2½	9½	8	22241	67.35
7/8			.8750	.7490	2⅝	10	8	22242	68.90
29/32			.9062	.7490	2⅝	10	8	22243	74.25
15/16			.9375	.7490	2⅝	10	8	22244	74.25
31/32			.9687	.7490	2⅝	10	8	22245	83.16
1			1.0000	.8740	2¾	10½	8	22246	83.96
1 1/16			1.0625	.8740	2¾	10½	8	22247	93.06
1 1/8			1.1250	.8740	2⅞	11	10	22248	98.91
1 3/16			1.1875	.9990	2⅞	11	10	22249	115.83
1¼			1.2500	.9990	3	11½	10	22250	122.76
1⅜			1.3750	.9990	3¼	12	10	22251	150.48
1½			1.5000	1.2490	3½	12½	10	22252	173.76

Straight Shank Chucking Reamer Sets

High Speed Steel — Straight Flute
Right Hand Cut

SET NO.	PCS. PER SET	SIZE RANGE	EDP NO.	LIST PRICE
501	29	1/16 to ½ by 64ths	22301	$659.05
502	26	A to Z	22302	646.98
503	60	Nos. 1 to 60	22303	974.99

List No. 1655
In Metal Indexed Case

Metric Straight Shank Chucking Reamers

High Speed Steel
Straight Flute — Right Hand Cut

45° Chamfer for reaming of most materials.

List No. 1655M

Diameter Tolerances (Inches)
up to 12.5 mm — +.0002/-0
13.0 mm to 14.0 mm — +.0003/-0
14.5 mm to 25.0 mm — +.0001/+.0004

STANDARD PACKAGE All sizes — 1 each

MM SIZE	DEC. EQUIV.	SH. DIA.	L.O.F.	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
1.0	.0394	.0394	½	2½	4	22350	$15.77
1.5	.0591	.0510	½	2½	4	22351	15.77
2.0	.0787	.0720	¾	3	4	22352	12.69
2.5	.0984	.0928	⅞	3½	4	22353	12.69
3.0	.1181	.1120	⅞	3½	4	22354	13.19
3.5	.1378	.1350	1	4	4	22355	15.74
4.0	.1575	.1510	1	4	6	22356	16.96
4.5	.1772	.1704	1⅛	4½	6	22357	17.02
5.0	.1969	.1895	1¼	5	6	22358	18.86
5.5	.2165	.2075	1¼	5	6	22359	18.86
6.0	.2362	.2265	1½	6	6	22360	20.41
6.5	.2559	.2405	1½	6	6	22361	22.77
7.0	.2756	.2485	1½	6	6	22362	22.77
7.5	.2953	.2792	1½	6	6	22363	22.77
8.0	.3150	.2792	1½	6	6	22364	24.33
8.5	.3346	.2792	1½	6	6	22365	24.42
9.0	.3543	.3105	1¾	7	6	22366	24.57
9.5	.3740	.3105	1¾	7	6	22367	23.49
10.0	.3937	.3105	1¾	7	6	22368	26.73
10.5	.4134	.3730	1¾	7	6	22369	27.72
11.0	.4331	.3730	1¾	7	6	22370	27.72
11.5	.4528	.3730	1¾	7	6	22371	30.20
12.0	.4724	.4355	2	8	6	22372	30.20
12.5	.4921	.4355	2	8	6	22373	30.20
13.0	.5118	.4355	2	8	6	22374	37.42

MM SIZE	DEC. EQUIV.	SH. DIA.	L.O.F.	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
13.5	.5315	.4355	2	8	6	22375	$37.42
14.0	.5512	.4355	2	8	8	22376	37.42
14.5	.5709	.4355	2	8	8	22377	37.42
15.0	.5906	.4355	2	8	8	22378	37.42
15.5	.6102	.5615	2¼	9	8	22379	43.67
16.0	.6299	.5615	2¼	9	8	22380	43.67
16.5	.6496	.5615	2¼	9	8	22381	43.67
17.0	.6693	.5615	2¼	9	8	22382	49.33
17.5	.6890	.5615	2¼	9	8	22383	52.96
18.0	.7087	.5615	2¼	9	8	22384	52.96
18.5	.7283	.6240	2½	9	8	22385	61.02
19.0	.7480	.6240	2½	9	8	22386	61.02
19.5	.7677	.6240	2½	9	8	22387	58.71
20.0	.7874	.6240	2½	9	8	22388	62.87
20.5	.8071	.6240	2½	9	8	22389	62.87
21.0	.8268	.6240	2½	9½	8	22390	62.87
21.5	.8465	.7490	2⅝	10	8	22391	73.29
22.0	.8661	.7490	2⅝	10	8	22392	73.29
22.5	.8858	.7490	2⅝	10	8	22393	74.84
23.0	.9055	.7490	2⅝	10	8	22394	74.84
23.5	.9252	.7490	2⅝	10	8	22395	80.19
24.0	.9449	.7490	2⅝	10	8	22396	80.19
24.5	.9646	.7490	2⅝	10	8	22397	80.19
25.0	.9843	.8740	2¾	10½	8	22398	85.13

Metric Straight Shank Chucking Reamer Sets

High Speed Steel Straight Flute – Right Hand Cut

List No. 1655M

Over and Under Size Set
In Plastic Pouch

SIZES			PCS.	EDP NO.	LIST PRICE
.1565	.2766	.3927			
.1585	.3140	.3947			
.2352	.3160	.4714	14	23304	$452.02
.2372	.3533	.4734			
.2746	.3553				

Standard Size Set
In Metal Indexed Case

SIZES	PIECES	EDP NO.	LIST PRICE
1.0mm to 13.0mm by .5mm	25	23305	$560.10

Decimal Size Straight Shank Chucking Reamers

High Speed Steel
Straight Flute — Right Hand Cut
.0005″ Increments

45° Chamfer for reaming of most materials.

List No. 1655H

Diameter Tolerances
up to .5000 — +.0002/-0
.5005 to .6250 — +.0003/-0
.6255 to 1.0030 — +.0001/+.0004

STANDARD PACKAGE All sizes – 1 each

DEC. SIZE	EDP NO.	LIST PRICE	DEC. SIZE	EDP NO.	LIST PRICE	DEC. SIZE	EDP NO.	LIST PRICE	DEC. SIZE	EDP NO.	LIST PRICE
.0300	29000	$21.95	.0560	29047	$21.14	.0835	29092	$19.39	.1115	29137	$17.01
.0305	29001	21.95	.0565	29048	21.14	.0840	29093	19.39	.1120	29138	17.01
.0310	29002	21.95	.0570	29049	21.14	.0845	29094	19.39	.1125	29139	17.01
.0315	29004	21.95	.0575	29050	21.14	.0850	29095	19.39	.1135	29140	17.01
.0320	29005	21.95	.0580	29051	21.14	.0855	29096	19.39	.1140	29141	17.01
.0325	29006	21.95	.0585	29052	21.14	.0865	29097	19.39	.1145	29142	17.01
.0330	29007	21.95	.0590	29053	21.14	.0870	29098	19.39	.1150	29143	17.01
.0335	29008	21.95	.0600	29054	21.14	.0875	29099	19.39	.1155	29144	17.01
.0340	29009	21.95	.0605	29055	21.14	.0880	29100	19.39	.1160	29145	17.01
.0345	29010	21.95	.0610	29056	21.14	.0885	29101	19.39	.1165	29146	17.01
.0350	29011	21.95	.0615	29057	21.14	.0895	29102	19.39	.1170	29147	17.01
.0355	29012	21.95	.0620	29058	21.14	.0900	29103	19.39	.1175	29148	17.01
.0360	29013	21.95	.0630	29059	19.39	.0905	29104	19.39	.1180	29149	17.01
.0365	29014	21.95	.0640	29060	19.39	.0910	29105	19.39	.1185	29150	17.01
.0370	29015	21.95	.0645	29061	19.39	.0915	29106	19.39	.1190	29151	17.01
.0375	29016	21.95	.0650	29062	19.39	.0920	29107	19.39	.1195	29152	17.01
.0380	29017	21.95	.0655	29063	19.39	.0925	29108	19.39	.1205	29153	17.01
.0385	29018	21.95	.0660	29064	19.39	.0930	29109	19.39	.1210	29154	17.01
.0390	29019	21.95	.0665	29065	19.39	.0940	29110	19.39	.1215	29155	17.01
.0395	29021	21.14	.0675	29066	19.39	.0945	29111	19.39	.1220	29156	17.01
.0405	29022	21.14	.0680	29067	19.39	.0950	29112	19.39	.1225	29157	17.01
.0415	29023	21.14	.0685	29068	19.39	.0955	29113	19.39	.1235	29158	17.01
.0425	29024	21.14	.0690	29069	19.39	.0965	29114	19.39	.1245	29159	17.01
.0435	29025	21.14	.0695	29070	19.39	.0970	29115	19.39	.1255	29160	22.84
.0440	29026	21.14	0705	29071	19.39	.0975	29116	19.39	.1265	29161	22.84
.0445	29027	21.14	.0710	29072	19.39	.0985	29117	19.39	.1270	29162	22.84
.0450	29028	21.14	.0715	29073	19.39	.0990	29118	19.39	.1275	29163	22.84
.0455	29029	21.14	.0720	29074	19.39	.1000	29119	19.39	.1280	29164	22.84
.0460	29030	21.14	.0725	29075	19.39	.1005	29120	19.39	.1290	29165	22.84
.0470	29031	21.14	.0735	29076	19.39	.1010	29121	19.39	.1295	29166	22.84
.0475	29032	21.14	.0740	29077	19.39	.1020	29122	19.39	.1300	29167	22.84
.0480	29033	21.14	.0745	29078	19.39	.1025	29123	19.39	.1305	29168	22.84
.0485	29034	21.14	.0750	29079	19.39	.1030	29124	19.39	.1310	29169	22.84
.0490	29035	21.14	.0755	29080	19.39	.1035	29125	19.39	.1315	29170	22.84
.0495	29036	21.14	.0765	29081	19.39	.1045	29126	19.39	.1320	29171	22.84
.0500	29037	21.14	.0770	29082	19.39	.1050	29127	19.39	.1325	29172	22.84
.0505	29038	21.14	.0775	29083	19.39	.1055	29128	19.39	.1330	29173	22.84
.0510	29039	21.14	.0780	29084	19.39	.1060	29129	19.39	.1335	29174	22.84
.0515	29040	21.14	.0790	29085	19.39	.1070	29130	19.39	.1340	29175	22.84
.0525	29041	21.14	.0795	29086	19.39	.1075	29131	19.39	.1345	29176	22.84
.0530	29042	21.14	.0800	29087	19.39	.1080	29132	19.39	.1350	29177	22.84
.0535	29043	21.14	.0805	29088	19.39	.1085	29133	19.39	.1355	29178	22.84
.0540	29044	21.14	.0815	29089	19.39	.1090	29134	19.39	.1365	29179	22.84
.0545	29045	21.14	.0825	29090	19.39	.1095	29135	17.01	.1370	29180	22.84
.0555	29046	21.14	.0830	29091	19.39	.1105	29136	17.01	.1375	29181	22.84

(continued)

Decimal Size Chucking Reamers (continued)

List No. 1655H

DEC. SIZE	EDP NO.	LIST PRICE	DEC. SIZE	EDP NO.	LIST PRICE	DEC. SIZE	EDP NO.	LIST PRICE	DEC. SIZE	EDP NO.	LIST PRICE
.1380	29182	$22.84	.1755	29245	$20.30	.2170	29308	$24.44	.2540	29371	$27.65
.1385	29183	22.84	.1760	29246	20.30	.2175	29309	24.44	.2545	29372	27.65
.1390	29184	22.84	.1765	29247	20.30	.2180	29310	24.44	.2550	29373	27.65
.1395	29185	22.84	.1775	29248	20.30	.2185	29311	24.44	.2555	29374	27.65
.1400	29186	22.84	.1780	29249	20.30	.2190	29312	24.76	.2560	29375	27.65
.1410	29187	21.14	.1785	29250	20.30	.2195	29313	24.76	.2565	29376	27.65
.1415	29188	21.14	.1790	29251	20.30	.2200	29314	24.76	.2575	29377	27.65
.1420	29189	21.14	.1795	29252	20.30	.2205	29315	24.76	.2580	29378	27.65
.1425	29190	21.14	.1805	29253	20.30	.2215	29316	24.76	.2585	29379	27.65
.1430	29191	21.14	.1810	29254	20.30	.2220	29317	24.76	.2590	29380	27.65
.1435	29192	21.14	.1815	29255	20.30	.2225	29318	24.76	.2595	29381	27.65
.1445	29193	21.14	.1825	29256	20.30	.2230	29319	24.76	.2600	29382	27.65
.1450	29194	21.14	.1830	29257	20.30	.2235	29320	24.76	.2605	29383	27.65
.1455	29195	21.14	.1835	29258	20.30	.2240	29321	24.76	.2615	29384	27.65
.1460	29196	21.14	.1840	29259	20.30	.2245	29322	24.76	.2620	29385	27.65
.1465	29197	21.14	.1845	29260	20.30	.2250	29323	24.76	.2625	29386	27.65
.1475	29198	21.14	.1860	29261	20.30	.2255	29324	24.76	.2630	29387	27.65
.1480	29199	21.14	.1880	29262	24.87	.2260	29325	24.76	.2635	29388	27.65
.1485	29200	21.14	.1895	29263	24.87	.2265	29326	24.76	.2640	29389	27.65
.1490	29201	21.14	.1900	29264	24.87	.2270	29327	24.76	.2645	29390	27.65
.1500	29202	21.14	.1905	29265	24.87	.2275	29328	24.76	.2650	29391	27.65
.1505	29203	21.14	.1915	29266	24.87	.2285	29329	24.76	.2655	29392	27.65
.1510	29204	21.14	.1920	29267	24.87	.2290	29330	24.76	.2665	29393	27.65
.1515	29205	21.14	.1925	29268	24.87	.2295	29331	24.76	.2670	29394	27.65
.1525	29206	21.14	.1930	29269	24.87	.2300	29332	24.76	.2675	29395	27.65
.1530	29207	21.14	.1940	29270	24.87	.2305	29333	24.76	.2680	29396	27.65
.1535	29208	21.14	.1945	29271	24.87	.2310	29334	24.76	.2685	29397	27.65
.1545	29209	21.14	.1950	29272	24.87	.2315	29335	24.76	.2690	29398	27.65
.1550	29210	21.14	.1955	29273	24.87	.2320	29336	24.76	.2695	29399	27.65
.1555	29211	21.14	.1965	29274	24.87	.2325	29337	24.76	.2700	29400	27.65
.1560	29212	21.14	.1970	29275	24.87	.2330	29338	24.76	.2705	29401	27.65
.1565	29213	22.01	.1975	29276	24.87	.2335	29339	24.76	.2710	29402	27.65
.1580	29214	22.01	.1980	29277	24.87	.2345	29340	22.82	.2715	29403	27.65
.1585	29215	22.01	.1985	29278	24.87	.2350	29341	22.82	.2725	29404	27.65
.1595	29216	22.01	.1995	29279	24.87	.2355	29342	22.82	.2730	29405	27.65
.1600	29217	22.01	.2000	29280	24.87	.2360	29343	22.82	.2735	29406	27.65
.1605	29218	22.01	.2005	29281	24.87	.2365	29344	22.82	.2740	29407	27.65
.1610	29219	22.01	.2015	29282	24.87	.2370	29345	22.82	.2745	29408	27.65
.1615	29220	22.01	.2020	29283	24.87	.2375	29346	22.82	.2750	29409	27.65
.1620	29221	22.01	.2025	29284	24.87	.2385	29347	22.82	.2755	29410	27.65
.1625	29222	22.01	.2030	29285	24.87	.2390	29348	22.82	.2760	29411	27.65
.1630	29223	22.01	.2035	29286	24.44	.2395	29349	22.82	.2765	29412	27.65
.1635	29224	22.01	.2045	29287	24.44	.2400	29350	22.82	.2775	29413	27.65
.1640	29225	22.01	.2050	29288	24.44	.2405	29351	22.82	.2780	29414	27.65
.1645	29226	22.01	.2060	29289	24.44	.2410	29352	22.82	.2785	29415	27.65
.1650	29227	22.01	.2065	29290	24.44	.2415	29353	22.82	.2790	29416	27.65
.1655	29228	22.01	.2070	29291	24.44	.2425	29354	22.82	.2795	29417	27.65
.1665	29229	22.01	.2075	29292	24.44	.2430	29355	22.82	.2800	29418	27.65
.1670	29230	22.01	.2080	29293	24.44	.2435	29356	22.82	.2805	29419	27.65
.1675	29231	22.01	.2085	29294	24.44	.2440	29357	22.82	.2815	29420	27.65
.1680	29232	22.01	.2095	29295	24.44	.2445	29358	22.82	.2820	29421	27.65
.1685	29233	22.01	.2100	29296	24.44	.2450	29359	22.82	.2825	29422	27.65
.1690	29234	22.01	.2105	29297	24.44	.2455	29360	22.82	.2830	29423	27.65
.1700	29235	22.01	.2110	29298	24.44	.2465	29361	22.82	.2835	29424	27.65
.1705	29236	22.01	.2115	29299	24.44	.2470	29362	22.82	.2840	29425	27.65
.1710	29237	22.01	.2120	29300	24.44	.2475	29363	22.82	.2845	29426	27.65
.1715	29238	22.01	.2125	29301	24.44	.2485	29364	22.82	.2850	29427	27.65
.1720	29239	20.30	.2135	29302	24.44	.2505	29365	27.65	.2855	29428	27.65
.1725	29240	20.30	.2140	29303	24.44	.2515	29366	27.65	.2860	29429	27.65
.1735	29241	20.30	.2145	29304	24.44	.2520	29367	27.65	.2865	29430	27.65
.1740	29242	20.30	.2150	29305	24.44	.2525	29368	27.65	.2870	29431	27.65
.1745	29243	20.30	.2155	29306	24.44	.2530	29369	27.65	.2875	29432	27.65
.1750	29244	20.30	.2160	29307	24.44	.2535	29370	27.65	.2880	29433	27.65

(continued)

Decimal Size Chucking Reamers (continued)

List No. 1655H

DEC. SIZE	EDP NO.	LIST PRICE	DEC. SIZE	EDP NO.	LIST PRICE	DEC. SIZE	EDP NO.	LIST PRICE	DEC. SIZE	EDP NO.	LIST PRICE
.2885	29434	$27.65	.3255	29498	$28.03	.3590	29561	$29.21	.3945	29624	$31.64
.2890	29435	27.65	.3260	29499	28.03	.3595	29562	26.76	.3950	29625	31.64
.2895	29436	27.65	.3265	29500	28.03	.3600	29563	26.76	.3955	29626	31.64
.2905	29437	27.65	.3270	29501	28.03	.3605	29564	26.76	.3960	29627	31.64
.2910	29438	27.65	.3275	29502	28.03	.3610	29565	26.76	.3965	29628	31.64
.2915	29439	27.65	.3280	29503	28.03	.3615	29566	26.76	.3975	29629	31.64
.2920	29440	27.65	.3285	29504	28.03	.3620	29567	26.76	.3980	29630	31.64
.2925	29441	27.65	.3290	29505	28.03	.3625	29568	26.76	.3985	29631	31.64
.2930	29442	27.65	.3295	29506	28.03	.3630	29569	26.76	.3990	29632	31.64
.2935	29443	27.65	.3300	29507	28.03	.3635	29570	26.76	.3995	29633	31.64
.2940	29444	27.65	.3305	29508	28.03	.3640	29571	26.76	.4000	29634	31.64
.2945	29445	27.65	.3310	29509	28.03	.3645	29572	26.76	.4005	29635	31.64
.2955	29446	27.65	.3315	29510	28.03	.3650	29573	26.76	.4010	29636	31.64
.2960	29447	27.65	.3325	29511	28.03	.3655	29574	26.76	.4015	29637	31.64
.2965	29448	27.65	.3330	29512	28.03	.3660	29575	26.76	.4020	29638	31.64
.2970	29449	25.38	.3335	29513	28.03	.3665	29576	26.76	.4025	29639	31.64
.2975	29450	25.38	.3340	29514	28.03	.3670	29577	26.76	.4030	29640	31.64
.2980	29451	25.38	.3345	29515	28.03	.3675	29578	26.76	.4035	29641	31.64
.2985	29452	25.38	.3350	29516	28.03	.3685	29579	26.76	.4045	29642	31.64
.2990	29453	25.38	.3355	29517	28.03	.3690	29580	26.76	.4050	29643	31.64
.2995	29454	25.38	.3360	29518	28.03	.3695	29581	26.76	.4055	29644	31.64
.3000	29455	25.38	.3365	29519	28.03	.3700	29582	26.76	.4060	29645	31.64
.3005	29456	25.38	.3370	29520	28.03	.3705	29583	26.76	.4065	29646	31.64
.3010	29457	25.38	.3375	29521	28.03	.3710	29584	26.76	.4070	29647	31.64
.3015	29458	25.38	.3380	29522	28.03	.3715	29585	26.76	.4075	29648	31.64
.3025	29459	25.38	.3385	29523	28.03	.3720	29586	26.76	.4080	29649	31.64
.3030	29460	25.38	.3395	29524	28.03	.3725	29587	26.76	.4085	29650	31.64
.3035	29461	25.38	.3400	29525	28.03	.3735	29588	26.76	.4090	29651	31.64
.3040	29462	25.38	.3405	29526	28.03	.3755	29589	30.62	.4095	29652	31.64
.3045	29463	25.38	.3410	29527	28.03	.3765	29590	30.62	.4100	29653	31.64
.3050	29464	25.38	.3415	29528	28.03	.3775	29591	30.62	.4105	29654	31.64
.3055	29465	25.38	.3420	29529	28.03	.3780	29592	30.62	.4110	29655	31.64
.3060	29466	25.38	.3425	29530	28.03	.3785	29593	30.62	.4115	29656	31.64
.3065	29467	25.38	.3430	29531	28.03	.3790	29594	30.62	.4120	29657	31.64
.3070	29468	25.38	.3435	29532	28.03	.3795	29595	30.62	.4125	29658	31.64
.3075	29469	25.38	.3440	29533	29.21	.3800	29596	30.62	.4135	29659	31.64
.3080	29470	25.38	.3445	29534	29.21	.3805	29597	30.62	.4140	29660	31.64
.3085	29471	25.38	.3450	29535	29.21	.3810	29598	30.62	.4145	29661	31.64
.3090	29472	25.38	.3455	29536	29.21	.3815	29599	30.62	.4150	29662	31.64
.3095	29473	25.38	.3460	29537	29.21	.3820	29600	30.62	.4155	29663	31.64
.3100	29474	25.38	.3465	29538	29.21	.3825	29601	30.62	.4160	29664	31.64
.3110	29475	25.38	.3470	29539	29.21	.3830	29602	30.62	.4165	29665	31.64
.3130	29476	28.03	.3475	29540	29.21	.3835	29603	30.62	.4170	29666	31.64
.3140	29478	28.03	.3485	29541	29.21	.3840	29604	30.62	.4175	29667	31.64
.3145	29479	28.03	.3490	29542	29.21	.3845	29605	30.62	.4180	29668	31.64
.3155	29480	28.03	.3495	29543	29.21	.3850	29606	30.62	.4185	29669	31.64
.3165	29481	28.03	.3500	29544	29.21	.3855	29607	30.62	.4190	29670	31.64
.3170	29482	28.03	.3505	29545	29.21	.3865	29608	30.62	.4195	29671	31.64
.3175	29483	28.03	.3510	29546	29.21	.3870	29609	30.62	.4200	29672	31.64
.3180	29484	28.03	.3515	29547	29.21	.3875	29610	30.62	.4205	29673	31.64
.3185	29485	28.03	.3520	29548	29.21	.3880	29611	30.62	.4210	29674	31.64
.3190	29486	28.03	.3525	29549	29.21	.3885	29612	30.62	.4215	29675	31.64
.3195	29487	28.03	.3530	29550	29.21	.3890	29613	30.62	.4220	29676	30.11
.3200	29488	28.03	.3535	29551	29.21	.3895	29614	30.62	.4225	29677	30.11
.3205	29489	28.03	.3540	29552	29.21	.3900	29615	30.62	.4230	29678	30.11
.3210	29490	28.03	.3545	29553	29.21	.3905	29616	30.62	.4235	29679	30.11
.3215	29491	28.03	.3550	29554	29.21	.3910	29617	31.64	.4240	29680	30.11
.3220	29492	28.03	.3555	29555	29.21	.3915	29618	31.64	.4245	29681	30.11
.3225	29493	28.03	.3560	29556	29.21	.3920	29619	31.64	.4250	29682	30.11
.3235	29494	28.03	.3565	29557	29.21	.3925	29620	31.64	.4255	29683	30.11
.3240	29495	28.03	.3570	29558	29.21	.3930	29621	31.64	.4260	29684	30.11
.3245	29496	28.03	.3575	29559	29.21	.3935	29622	31.64	.4265	29685	30.11
.3250	29497	28.03	.3585	29560	29.21	.3940	29623	31.64	.4270	29686	30.11

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Decimal Size Chucking Reamers (continued)

List No. 1655H

DEC. SIZE	EDP NO.	LIST PRICE	DEC. SIZE	EDP NO.	LIST PRICE	DEC. SIZE	EDP NO.	LIST PRICE	DEC. SIZE	EDP NO.	LIST PRICE
.4275	29687	$30.11	.4615	29750	$33.91	.4930	29813	$31.86	.7495	29874	$60.99
.4280	29688	30.11	.4620	29751	33.91	.4935	29814	31.86	.7505	29875	62.05
.4285	29689	30.11	.4625	29752	33.91	.4940	29815	31.86	.7510	29876	62.05
.4290	29690	30.11	.4630	29753	33.91	.4945	29816	31.86	.7515	29877	62.05
.4295	29691	30.11	.4635	29754	33.91	.4950	29817	31.86	.7520	29878	62.05
.4300	29692	30.11	.4640	29755	33.91	.4955	29818	31.86	.7525	29879	62.05
.4305	29693	30.11	.4645	29756	33.91	.4960	29819	31.86	.7530	29880	62.05
.4310	29694	30.11	.4650	29757	33.91	.4965	29820	31.86	.7540	29881	62.05
.4315	29695	30.11	.4655	29758	33.91	.4970	29821	31.86	.7550	29882	62.05
.4320	29696	30.11	.4660	29759	33.91	.4975	29822	31.86	.8095	29883	62.05
.4325	29697	30.11	.4665	29760	33.91	.4985	29823	31.86	.8100	29884	62.05
.4330	29698	30.11	.4670	29761	33.91	.5005	29824	41.72	.8105	29885	62.05
.4335	29699	30.11	.4675	29762	33.91	.5015	29825	41.72	.8110	29886	62.05
.4340	29700	30.11	.4680	29763	33.91	.5020	29826	41.72	.8115	29887	62.05
.4345	29701	30.11	.4685	29764	33.91	.5025	29827	41.72	.8120	29888	62.05
.4350	29702	30.11	.4690	29765	33.91	.5030	29828	41.72	.8130	29889	67.53
.4360	29703	30.11	.4695	29766	33.91	.5035	29829	41.72	.8135	29890	67.53
.4380	29704	33.91	.4700	29767	33.91	.5040	29830	41.72	.8140	29891	67.53
.4390	29705	33.91	.4705	29768	33.91	.5045	29831	41.72	.8145	29892	67.53
.4395	29706	33.91	.4710	29769	33.91	.5050	29832	41.72	.8150	29893	67.53
.4400	29707	33.91	.4715	29770	33.91	.5060	29833	41.72	.8155	29894	67.53
.4405	29708	33.91	.4720	29771	33.91	.5070	29834	41.72	.8720	29895	68.88
.4410	29709	33.91	.4725	29772	33.91	.5090	29835	41.72	.8725	29896	68.88
.4415	29710	33.91	.4730	29773	33.91	.5100	29836	41.72	.8730	29897	68.88
.4420	29711	33.91	.4735	29774	33.91	.5600	29837	40.96	.8735	29898	68.88
.4425	29712	33.91	.4740	29775	33.91	.5605	29838	40.96	.8740	29899	68.88
.4430	29713	33.91	.4745	29776	33.91	.5610	29839	40.96	.8745	29900	68.88
.4435	29714	33.91	.4750	29777	33.91	.5615	29932	40.96	.8755	29901	80.16
.4440	29715	33.91	.4755	29778	33.91	.5620	29840	40.96	.8760	29902	80.16
.4445	29716	33.91	.4760	29779	33.91	.5630	29841	46.66	.8765	29903	80.16
.4450	29717	33.91	.4765	29780	33.91	.5635	29933	46.66	.8770	29904	80.16
.4455	29718	33.91	.4770	29781	33.91	.5640	29842	46.66	.8775	29905	80.16
.4460	29719	33.91	.4775	29782	33.91	.5645	29843	46.66	.8780	29906	80.16
.4465	29720	33.91	.4780	29783	33.91	.5650	29844	46.66	.9340	29907	80.16
.4470	29721	33.91	.4785	29784	33.91	.5655	29845	46.66	.9345	29908	80.16
.4475	29722	33.91	.4790	29785	33.91	.6220	29846	45.93	.9350	29909	80.16
.4480	29723	33.91	.4795	29786	33.91	.6225	29847	45.93	.9355	29910	80.16
.4485	29724	33.91	.4800	29787	33.91	.6230	29848	45.93	.9360	29911	80.16
.4490	29725	33.91	.4805	29788	33.91	.6235	29849	45.93	.9365	29912	80.16
.4495	29726	33.91	.4810	29789	33.91	.6240	29850	45.93	.9370	29913	80.16
.4500	29727	33.91	.4815	29790	33.91	.6245	29851	45.93	.9380	29914	86.83
.4505	29728	33.91	.4820	29791	33.91	.6255	29852	50.49	.9385	29915	86.83
.4510	29729	33.91	.4825	29792	33.91	.6260	29853	50.49	.9390	29916	86.83
.4515	29730	33.91	.4830	29793	33.91	.6265	29854	50.49	.9395	29917	86.83
.4520	29731	33.91	.4835	29794	33.91	.6270	29855	50.49	.9400	29918	86.83
.4525	29732	33.91	.4840	29795	33.91	.6275	29856	50.49	.9405	29919	86.83
.4530	29733	33.91	.4845	29796	31.86	.6280	29857	50.49	.9970	29920	88.49
.4535	29734	33.91	.4850	29797	31.86	.6845	29858	50.49	.9975	29921	88.49
.4540	29735	33.91	.4855	29798	31.86	.6850	29859	50.49	.9980	29922	88.49
.4545	29736	33.91	.4860	29799	31.86	.6855	29860	50.49	.9985	29923	88.49
.4550	29737	33.91	.4865	29800	31.86	.6860	29861	50.49	.9990	29924	88.49
.4555	29738	33.91	.4870	29801	31.86	.6865	29862	50.49	.9995	29925	88.49
.4560	29739	33.91	.4875	29802	31.86	.6870	29863	50.49	1.0005	29926	117.77
.4565	29740	33.91	.4880	29803	31.86	.6880	29864	54.70	1.0010	29927	117.77
.4570	29741	33.91	.4885	29804	31.86	.6885	29865	54.70	1.0015	29928	117.77
.4575	29742	33.91	.4890	29805	31.86	.6890	29866	54.70	1.0020	29929	117.77
.4580	29743	33.91	.4895	29806	31.86	.6895	29867	54.70	1.0025	29930	117.77
.4585	29744	33.91	.4900	29807	31.86	.6900	29868	54.70	1.0030	29931	117.77
.4590	29745	33.91	.4905	29808	31.86	.6905	29869	54.70			
.4595	29746	33.91	.4910	29809	31.86	.7470	29870	60.99			
.4600	29747	33.91	.4915	29810	31.86	.7475	29871	60.99			
.4605	29748	33.91	.4920	29811	31.86	.7485	29872	60.99			
.4610	29749	33.91	.4925	29812	31.86	.7490	29873	60.99			

Intermediate Size Straight Shank Chucking Reamers

High Speed Steel
Straight Flute – Right Hand Cut

List No. 1655I

Size Range .0100″-1.9999″

Price on Application

Dowel Pin Size Straight Shank Chucking Reamers

List No. 1655D

High Speed Steel — Right Hand Cut Straight Flute

45° Chamfer for reaming of most materials.

Dowel Pin Reamers are produced with increased back taper and a minus diameter tolerance.

Chucking Reamers are produced with minimal back taper and a plus diameter tolerance.

STANDARD PACKAGE All sizes – 1 each

DIAMETER TOLERANCES +.0000, -.0002

DECIMAL SIZE	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
.1230	⅞	3½	4	21561	$14.26
.1247	⅞	3½	4	21562	14.26
.1855	1⅛	4½	6	21563	18.17
.1870	1⅛	4½	6	21564	18.17
.2480	1½	6	6	21565	19.86
.2495	1½	6	6	21566	19.86
.3105	1½	6	6	21567	23.34

DECIMAL SIZE	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
.3120	1½	6	6	21568	$23.34
.3730	1¾	7	6	21569	25.18
.3745	1¾	7	6	21570	25.18
.4355	1¾	7	6	21571	28.44
.4370	1¾	7	6	21572	28.44
.4980	2	8	6	21573	30.96
.4995	2	8	6	21574	30.96

Reamer Terminology

Machine Chucking Reamer — Used primarily in machines such as turret lathes, transfer lines, numerical control, etc. for production reaming.

Hand Reamer — Used primarily by hand utilizing wrench and driven by the square. Excellent for tool and die work, machine and repair shop. May be machine driven in some cases.

Shank — The part of the reamer which is held and driven.

Neck — The section of reduced diameter between the body and the shank.

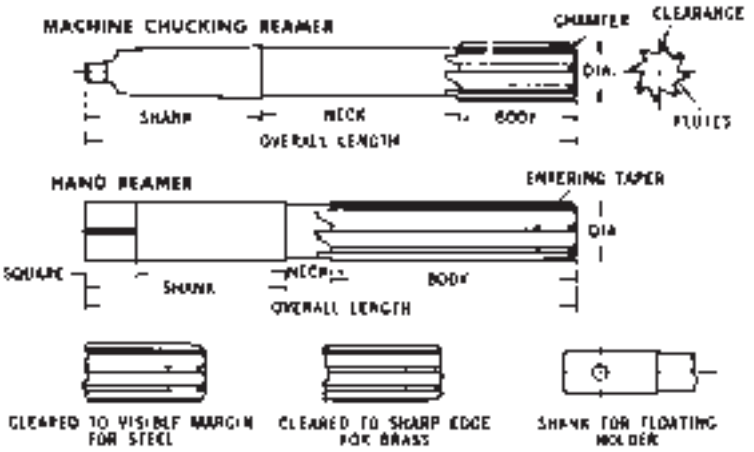
Diameter — The diameter over the body of the reamer measured at the point.

Chamfer — The leading cutting edge of the reamer, usually 45°.

Clearance — The relief on the outside diameter of the reamer, usually running to a theoretically sharp edge or cylindrical margin as the material to be reamed dictates.

Flutes — Helical or straight grooves cut or formed in the body of the reamer to permit chip flow and form lands for proper clearance.

Overall Length — The length from the extreme end of the shank to the extreme end of the body section. Does not include conical point when used as in structural reamers.



Cobalt Straight Shank Chucking Reamers

Straight Flute — Right Hand Cut

45° Chamfer for reaming of most materials. **M42 8% Cobalt** steel offers increased hardness, toughness, wear resistance and heat resistance. Recommended for reaming high alloy steels, titanium, inconel, stainless steel and other difficult-to-ream materials. Longer tool life in production applications.

List No. 2655 - Fractional

Diameter Tolerances
up to ½" (including 12.5 mm) — +.0002/-0
over ½" to ⅝" — +.0003/-0
over ⅝" to 1½" — +.0001/+.0004

STANDARD PACKAGE All sizes — 1 each

SIZE	DEC. EQUIV.	SH. DIA.	L.O.F.	OAL	NO. OF FLT.	EDP NO.	LIST PRICE
1/16	.0625	.0585	½	2½	4	22400	$16.79
5/64	.0781	.0720	¾	3	4	22401	13.51
3/32	.0938	.0880	¾	3	4	22402	13.51
7/64	.1094	.1030	⅞	3½	4	22403	14.05
1/8	.1250	.1190	⅞	3½	4	22404	11.23
9/64	.1406	.1350	1	4	4	22405	16.79
5/32	.1562	.1510	1	4	6	22406	15.08
11/64	.1719	.1645	1⅛	4½	6	22407	17.90
3/16	.1875	.1805	1⅛	4½	6	22408	16.13
13/64	.2031	.1945	1¼	5	6	22409	21.68
7/32	.2188	.2075	1¼	5	6	22410	21.68
15/64	.2344	.2265	1½	6	6	22411	22.30
1/4	.2500	.2405	1½	6	6	22413	19.03
17/64	.2656	.2485	1½	6	6	22415	30.34
9/32	.2812	.2485	1½	6	6	22416	28.84
19/64	.2969	.2792	1½	6	6	22417	30.34
5/16	.3125	.2792	1½	6	6	22419	27.36
21/64	.3281	.2792	1½	6	6	22421	32.70
11/32	.3438	.2792	1½	6	6	22422	32.70
23/64	.3594	.3105	1¾	7	6	22423	33.24
3/8	.3750	.3105	1¾	7	6	22425	29.93
25/64	.3906	.3105	1¾	7	6	22427	40.54
13/32	.4062	.3105	1¾	7	6	22428	40.54
27/64	.4219	.3730	1¾	7	6	22429	$40.54
7/16	.4325	.3730	1¾	7	6	22431	38.51
29/64	.4531	.3730	1¾	7	6	22433	46.47
15/32	.4688	.3730	1¾	7	6	22434	46.47
31/64	.4844	.4355	2	8	6	22435	46.47
½	.5000	.4355	2	8	6	22437	44.10
17/32	.5312	.4355	2	8	6	22440	52.14
9/16	.5625	.4355	2	8	8	22443	52.14
19/32	.5938	.4355	2	8	8	22445	52.14
⅝	.6250	.5615	2¼	9	8	22448	60.81
21/32	.6562	.5615	2¼	9	8	22451	68.76
11/16	.6875	.5615	2¼	9	8	22454	68.76
23/32	.7188	.5615	2¼	9	8	22457	76.77
¾	.7500	.6240	2½	9½	8	22460	77.18
25/32	.7812	.6240	2½	9½	8	22463	83.23
13/16	.8125	.6240	2½	9½	8	22466	83.23
27/32	.8438	.6240	2½	9½	8	22469	98.49
⅞	.8750	.7490	2⅝	10	8	22472	100.76
29/32	.9062	.7490	2⅝	10	8	22475	108.59
15/16	.9375	.7490	2⅝	10	8	22478	108.59
31/32	.9688	.7490	2⅝	10	8	22481	121.61
1	1.000	.8740	2¾	10½	8	22484	122.77

List 2655M — Cobalt Metric Sizes

MM SIZE	DEC. EQUIV.	SH. DIA.	L.O.F.	OAL	NO. OF FLT.	EDP NO.	LIST PRICE
1.0	.0394	.0394	½	2½	4	22515	$17.03
1.5	.0591	.0510	½	2½	4	22516	17.03
2.0	.0787	.0720	¾	3	4	22517	20.55
2.5	.0984	.0928	⅞	3½	4	22518	13.83
3.0	.1181	.1120	⅞	3½	4	22519	14.25
3.5	.1378	.1350	1	4	4	22520	17.03
4.0	.1575	.1510	1	4	6	22521	17.03
4.5	.1772	.1704	1⅛	4½	6	22522	18.16
5.0	.1969	.1895	1¼	5	6	22523	21.98
5.5	.2165	.2075	1¼	5	6	22524	21.98
6.0	.2362	.2265	1½	6	6	22525	22.70
6.5	.2559	.2405	1½	6	6	22526	22.70
7.0	.2756	.2485	1½	6	6	22527	$30.78
7.5	.2953	.2792	1½	6	6	22528	30.78
8.0	.3150	.2792	1½	6	6	22529	30.78
8.5	.3346	.2792	1½	6	6	22530	33.17
9.0	.3543	.3105	1¾	7	6	22531	33.72
9.5	.3740	.3105	1¾	7	6	22532	32.03
10.0	.3937	.3105	1¾	7	6	22533	41.12
10.5	.4134	.3730	1¾	7	6	22534	41.12
11.0	.4331	.3730	1¾	7	6	22535	41.12
11.5	.4528	.3730	1¼	7	6	22536	47.17
12.0	.4724	.4355	2	8	6	22537	47.17
12.5	.4921	.4355	2	8	6	22538	47.17

Cobalt Chucking Reamer Set

Straight Shank — Straight Flute Right Hand Cut

SET NO.	SIZE RANGE	EDP NO.	LIST PRICE
501C	1/16 - ½ by 64ths	22510	$849.85

List No. 2655
In Metal Indexed Case

Carbide Tipped Straight Shank Chucking Reamers

Straight Flute — Right Hand Cut

Carbide Tipped offers excellent wear resistance for general reaming of steel, cast iron, plastics, and other abrasive non-ferrous materials. Longer tool life in production applications.

List No. 5655

STANDARD PACKAGE All sizes — 1 each

Tools are furnished to a +.0003 -.0000 diameter tolerance.

SIZE	DEC. EQUIV.	SH. DIA.	L.O.F.	OAL	NO. OF FLT.	EDP NO.	LIST PRICE
3/16	.1875	11/64	1 1/8	4 1/2	4	55212	$55.60
13/64	.2031	11/64	1 1/8	4 1/2	4	55213	55.60
7/32	.2187	13/64	1 1/4	5	4	55214	55.60
15/64	.2344	7/32	1 1/2	6	4	55215	55.60
1/4	.2500	15/64	1 1/2	6	4	55216	55.60
17/64	.2656	15/64	1 1/2	6	4	55217	56.92
9/32	.2812	15/64	1 1/2	6	4	55218	56.92
19/64	.2969	9/32	1 1/2	6	4	55219	56.92
5/16	.3125	9/32	1 1/2	6	4	55220	56.92
21/64	.3281	9/32	1 1/2	6	4	55221	58.91
11/32	.3437	9/32	1 1/2	6	4	55222	58.91
23/64	.3594	5/16	1 3/4	7	4	55223	59.00
3/8	.3750	5/16	1 3/4	7	4	55224	59.00
25/64	.3906	5/16	1 3/4	7	4	55225	61.67
13/32	.4062	5/16	1 3/4	7	4	55226	61.67
27/64	.4219	3/8	1 3/4	7	4	55227	65.75
7/16	.4375	3/8	1 3/4	7	4	55228	65.75
29/64	.4531	3/8	1 3/4	7	4	55229	66.97
15/32	.4687	3/8	1 3/4	7	4	55230	66.97
31/64	.4844	7/16	2	8	6	55231	72.28
1/2	.5000	7/16	2	8	6	55232	72.39
33/64	.5156	7/16	2	8	6	55233	74.27
17/32	.5312	7/16	2	8	6	55234	74.27
35/64	.5469	7/16	2	8	6	55235	74.36
9/16	.5625	7/16	2	8	6	55236	74.36
37/64	.5781	7/16	2	8	6	55237	77.13
19/32	.5938	7/16	2	8	6	55238	77.13
39/64	.6094	9/16	2 1/4	9	6	55239	77.25
5/8	.6250	9/16	2 1/4	9	6	55240	77.25
41/64	.6406	9/16	2 1/4	9	6	55241	78.57
21/32	.6562	9/16	2 1/4	9	6	55242	78.57
43/64	.6719	9/16	2 1/4	9	6	55243	$78.57
11/16	.6875	9/16	2 1/4	9	6	55244	78.57
45/64	.7031	9/16	2 1/4	9	6	55245	81.99
23/32	.7187	9/16	2 1/4	9	6	55246	81.99
47/64	.7344	5/8	2 1/2	9 1/2	6	55247	82.22
3/4	.7500	5/8	2 1/2	9 1/2	6	55248	82.22
49/64	.7656	5/8	2 1/2	9 1/2	6	55249	84.86
25/32	.7812	5/8	2 1/2	9 1/2	6	55250	84.86
51/64	.7969	5/8	2 1/2	9 1/2	6	55251	84.99
13/16	.8125	5/8	2 1/2	9 1/2	6	55252	84.99
53/64	.8281	5/8	2 1/2	9 1/2	6	55253	88.17
27/32	.8437	5/8	2 1/2	9 1/2	6	55254	88.17
55/64	.8594	3/4	2 5/8	10	6	55255	88.31
7/8	.8750	3/4	2 5/8	10	6	55256	88.31
57/64	.8906	3/4	2 5/8	10	6	55257	102.99
29/32	.9062	3/4	2 5/8	10	6	55258	102.99
59/64	.9219	3/4	2 5/8	10	8	55259	102.99
15/16	.9375	3/4	2 5/8	10	8	55260	102.99
61/64	.9531	3/4	2 5/8	10	8	55261	107.87
31/32	.9687	3/4	2 5/8	10	8	55262	107.87
63/64	.9844	7/8	2 3/4	10 1/2	8	55263	107.96
1	1.0000	7/8	2 3/4	10 1/2	8	55264	107.96
1 1/16	1.0625	7/8	2 3/4	10 1/2	8	55304	116.26
1 1/8	1.1250	7/8	2 7/8	11	8	55308	125.87
1 3/16	1.1875	1	2 7/8	11	8	55312	132.29
1 1/4	1.2500	1	3	11 1/2	8	55316	139.68
1 5/16	1.3125	1	3	11 1/2	8	55320	147.21
1 3/8	1.3750	1	3 1/4	12	8	55324	156.04
1 7/16	1.4375	1 1/4	3 1/4	12	8	55328	174.04
1 1/2	1.5000	1 1/4	3 1/2	12 1/2	8	55332	182.63

SPECIAL TAPS FAST QUOTE SERVICE

Call Morse Cutting Tools for all of your special tap needs.
To expedite your quote please provide the following information:

TAP SIZE _____ CLASS of FIT or H LIMIT _____ # of FLUTES _____

TYPE of TAP _____ SURFACE TREATMENT _____

MATERIAL to be THREADED _____ HARDNESS _____

BLIND or THROUGH HOLE _____ LENGTH of THREAD _____

# of HOLES to TAP _____ TAPPING EQUIPMENT USED _____

CURRENT TAP USED _____ TAPPING PROBLEM _____

Solid Carbide Straight Shank Chucking Reamers

Straight Flute — Right Hand Cut — 4-Flute

Solid Carbide offers excellent rigidity and wear resistance. Recommended for general reaming of ferrous and non-ferrous materials including steel, alloy steel, stainless steel, plastic, aluminum and other abrasive non-ferrous materials. Longer tool life in production applications.

List No. 5661

STANDARD PACKAGE All sizes — 1 each

DIAMETER TOLERANCES +.0003", -.0000"

SIZE	DEC. EQUIV.	SHANK DIA.	L.O.F.	OAL	EDP NO.	LIST PRICE
1/16	.0625	.0625	3/8	1 1/2	55732	$23.85
5/64	.0781	.0670	1/2	1 3/4	55738	24.80
3/32	.0937	.0820	1/2	2	55745	25.75
7/64	.1094	.1000	5/8	2 1/4	55752	27.35
1/8	.1250	.1170	5/8	2 1/4	55758	28.30
9/64	.1406	.1320	3/4	2 1/2	55762	29.85
5/32	.1562	.1406	3/4	2 1/2	55768	33.70
11/64	.1719	.1620	7/8	2 3/4	55774	$35.90
3/16	.1875	.1800	7/8	2 3/4	55780	39.40
13/64	.2031	.1900	1	3	55787	41.95
7/32	.2187	.2050	1	3	55792	46.70
15/64	.2344	.2200	1	3	55796	50.50
1/4	.2500	.2350	1	3	55801	53.70

Carbide Tipped Flute Long Carbide Straight Shank Chucking Reamers

Carbide Full Length of Flutes specially designed for precision reaming in **deep holes** and for long production runs. **Carbide Tipped** offers excellent wear resistance for general reaming of steel, cast iron, plastics, and other abrasive non-ferrous materials. Longer tool life in production applications.

List No. 5659

STANDARD PACKAGE All sizes — 1 each

DIAMETER TOLERANCES +.0003", -.0000"

SIZE	DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
1/4	.2500	15/64	1 1/2	6	4	55516	$61.23
9/32	.2812	15/64	1 1/2	6	4	55518*	62.44
5/16	.3125	9/32	1 1/2	6	4	55520	62.44
11/32	.3437	9/32	1 1/2	6	4	55522*	64.75
3/8	.3750	5/16	1 3/4	7	4	55524	64.75
13/32	.4062	5/16	1 3/4	7	4	55526*	67.96
7/16	.4375	3/8	1 3/4	7	4	55528	73.49
15/32	.4687	3/8	1 3/4	7	4	55530*	79.45
1/2	.5000	7/16	2	8	6	55532	79.45
17/32	.5312	7/16	2	8	6	55534*	81.66
9/16	.5625	7/16	2	8	6	55536	81.66
5/8	.6250	9/16	2	9	6	55540	84.77
11/16	.6875	9/16	2	9	6	55544	86.31
3/4	.7500	5/8	2	9 1/2	6	55548	90.29
25/32	.7812	5/8	2	9 1/2	6	55550*	93.40
13/16	.8125	5/8	2	9 1/2	6	55552	93.40
7/8	.8750	3/4	2 1/4	10	6	55556	97.13
29/32	.9062	3/4	2 1/4	10	6	55558*	113.15
15/16	.9375	3/4	2 1/4	10	8	55560	113.15
31/32	.9687	3/4	2 1/4	10	8	55562*	118.58
1	1.0000	7/8	2 1/4	10 1/2	8	55564	118.58
1 1/16	1.0625	7/8	2 1/4	10 1/2	8	55334	127.97
1 1/8	1.1250	7/8	2 1/4	11	8	55338	138.45
1 1/4	1.2500	1	2 1/2	11 1/2	8	55342	169.09
1 3/8	1.3750	1	2 1/2	12	8	55346	171.63

*** Available While Supplies Last**

Expansion Straight Shank Chucking Reamers

High Speed Steel
Straight Flute — Right Hand Cut

Expansion Reamers are expandable to permit many regrinds to the original reamer size. Recommended for reaming a wide range of materials.

List No. 1733

STANDARD PACKAGE All sizes — 1 each

NOTE: Expansion feature is for expansion and regrind to the original reamer size only. Not to be used as an adjustable reamer for producing different hole sizes. Expansion screw should never be loosened to achieve a smaller reamer size.

SIZE	DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
3/8	.3750	5/16	3/4	7	6	22901	$76.50
13/32	.4062	5/16	3/4	7	6	22902	81.51
7/16	.4375	3/8	7/8	7	6	22903	81.51
15/32	.4688	27/64	7/8	7	6	22904	84.62
1/2	.5000	7/16	1	8	6	22905	86.13
17/32	.5313	7/16	1	8	6	22906	89.78
9/16	.5625	7/16	1 1/8	8	6	22907	92.07
19/32	.5938	7/16	1 1/8	8	6	22908	93.46
5/8	.6250	9/16	1 1/4	9	6	22909	96.31
21/32	.6562	9/16	1 1/4	9	6	22910	100.16
11/16	.6875	9/16	1 1/4	9	6	22911	100.16
23/32	.7188	9/16	1 1/4	9	6	22912	107.39
3/4	.7500	5/8	1 3/8	9 1/2	6	22913	111.08
25/32	.7812	5/8	1 3/8	9 1/2	6	22914	117.61
13/16	.8125	5/8	1 3/8	9 1/2	6	22915	122.13
27/32	.8438	5/8	1 3/8	9 1/2	6	22916	127.32
7/8	.8750	3/4	1 1/2	10	6	22917	132.34
29/32	.9062	3/4	1 1/2	10	6	22918	137.98
15/16	.9375	3/4	1 1/2	10	6	22919	144.42
31/32	.9688	3/4	1 1/2	10	6	22920	150.96
1	1.0000	7/8	1 5/8	10 1/2	8	22921	159.23
1 1/16	1.0625	7/8	1 5/8	10 1/2	8	22922	176.00
1 1/8	1.1250	7/8	1 3/4	11	8	22923	192.59
1 3/16	1.1875	1	1 3/4	11	8	22924	202.84
1 1/4	1.2500	1	1 7/8	11 1/2	8	22925	218.61

Carbide Tipped Expansion Straight Shank Chucking Reamers

Straight Flute — Right Hand Cut

Expansion Reamers are expandable to permit many regrinds to the original reamer size. **Carbide Tipped** offers excellent wear resistance for general reaming of steel, cast iron, plastics, and other abrasive non-ferrous materials. Longer tool life in production applications.

List No. 5733

NOTE: Expansion feature is for expansion and regrind to the original reamer size only. Not to be used as an adjustable reamer for producing different hole sizes. Expansion screw should never be loosened to achieve a smaller reamer size.

STANDARD PACKAGE All sizes — 1 each

SIZE	DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
3/8	.3750	5/16	1	7	4	56003	$99.91
7/16	.4375	3/8	1	7	4	56004	106.08
15/32	.4687	3/8	1	7	4	56036*	110.83
1/2	.5000	7/16	1	8	6	56005	111.38
9/16	.5625	7/16	1 1/8	8	6	56007	115.26
5/8	.6250	9/16	1 1/4	9	6	56009	120.34
21/32	.6562	9/16	1 1/4	9	6	56010*	131.52
11/16	.6875	9/16	1 1/4	9	6	56011	131.63
3/4	.7500	5/8	1 3/8	9 1/2	6	56013	136.57
25/32	.7812	5/8	1 3/8	9 1/2	6	56014*	147.03

*Available While Supplies Last

(continued)

Carbide Tipped Expansion Chucking Reamers (continued)

List No. 5733

SIZE	DEC. EQUIV.	SHANK DIA.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
13/16	.8125	5/8	1 3/8	9 1/2	6	56015	$147.15
27/32	.8437	5/8	1 3/8	9 1/2	6	56016*	152.90
7/8	.8750	3/4	1 1/2	10	6	56017	152.94
15/16	.9375	3/4	1 1/2	10	8	56019	162.68
1	1.000	7/8	1 5/8	10 1/2	8	56021	169.01
1 1/16	1.0625	7/8	1 5/8	10 1/2	8	56023	178.94
1 1/8	1.1250	7/8	1 3/4	11	8	56025	185.43
1 3/16	1.1875	1	1 3/4	11	8	56026	197.36
1 1/4	1.2500	1	1 7/8	11 1/2	8	56027	202.15
1 5/16	1.3125	1	1 7/8	11 1/2	8	56028*	211.46
1 3/8	1.3750	1	2	12	8	56029	234.63
1 1/2	1.5000	1 1/4	2 1/8	12 1/2	8	56031	252.41
1 11/16	1.6875	1 1/4	2 1/8	12 1/2	8	56039*	338.86
1 13/16	1.8125	1 1/4	2 1/8	12 1/2	8	56040*	401.20
1 7/8	1.8750	1 1/4	2 1/8	12 1/2	8	56041*	402.05
1 15/16	1.9375	1 1/4	2 1/8	12 1/2	8	56042*	438.31
2	2.0000	1 1/4	2 1/8	12 1/2	8	56043*	438.31

*Available While Supplies Last

Right Hand Helix Straight Shank Chucking Reamers

High Speed Steel — Right Hand Cut

Right Hand Helix pulls chips out of the hole in blind hole and through hole applications, bridges interruptions and provides better finish and sizing than straight flute reamers. Recommended for reaming a wide range of materials

List No. 1653

45° Chamfer for reaming of most materials

STANDARD PACKAGE All sizes — 1 each

SIZE	DEC. EQUIV.	L.O.F.	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
1/16	.0625	1/2	2 1/2	4	21701	$18.13
5/64	.0781	3/4	3	4	21702	14.59
3/32	.0938	3/4	3	4	21703	14.49
7/64	.1094	7/8	3 1/2	4	21704	15.16
1/8	.1250	7/8	3 1/2	4	21705	13.65
9/64	.1406	1	4	4	21706	18.13
5/32	.1562	1	4	6	21707	18.13
11/64	.1719	1 1/8	4 1/2	6	21708	19.35
3/16	.1875	1 1/8	4 1/2	6	21709	18.37
13/64	.2031	1 1/4	5	6	21710	21.69
7/32	.2188	1 1/4	5	6	21711	21.69
15/64	.2344	1 1/2	6	6	21712	22.29
1/4	.2500	1 1/2	6	6	21713	19.10
17/64	.2656	1 1/2	6	6	21714	25.06
9/32	.2812	1 1/2	6	6	21715	23.77
19/64	.2969	1 1/2	6	6	21716	25.03
5/16	.3125	1 1/2	6	6	21717	22.53
21/64	.3281	1 1/2	6	6	21718	26.78
11/32	.3438	1 1/2	6	6	21719	26.78
23/64	.3594	1 3/4	7	6	21720	27.04
3/8	.3750	1 3/4	7	6	21721	24.31
25/64	.3906	1 3/4	7	6	21722	29.42
13/32	.4062	1 3/4	7	6	21723	30.50
27/64	.4219	1 3/4	7	6	21724	30.50
7/16	.4375	1 3/4	7	6	21725	28.96
29/64	.4531	1 3/4	7	6	21726	33.21
15/32	.4688	1 3/4	7	6	21727	33.21

SIZE	DEC. EQUIV.	L.O.F.	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
31/64	.4844	2	8	6	21728	$33.21
1/2	.5000	2	8	6	21729	35.48
17/32	.5313	2	8	6	21730	39.20
9/16	.5625	2	8	8	21731	39.20
19/32	.5938	2	8	8	21732	42.46
5/8	.6250	2 1/4	9	8	21733	45.74
21/32	.6562	2 1/4	9	8	21734	48.11
11/16	.6875	2 1/4	9	8	21735	51.72
23/32	.7188	2 1/4	9	8	21736	57.73
3/4	.7500	2 1/2	9 1/2	8	21737	58.04
25/32	.7812	2 1/2	9 1/2	8	21738	62.60
13/16	.8125	2 1/2	9 1/2	8	21739	62.60
27/32	.8438	2 1/2	9 1/2	8	21740	74.09
7/8	.8750	2 5/8	10	8	21741	75.78
29/32	.9062	2 5/8	10	8	21742	81.69
15/16	.9375	2 5/8	10	8	21743	81.69
31/32	.9688	2 5/8	10	8	21744	91.48
1	1.0000	2 3/4	10 1/2	8	21745	92.34
1 1/16	1.0625	2 3/4	10 1/2	8	21746	102.37
1 1/8	1.1250	2 7/8	11	10	21747	108.81
1 3/16	1.1875	2 7/8	11	10	21748	127.43
1 1/4	1.2500	3	11 1/2	10	21749	135.04
1 5/16	1.3125	3	11 1/2	10	21750	157.52
1 3/8	1.3750	3 1/4	12	10	21751	165.52
1 7/16	1.4375	3 1/4	12	10	21752	177.51
1 1/2	1.5000	3 1/2	12 1/2	10	21753	191.12

Carbide Tipped Right Hand Helix Straight Shank Chucking Reamers

Right Hand Cut

List No. 5653

Diameter Tolerance +.0003/-0

STANDARD PACKAGE All sizes — 1 each

Right Hand Helix pulls chips out of the hole in blind hole and through hole applications, bridges interruptions and provides better finish and sizing than straight flute reamers. **Carbide Tipped** offers excellent wear resistance for general reaming of steel, cast iron, plastics, and other abrasive non-ferrous materials. Longer tool life in production applications.

SIZE	DEC. EQUIV.	SH. DIA.	L.O.F.	OAL	NO. OF FLT.	EDP NO.	LIST PRICE
1/4	.2500	15/64	1 1/2	6	4	55151*	$75.59
9/32	.2812	15/64	1 1/2	6	4	55152*	75.59
5/16	.3125	9/32	1 1/2	6	4	55153*	84.93
11/32	.3437	9/32	1 1/2	6	4	55154*	84.93
3/8	.3750	5/16	1 3/4	7	4	55155*	84.20
7/16	.4375	3/8	1 3/4	7	4	55157*	91.52
15/32	.4687	3/8	1 3/4	7	4	55158*	97.13
1/2	.5000	7/16	2	8	6	55159*	98.12
17/32	.5312	7/16	2	8	6	55168*	101.14
9/16	.5625	7/16	2	8	6	55160*	101.14
19/32	.5938	7/16	2	8	6	55169*	104.10
5/8	.6250	9/16	2 1/4	9	6	55161*	104.10
21/32	.6562	9/16	2 1/4	9	6	55170*	107.21
11/16	.6875	9/16	2 1/4	9	6	55162*	114.05

SIZE	DEC. EQUIV.	SH. DIA.	L.O.F.	OAL	NO. OF FLT.	EDP NO.	LIST PRICE
23/32	.7187	9/16	2 1/4	9	6	55171*	$115.70
3/4	.7500	5/8	2 1/2	9 1/2	6	55163*	117.48
25/32	.7812	5/8	2 1/2	9 1/2	6	55172*	120.56
13/16	.8125	5/8	2 1/2	9 1/2	6	55164*	120.56
27/32	.8437	5/8	2 1/2	9 1/2	6	55173*	127.09
7/8	.8750	3/4	2 5/8	10	6	55165*	127.09
29/32	.9062	3/4	2 5/8	10	6	55174*	148.07
15/16	.9375	3/4	2 5/8	10	8	55166*	148.07
31/32	.9687	3/4	2 5/8	10	8	55175*	155.26
1	1.0000	7/8	2 3/4	10 1/2	8	55167*	155.26
1 1/8	1.1250	7/8	2 7/8	11	8	55177*	171.73
1 3/16	1.1875	1	2 7/8	11	8	55178*	180.44
1 1/4	1.2500	1	3	11 1/2	8	55179*	190.96

* Available While Supplies Last

Carbide Tipped Left Hand Helix Straight Shank Chucking Reamers

Right Hand Cut

List No. 5651

Tools are furnished to a +.0003 -.0000 diameter tolerance.

Left Hand Helix, for through holes only, pushes chips ahead of the reamer, bridges interruptions and provides better finish and sizing than straight flute reamers.

Carbide Ttipped offers excellent wear resistance for general reaming of steel, cast iron, plastics and other abrasive non-ferrous materials. Longer tool life in production applicastions.

SIZE	DEC. EQUIV.	SH. DIA.	L.O.F.	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
1/4	.2500	15/64	1 1/2	6	4	55101*	$75.59
9/32	.2812	15/64	1 1/2	6	4	55102*	75.81
5/16	.3125	9/32	1 1/2	6	4	55103*	75.81
3/8	.3750	5/16	1 3/4	7	4	55105*	84.18
13/32	.4062	5/16	1 3/4	7	4	55106*	87.97
7/16	.4375	3/8	1 3/4	7	4	55107*	91.52
15/32	.4688	3/8	1 3/4	7	4	55108*	97.13
1/2	.5000	7/16	2	8	6	55109*	98.12
17/32	.5313	7/16	2	8	6	55118*	101.14
9/16	.5625	7/16	2	8	6	55110*	101.14
19/32	.5938	7/16	2	8	6	55119*	104.10
5/8	.6250	9/16	2 1/4	9	6	55111*	104.10

SIZE	DEC. EQUIV.	SH. DIA.	L.O.F.	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
11/16	.6875	9/16	2 1/4	9	6	55112*	$114.05
23/32	.7188	9/16	2 1/4	9	6	55121*	115.70
3/4	.7500	5/8	2 1/2	9 1/2	6	55113*	117.48
27/32	.8438	5/8	2 1/2	9 1/2	6	55123*	127.09
7/8	.8750	3/4	2 5/8	10	6	55115*	127.09
29/32	.9062	3/4	2 5/8	10	6	55124*	148.07
15/16	.9375	3/4	2 5/8	10	8	55116*	148.07
31/32	.9688	3/4	2 5/8	10	8	55125*	155.26
1	1.0000	7/8	2 3/4	10 1/2	8	55117*	155.26
1 1/8	1.1250	7/8	2 7/8	11	8	55127*	171.73
1 3/16	1.1875	1	2 7/8	11	8	55128*	180.44

* Available While Supplies Last

Left Hand Helix Straight Shank Chucking Reamers

High Speed Steel — Right Hand Cut

45° Chamfer for reaming of most materials. **Left Hand Helix,** for through holes only, pushes chips ahead of the reamer, bridges interruptions and provides better finish and sizing than straight flute reamers.

List No. 1652

Diameter Tolerances
up to ½" — +.0002/-0
over ½" to ⅝" — +.0003/-0
over ⅝" to 1½" — +.0001/+.0004

STANDARD PACKAGE All sizes – 1 each

SIZE	DEC. EQUIV.	SH. DIA.	L.O.F.	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
1/16	.0625	.0585	1/2	2 1/2	4	21884*	$16.95
5/64	.0781	.0720	3/4	3	4	21885*	15.62
3/32	.0938	.0880	3/4	3	4	21886*	16.95
7/64	.1094	.1030	7/8	3 1/2	4	21887*	18.70
1/8	.1250	.1190	7/8	3 1/2	4	21888*	13.86
9/64	.1406	.1350	1	4	4	21889*	19.36
5/32	.1562	.1510	1	4	6	21890*	20.68
11/64	.1719	.1645	1 1/8	4 1/2	6	21891*	21.56
3/16	.1875	.1805	1 1/8	4 1/2	6	21892*	18.92
13/64	.2031	.1945	1 1/4	5	6	21893*	22.88
7/32	.2188	.2075	1 1/4	5	6	21894*	22.66
15/64	.2344	.2265	1 1/2	6	6	21895*	26.62
1/4	.2500	.2405	1 1/2	6	6	21896*	21.61
17/64	.2656	.2485	1 1/2	6	6	21897*	28.38
9/32	.2812	.2485	1 1/2	6	6	21898*	27.50
19/64	.2969	.2792	1 1/2	6	6	21899*	28.38
5/16	.3125	.2792	1 1/2	6	6	21900*	25.09
21/64	.3281	.2792	1 1/2	6	6	21901*	32.12
11/32	.3438	.2792	1 1/2	6	6	21902*	31.46
23/64	.3594	.3105	1 3/4	7	6	21903*	31.24
3/8	.3750	.3105	1 3/4	7	6	21904*	27.72
25/64	.3906	.3105	1 3/4	7	6	21905*	32.61
13/32	.4062	.3105	1 3/4	7	6	21906*	32.78
27/64	.4219	.3730	1 3/4	7	6	21907*	32.43
7/16	.4375	.3730	1 3/4	7	6	21908*	31.16
29/64	.4531	.3730	1 3/4	7	6	21909*	38.28
15/32	.4688	.3730	1 3/4	7	6	21910*	36.96
31/64	.4844	.4355	2	8	6	21911*	$39.16
1/2	.5000	.4355	2	8	6	21912*	35.42
17/32	.5313	.4355	2	8	6	21913*	43.34
9/16	.5625	.4355	2	8	8	21914*	42.24
19/32	.5938	.4355	2	8	8	21915*	51.04
5/8	.6250	.5615	2 1/4	9	8	21916*	49.28
21/32	.6562	.5615	2 1/4	9	8	21917*	54.78
11/16	.6875	.5615	2 1/4	9	8	21918*	56.10
23/32	.7188	.5615	2 1/4	9	8	21919*	63.58
3/4	.7500	.6240	2 1/2	9 1/2	8	21920*	61.38
25/32	.7812	.6240	2 1/2	9 1/2	8	21921*	68.64
13/16	.8125	.6240	2 1/2	9 1/2	8	21922*	69.35
27/32	.8438	.6240	2 1/2	9 1/2	8	21923*	80.08
7/8	.8750	.7490	2 5/8	10	8	21924*	86.29
29/32	.9062	.7490	2 5/8	10	8	21925*	89.32
15/16	.9375	.7490	2 5/8	10	8	21926*	90.34
31/32	.9688	.7490	2 5/8	10	8	21927*	97.77
1	1.0000	.8740	2 3/4	10 1/2	8	21928*	111.10
1 1/16	1.0625	.8740	2 3/4	10 1/2	8	21929*	115.94
1 1/8	1.1250	.8740	2 7/8	11	10	21930*	118.76
1 3/16	1.1875	.9990	2 7/8	11	10	21931*	133.76
1 1/4	1.2500	.9990	3	11 1/2	10	21932*	146.96
1 3/8	1.3750	.9990	3 1/4	12	10	21934*	173.80
1 7/16	1.4375	1.2490	3 1/4	12	10	21935*	191.84
1 1/2	1.5000	1.2490	3 1/2	12 1/2	10	21936*	206.58

* Available While Supplies Last

Taper Shank Chucking Reamers

High Speed Steel — Morse Taper Shank Straight Flute — Right Hand Cut

List No. 1656

45° Chamfer for reaming of most materials.

SIZE	MORSE TAPER NO.	DEC. EQUIV.	L.O.F.	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
1/4	1	.2500	1 1/2	6	6	22311	$30.94
5/16	1	.3125	1 1/2	6	6	22313	31.86
11/32	1	.3438	1 1/2	6	6	22314	34.52
3/8	1	.3750	1 3/4	7	6	22315	35.60
13/32	1	.4062	1 3/4	7	6	22316	37.68
7/16	1	.4375	1 3/4	7	6	22317	36.41
15/32	1	.4688	1 3/4	7	6	22318	40.38
1/2	1	.5000	2	8	6	22319	39.87
17/32	1	.5313	2	8	6	22320	44.54
9/16	1	.5625	2	8	8	22321	47.34
19/32	1	.5938	2	8	8	22322	48.20
5/8	2	.6250	2 1/4	9	8	22323	51.33
21/32	2	.6562	2 1/4	9	8	22324	51.93
11/16	2	.6875	2 1/4	9	8	22325	51.79
23/32	2	.7188	2 1/4	9	8	22326	58.58
3/4	2	.7500	2 1/2	9 1/2	8	22327	58.41
25/32	2	.7812	2 1/2	9 1/2	8	22328	$66.78
13/16	2	.8125	2 1/2	9 1/2	8	22329	66.78
27/32	2	.8438	2 1/2	9 1/2	8	22330	83.19
7/8	2	.8750	2 5/8	10	8	22331	75.36
29/32	2	.9062	2 5/8	10	8	22332	83.19
15/16	3	.9375	2 5/8	10	8	22333	82.93
31/32	3	.9688	2 5/8	10	8	22334	100.37
1	3	1.0000	2 3/4	10 1/2	8	22335	91.80
1 1/16	3	1.0625	2 3/4	10 1/2	8	22336	100.37
1 1/8	3	1.1250	2 7/8	11	10	22337	111.39
1 3/16	3	1.1875	2 7/8	11	10	22338	124.82
1 1/4	4	1.2500	3	11 1/2	10	22339	135.15
1 5/16	4	1.3125	3	11 1/2	10	22340	147.78
1 3/8	4	1.3750	3 1/4	12	10	22341	159.75
1 7/16	4	1.4375	3 1/4	12	10	22342	177.44
1 1/2	4	1.5000	3 1/2	12 1/2	10	22343	184.01

Carbide Tipped Taper Shank Chucking Reamers

Carbide Tipped offers excellent wear resistance for general reaming of steel, cast iron, plastics, and other abrasive non-ferrous materials. Longer tool life in production applications.

List No. 5656

Straight Flute – Morse Taper Shank

Standard Tolerance +.0003″/-.0000″

STANDARD PACKAGE All sizes — 1 each

SIZE	MORSE TAPER NO.	DEC. EQUIV.	L.O.F.	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
1/4	1	.2500	1 1/2	6	4	55416	$64.19
9/32	1	.2812	1 1/2	6	4	55418	64.87
5/16	1	.3125	1 1/2	6	4	55420	64.87
11/32	1	.3437	1 1/2	6	4	55422	66.31
3/8	1	.3750	1 3/4	7	4	55424	67.10
13/32	1	.4062	1 3/4	7	4	55426	70.64
7/16	1	.4375	1 3/4	7	4	55428	75.15
15/32	1	.4687	1 3/4	7	4	55430	77.71
1/2	1	.5000	2	8	6	55432	79.56
17/32	1	.5312	2	8	6	55434	84.64
9/16	1	.5625	2	8	6	55436	84.64
19/32	1	.5938	2	8	6	55438	89.95
5/8	2	.6250	2 1/4	9	6	55440	89.95
21/32	2	.6562	2 1/4	9	6	55442	91.52
11/16	2	.6875	2 1/4	9	6	55444	91.52
23/32	2	.7187	2 1/4	9	6	55446	95.14
3/4	2	.7500	2 1/2	9 1/2	6	55448	95.14
25/32	2	.7812	2 1/2	9 1/2	6	55450	$97.37
13/16	2	.8125	2 1/2	9 1/2	6	55452	97.37
27/32	2	.8437	2 1/2	9 1/2	6	55454	102.00
7/8	2	.8750	2 5/8	10	6	55456	102.00
29/32	2	.9062	2 5/8	10	6	55458	126.19
15/16	3	.9375	2 5/8	10	8	55460	126.19
31/32	3	.9687	2 5/8	10	8	55462	127.86
1	3	1.0000	2 3/4	10 1/2	8	55464	127.86
1 1/16	3	1.0625	2 3/4	10 1/2	8	55466	188.64
1 1/8	3	1.1250	2 7/8	11	8	55468	200.80
1 3/16	3	1.1875	2 7/8	11	8	55470	212.72
1 1/4	4	1.2500	3	11 1/2	8	55472	236.38
1 5/16	4	1.3125	3	11 1/2	8	55474*	254.95
1 7/16	4	1.4375	3 1/4	12	8	55477*	270.74

* Available While Supplies Last

Carbide Tipped Flute Long Carbide Taper Shank Chucking Reamers

Carbide Full Length of Flutes specially designed for precision reaming in **deep holes** and for long production runs. **Carbide Tipped** offers excellent wear resistance for general reaming of steel, cast iron, plastics, and other abrasive non-ferrous materials. Longer tool life in production applications.

List No. 5660

Straight Flute – Morse Taper Shank

Standard Tolerance +.0003″/-.0000″

STANDARD PACKAGE All sizes — 1 each

SIZE	MORSE TAPER NO.	DEC. EQUIV.	L.O.F.	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
1/4	1	.2500	1 1/2	6	4	55616*	$70.64
9/32	1	.2812	1 1/2	6	4	55618*	71.38
5/16	1	.3125	1 1/2	6	4	55620*	71.38
11/32	1	.3437	1 1/2	6	4	55622*	72.94
3/8	1	.3750	1 3/4	7	4	55624*	73.80
13/32	1	.4062	1 3/4	7	4	55626*	77.71
7/16	1	.4375	1 3/4	7	4	55628*	84.55
15/32	1	.4687	1 3/4	7	4	55630*	84.99
1/2	1	.5000	2	8	6	55632*	93.04
17/32	1	.5312	2	8	6	55634*	93.04
9/16	1	.5625	2	8	6	55636*	93.04
19/32	1	.5938	2	8	6	55638*	98.91
5/8	2	.6250	2	9	6	55640*	98.91
21/32	2	.6562	2	9	6	55642*	100.57
11/16	2	.6875	2	9	6	55644*	100.57
23/32	2	.7187	2	9	6	55646*	100.57
3/4	2	.7500	2	9 1/2	6	55648*	$104.65
13/16	2	.8125	2	9 1/2	6	55652*	107.08
27/32	2	.8437	2	9 1/2	6	55654*	112.29
7/8	2	.8750	2 1/4	10	6	55656*	112.29
29/32	2	.9062	2 1/4	10	6	55658*	125.98
15/16	3	.9375	2 1/4	10	8	55660*	138.80
31/32	3	.9687	2 1/4	10	8	55662*	138.80
1	3	1.0000	2 1/4	10 1/2	8	55664*	138.80
1 1/16	3	1.0625	2 1/4	10 1/2	8	55666*	206.65
1 1/8	3	1.1250	2 1/4	11	8	55668*	222.56
1 3/16	3	1.1875	2 1/4	11	8	55670*	239.15
1 5/16	4	1.3125	2 1/2	11 1/2	8	55674*	286.99
1 3/8	4	1.3750	2 1/2	12	8	55676*	333.77
1 1/2	4	1.5000	2 1/2	12 1/2	8	55678*	356.60

* Available While Supplies Last

Expansion Taper Shank Chucking Reamers

High Speed Steel — Morse Taper Shank Straight Flute — Right Hand Cut

Expansion Reamers are expandable to permit many regrinds to the original reamer size. Recommended for reaming a wide range of materials.

List No. 1734

NOTE: Expansion feature is for expansion and regrind to the original reamer size only. Not to be used as an adjustable reamer for producing different hole sizes. Expansion screw should never be loosened to achieve a smaller reamer size.

STANDARD PACKAGE All sizes — 1 each

SIZE	DEC. EQUIV.	MORSE TAPER NO.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
3/8	.3750	1	3/4	7	6	22951	$86.81
7/16	.4375	1	7/8	7	6	22952	91.91
1/2	.5000	1	1	8	6	22953	95.96
17/32	.5313	1	1	8	6	22954*	99.77
9/16	.5625	1	1 1/8	8	6	22955	105.00
19/32	.5938	1	1 1/8	8	6	22956*	103.40
5/8	.6250	2	1 1/4	9	6	22957	111.79
21/32	.6562	2	1 1/4	9	6	22958*	110.05
11/16	.6875	2	1 1/4	9	6	22959	118.18
23/32	.7188	2	1 1/4	9	6	22960*	118.08
3/4	.7500	2	1 3/8	9 1/2	6	22961	124.64
13/16	.8125	2	1 3/8	9 1/2	6	22962	133.64
7/8	.8750	2	1 1/2	10	6	22963	142.17
15/16	.9375	3	1 1/2	10	6	22964	153.29
1	1.0000	3	1 5/8	10 1/2	8	22965	168.94
1 1/16	1.0625	3	1 5/8	10 1/2	8	22966	183.83
1 1/8	1.1250	3	1 3/4	11	8	22967	198.64
1 3/16	1.1875	3	1 3/4	11	8	22968	215.11
1 1/4	1.2500	4	1 7/8	11 1/2	8	22969	233.19
1 5/16	1.3125	4	1 7/8	11 1/2	8	22970	242.89
1 3/8	1.3750	4	2	12	8	22971	252.94
1 7/16	1.4375	4	2	12	10	22972	276.94
1 1/2	1.5000	4	2 1/8	12 1/2	10	22973	276.94

* Available While Supplies Last

Carbide Tipped Expansion Taper Shank Chucking Reamers

Morse Taper Shank — Right Hand Cut Straight Flute

Expansion Reamers are expandable to permit many regrinds to the original reamer size. **Carbide Tipped** offers excellent wear resistance for general reaming of steel, cast iron, plastics, and other abrasive non-ferrous materials. Longer tool life in production applications.

List No. 5734

NOTE: Expansion feature is for expansion and regrind to the original reamer size only. Not to be used as an adjustable reamer for producing different hole sizes. Expansion screw should never be loosened to achieve a smaller reamer size.

STANDARD PACKAGE All sizes — 1 each

SIZE	DEC. EQUIV.	MORSE TAPER NO.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
3/8	.3750	1	1	7	4	56053*	$112.61
7/16	.4375	1	1	7	4	56054*	116.04
15/32	.4687	1	1	7	4	56084*	120.56
1/2	.5000	1	1	8	6	56055*	123.99
17/32	.5313	1	1	8	6	56056*	125.21
9/16	.5625	1	1 1/8	8	6	56057*	125.54
5/8	.6250	2	1 1/4	9	6	56059*	130.62

*Available While Supplies Last

(continued)

Carbide Tipped Expansion Chucking Reamers (continued)

List No. 5734

SIZE	DEC. EQUIV.	MORSE TAPER NO.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
11/16	.6875	2	1¼	9	6	56061*	$146.97
¾	.7500	2	1⅜	9½	6	56063*	147.41
13/16	.8125	2	1⅜	9½	6	56065*	158.25
⅞	.8750	2	1½	10	6	56067*	164.76
29/32	.9062	2	1½	10	6	56068*	171.35
15/16	.9375	3	1½	10	8	56069*	174.50
1	1.0000	3	1⅝	10½	8	56071*	180.71
1 1/16	1.0625	3	1⅝	10½	8	56073*	191.18
1⅛	1.1250	3	1¾	11	8	56075*	197.69
1 3/16	1.1875	3	1¾	11	8	56076*	209.76
1¼	1.2500	4	1⅞	11½	8	56077*	225.23
1⅜	1.3750	4	2	12	8	56079*	257.92
1 7/16	1.4375	4	2	12	8	56080*	268.98
1½	1.5000	4	2⅛	12½	8	56081*	277.37
1 9/16	1.5625	4	2⅛	12½	8	56085*	333.34
1 11/16	1.6875	4	2⅛	12½	8	56087*	369.32
1 13/16	1.8125	4	2⅛	12½	10	56089*	437.26
1⅞	1.8750	4	2⅛	12½	10	56090*	437.26
1 15/16	1.9375	4	2⅛	12½	10	56091*	477.58

*Available While Supplies Last

Right Hand Helix Taper Shank Chucking Reamers

High Speed Steel — Morse Taper Shank Right Hand Cut

Right Hand Helix pulls chips out of the hole in blind hole and through hole applications, bridges interruptions and provides better finish and sizing than straight flute reamers. Recommended for reaming a wide range of materials.

List No. 1654

45° Chamfer for reaming of most materials

Diameter Tolerances
up to ½" — +.0002/-0
over ½" to ⅝" — +.0003/-0
over ⅝" to 1½" — +.0001/+.0004

STANDARD PACKAGE All sizes — 1 each

SIZE	MORSE TAPER NO.	DEC. EQUIV.	L.O.F.	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
¼	1	.2500	1½	6	6	21851	$34.03
5/16	1	.3125	1½	6	6	21853	35.05
11/32	1	.3438	1½	6	6	21854	37.98
⅜	1	.3750	1¾	7	6	21855	39.16
13/32	1	.4062	1¾	7	6	21856	43.86
7/16	1	.4375	1¾	7	6	21857	40.05
15/32	1	.4687	1¾	7	6	21858	47.56
½	1	.5000	2	8	6	21859	43.86
17/32	1	.5313	2	8	6	21860	48.86
9/16	1	.5625	2	8	8	21861	52.07
⅝	2	.6250	2¼	9	8	21863	56.44
21/32	2	.6562	2¼	9	8	21864	56.97
11/16	2	.6875	2¼	9	8	21865	56.97
23/32	2	.7188	2¼	9	8	21866	70.68
¾	2	.7500	2½	9½	8	21867	64.26
25/32	2	.7812	2½	9½	8	21868	80.79

SIZE	MORSE TAPER NO.	DEC. EQUIV.	L.O.F.	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
13/16	2	.8125	2½	9½	8	21869	$73.45
27/32	2	.8438	2½	9½	8	21870	92.06
⅞	2	.8750	2⅝	10	8	21871	82.88
29/32	2	.9062	2⅝	10	8	21872	100.62
15/16	3	.9375	2⅝	10	8	21873	91.21
31/32	3	.9688	2⅝	10	8	21874	112.89
1	3	1.0000	2¾	10½	8	21875	100.98
1 1/16	3	1.0625	2¾	10½	8	21876	110.39
1⅛	3	1.1250	2⅞	11	10	21877	122.51
1 3/16	3	1.1875	2⅞	11	10	21878	137.28
1¼	4	1.2500	3	11½	10	21879	148.65
1 5/16	4	1.3125	3	11½	10	21880	163.23
1⅜	4	1.3750	3¼	12	10	21881	176.62
1 7/16	4	1.4375	3¼	12	10	21882	192.42
1½	4	1.5000	3½	12½	10	21883	202.39

Jobber Reamers

High Speed Steel — Morse Taper Shank Straight Flute — Right Hand Cut

45° Chamfer for reaming of most materials. For applications requiring a machine reamer with long flutes.

List No. 1617

Diameter Tolerances
up to ½" — +.0002/-0
over ½" to ⅝" — +.0003/-0
over ⅝" to 1½" — +.0001/+.0004

STANDARD PACKAGE All sizes — 1 each

SIZE	MORSE TAPER NO.	DEC. EQUIV.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
1/4	1	.2500	2	5 3/16	6	21341	$54.85
5/16	1	.3125	2 1/4	5 1/2	6	21342	56.85
3/8	1	.3750	2 1/2	5 13/16	6	21343	83.07
7/16	1	.4375	2 3/4	6 1/8	6	21344	74.41
1/2	1	.5000	3	6 7/16	6	21345	74.41
9/16	1	.5625	3 1/4	6 3/4	8	21346	84.15
5/8	2	.6250	3 1/2	7 9/16	8	21347	87.82
11/16	2	.6875	3 7/8	8	8	21348	102.44
3/4	2	.7500	4 3/16	8 3/8	8	21349	102.44
13/16	2	.8125	4 9/16	8 13/16	8	21350	114.97
7/8	2	.8750	4 7/8	9 3/16	8	21351	128.51
15/16	3	.9375	5 1/8	10	8	21352	154.86
1	3	1.0000	5 7/16	10 3/8	8	21353	154.86
1 1/16	3	1.0625	5 5/8	10 5/8	8	21354*	156.10
1 1/2	4	1.5000	6 1/2	13 1/8	10	21359*	248.45

*Available While Supplies Last

Bridge Reamers

High Speed Steel — Morse Taper Shank Right Hand Cut

Commonly used on bridgework, ship construction and structural steel fabrication where extreme accuracy of diameter is not important. May be used in portable electric or pneumatic equipment.

List No. 1697 Straight Flute

List No. 1701 Left Hand Helical Flute

Left Hand Helical Flute cuts with a shearing action for smoother cutting and improved hole quality, eliminates grabbing and binding of the reamer in the hole and pushes chips ahead of the reamer.

STANDARD PACKAGE All sizes —1 each

SIZE	MORSE TAPER NO.	DEC. EQUIV.	FLUTE LENGTH	OAL	APPROX. POINT DIA.	NO. 1697 EDP NO.	NO. 1697 LIST PRICE	NO. 1701 EDP NO.	NO.1701 LIST PRICE
7/16	2	.4375	4 3/8	8 1/4	1/4	—	—	22721	$57.85
1/2	2	.5000	5 1/8	9	9/32	—	—	22722	61.25
9/16	2	.5625	5 1/8	9	11/32	22672	$68.99	22723	59.91
5/8	2	.6250	6 1/8	10	3/8	—	—	22724	72.62
11/16	3	.6875	7 1/8	11 3/4	25/64	22673	94.00	22725	81.19
3/4	3	.7500	7 3/8	12	7/16	—	—	22726	91.48
13/16	3	.8125	7 3/8	12	1/2	22674	106.50	22727	91.69
7/8	3	.8750	7 3/8	12	9/16	—	—	22728	112.95
15/16	3	.9375	7 3/8	12	5/8	22675	122.42	22729	110.25
1	3	1.0000	7 3/8	12	11/16	—	—	22730	130.45
1 1/16	3	1.0625	7 3/8	12	3/4	22676	143.30	22731	133.79
1 1/8	3	1.1250	7 3/8	12	13/16	—	—	22732	161.19
1 3/16	3	1.1875	7 3/8	12	7/8	—	—	22733	178.86
1 1/4	4	1.2500	7 3/8	13	15/16	—	—	22734	197.44
1 5/16	4	1.3125	7 3/8	13	1	—	—	22735	217.39

Car Reamers

High Speed Steel — Morse Taper Shank
Right Hand Cut

Car reamers have same features as bridge reamers except for shorter flute and overall lengths, for use in tight quarters.

List No. 1700 Left Hand Helical Flutes

STANDARD PACKAGE All sizes —1 each

SIZE	MORSE TAPER NO.	DEC. EQUIV.	FLUTE LENGTH	OAL	POINT DIA.	EDP NO.	LIST PRICE
5/16	1	.3125	2 3/4	5 11/16	11/64	22691*	$37.48
3/8	1	.3750	2 3/4	5 11/16	15/64	22692*	63.76
7/16	2	.4375	3 1/2	6 15/16	1/4	22693*	74.61
1/2	2	.5000	4	7 9/16	19/64	22694*	77.04
9/16	2	.5625	4	7 9/16	9/32	22695*	82.03
5/8	2	.6250	4 1/2	8 1/16	5/16	22696*	86.18
11/16	3	.6875	4 1/2	8 13/16	3/8	22697*	95.39
3/4	3	.7500	5	9 1/2	13/32	22698*	105.68
13/16	3	.8125	5	9 1/2	15/32	22699*	114.64

*** Available While Supplies Last**

Construction Taper Reamers

High Speed Steel – Straight Shank
Left Hand Helical Flute – Right Hand Cut

Construction reamers are especially adapted for heavy duty reaming in structural steel assemblies. They are tapered at the point to enter holes which are out of alignment.

Straight shank with stop collar to prevent the reamer from running through the hole.

List No. 1650 — 3-Flat Shank

Round shank with 3 flats to prevent slipping in the drill chuck

List No. 1650R — Round Shank

STANDARD PACKAGE All sizes —1 each

List No. 1650 — 3-Flat Shank

SIZE	DEC. EQUIV.	SHANK DIA.	POINT DIA.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
3/8	.3750	3/8	.1645	3 5/8	5 1/4	5	21000	$41.73
7/16	.4375	7/16	.1645	3 5/8	5 1/4	5	21001	56.11
1/2	.5000	1/2	.2340	4 3/8	6	5	21002	64.50
9/16	.5625	1/2	.2920	5	6 5/8	5	21003	78.64
5/8	.6250	1/2	.3520	5	6 5/8	5	21004	92.32
11/16	.6875	1/2	.4140	5 3/8	7	5	21005	110.49
3/4	.7500	1/2	.4770	5 3/8	7	5	21006	126.93
13/16	.8125	1/2	.5400	5 5/8	7 1/4	5	21009	129.32
7/8	.8750	1/2	.6020	5 5/8	7 1/4	5	21007	131.71
15/16	.9375	1/2	.6450	5 5/8	7 1/4	5	21010	149.51
1	1.0000	1/2	.7270	5 5/8	7 1/4	5	21008	167.31

List No. 1650R — Round Shank

SIZE	DEC. EQUIV.	SHANK DIA.	POINT DIA.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
3/8	.3750	3/8	.1645	3 5/8	5 1/4	5	21100	$40.41
7/16	.4375	7/16	.1645	3 5/8	5 1/4	5	21101	54.33
1/2	.5000	1/2	.2340	4 3/8	6	5	21102	62.45
9/16	.5625	1/2	.2920	5	6 5/8	5	21103	76.15
5/8	.6250	1/2	.3520	5	6 5/8	5	21104	89.39
11/16	.6875	1/2	.4140	5 3/8	7	5	21105	106.98
3/4	.7500	1/2	.4770	5 3/8	7	5	21106	122.90
13/16	.8125	1/2	.5400	5 5/8	7 1/4	5	21109	125.21
7/8	.8750	1/2	.6020	5 5/8	7 1/4	5	21107	127.53
15/16	.9375	1/2	.6450	5 5/8	7 1/4	5	21110	144.76
1	1.0000	1/2	.7270	5 5/8	7 1/4	5	21108	162.00

Morse Taper Finishing Reamers

High Speed Steel — Straight Shank
Straight Flute — Right Hand Cut

For accurate hand reaming of Morse Taper holes in sockets, sleeves and spindles.

List No. 1636 - Straight Shank

STANDARD PACKAGE All sizes — 1 each

DIA. OF REAMER LARGE END	SMALL END	MORSE TAPER NO.	FLUTE LENGTH	OAL	SHANK DIA.	EDP NO.	LIST PRICE
.3674	.2503	0	2¼	3¾	5/16	21491	$62.64
.5170	.3674	1	3	5	7/16	21492	81.58
.7444	.5696	2	3½	6	5/8	21493	96.98
.9881	.7748	3	4¼	7¼	7/8	21494	139.82
1.2893	1.0167	4	5¼	8½	1⅛	21495	204.82
1.8005	1.4717	5	6¼	9¾	1½	21496	371.18

Morse Taper Finishing Reamers

High Speed Steel — Morse Taper Shank
Straight Flute — Right Hand Cut

For accurate production reaming of Morse Taper holes in sockets, sleeves and spindles.

List No. 1635 - Taper Shank

STANDARD PACKAGE All sizes —1 each

DIA. OF REAMER LARGE END	SMALL END	MORSE TAPER NO.	FLUTE LENGTH	OAL	MORSE TAPER SHANK	EDP NO.	LIST PRICE
.3674	.2503	0	2¼	5 11/32	0	21481*	$95.57
.5170	.3674	1	3	6 5/16	1	21482*	119.30
.7444	.5696	2	3½	7⅜	2	21483*	141.87
.9881	.7748	3	4¼	8⅞	3	21484*	196.67
1.2893	1.0167	4	5¼	10⅞	4	21485*	311.88
1.8005	1.4717	5	6¼	13⅛	5	21486*	616.79

*** Available While Supplies Last**

Taper Pin Reamers

High Speed Steel – Straight Shank
Right Hand Cut
1/4″ Taper Per Foot

For reaming holes for standard taper pins. **Straight Flute** for hand reaming of most materials. **Helical Flute** for machine reaming of most materials. **Spiral Flute** for hand reaming of difficult-to-ream materials.

STANDARD PACKAGE All sizes —1 each

List No. 1680 Straight Flute Hand Reamers

List No. 1683 Helical Flute Machine Reamers
Left Hand Helix

List No. 1684 Spiral Flute Hand Reamers
Left Hand Helix

SIZE	SHANK DIA.	DIA. SMALL END	DIA. LARGE END	L.O.F.	OAL	1680 EDP NO.	NO. OF FLUTES	1680 LIST PRICE	1683 EDP NO.	NO. OF FLUTES	1683 LIST PRICE	1684 EDP NO.	NO. OF FLUTES	1684 LIST PRICE
7/0	5/64	.0497	.0666	13/16	1 13/16	22581	4	$39.11	22611	2	$39.60	22641	4	$40.59
6/0	3/32	.0611	.0806	15/16	1 15/16	22582	4	39.11	22612	2	34.17	22642	4	44.65
5/0	7/64	.0719	.0966	1 3/16	2 3/16	22583	4	35.64	22613	2	35.44	22643	4	43.02

(continued)

Taper Pin Reamers (continued)

List No. 1680, 1683, 1684

SIZE	SHANK DIA.	DIA. SMALL END	DIA. LARGE END	L.O.F.	OAL	1680 EDP NO.	NO. OF FLUTES	1680 LIST PRICE	1683 EDP NO.	NO. OF FLUTES	1683 LIST PRICE	1684 EDP NO.	NO. OF FLUTES	1684 LIST PRICE
4/0	1/8	.0869	.1142	1 5/16	2 5/16	22584	4	$35.64	22614	3	$35.44	22644	4	$39.11
3/0	9/64	.1029	.1302	1 5/16	2 5/16	22585	4	35.64	22615	3	31.98	22645	4	39.11
2/0	5/32	.1137	.1462	1 9/16	2 9/16	22586	4	31.87	22616	3	32.39	22646	4	34.17
0	11/64	.1287	.1638	1 11/16	2 15/16	22587	4	30.69	22617	3	33.17	22647	4	32.67
1	3/16	.1447	.1798	1 11/16	2 15/16	22588	6	29.70	22618	3	33.66	22648	6	33.17
2	13/64	.1605	.2008	1 15/16	3 3/16	22589	6	29.70	22619	3	38.12	22649	6	33.17
3	15/64	.1813	.2294	2 5/16	3 11/16	22590	6	29.70	22620	3	39.41	22650	6	33.17
4	17/64	.2071	.2604	2 9/16	4 1/16	22591	6	33.17	22621	3	44.35	22651	6	36.14
5	5/16	.2409	.2994	2 13/16	4 5/16	22592	6	35.64	22622	3	48.52	22652	6	38.57
6	23/64	.2773	.3540	3 11/16	5 7/16	22593	6	43.08	22623	3	56.94	22653	6	47.52
7	13/32	.3297	.4220	4 7/16	6 5/16	22594	6	55.44	22624	3	70.29	22654	6	60.10
8	7/16	.3971	.5050	5 3/16	7 3/16	22595	6	70.98	22625	3	82.49	22655	6	77.73
9	9/16	.4805	.6066	6 1/16	8 5/16	22596	6	86.13	22626	4	90.60	22656	6	93.77
10	5/8	.5799	.7219	6 13/16	9 5/16	22597	6	94.55	22627	4	115.05	22657	6	103.95

Hand Reamers

High Speed Steel
Right Hand Cut

Used for hand reaming for final sizing and finishing of holes. Ground with a starting taper for easy entry into the hole. Shanks are the same size as the reamer size and are supplied with a square end for holding in a tap wrench or vise.

Diameter Tolerances
up to ½" — +.0002/-0
over ½" to 5/8" — +.0003/-0
over 5/8" to 1½" — +.0001/+.0004

List No. 1601 Straight Flute

Straight Flute for most applications

List No. 1602 Left Hand Helical Flute

Left Hand Helical Flute pushes chips out ahead of the reamer in through holes and bridges interruptions in the hole being reamed.

STANDARD PACKAGE All sizes —1 each

List No. 1601 Straight Flute

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
1/8	.1250	1½	3	6	21231	$38.84
5/32	.1562	1 5/8	3¼	6	21232	42.00
3/16	.1875	1¾	3½	6	21233	41.19
7/32	.2188	1 7/8	3¾	6	21234	45.40
¼	.2500	2	4	6	21235	45.12
9/32	.2812	2 1/8	4¼	6	21236	48.86
5/16	.3125	2¼	4½	6	21237	47.76
11/32	.3438	2 3/8	4¾	6	21238	55.44
3/8	.3750	2½	5	6	21239	54.14
13/32	.4062	2 5/8	5¼	6	21240	62.83
7/16	.4375	2¾	5½	6	21241	61.52
15/32	.4688	2 7/8	5¾	6	21242	68.11
½	.5000	3	6	6	21243	65.46
17/32	.5312	3 1/8	6¼	6	21244	70.71
9/16	.5625	3¼	6½	8	21245	75.63
19/32	.5938	3 3/8	6¾	8	21246	92.46
5/8	.6250	3½	7	8	21247	81.51
21/32	.6562	3 11/16	7 3/8	8	21248	100.47
11/16	.6875	3 7/8	7¾	8	21249	89.56
23/32	.7188	4 1/16	8 1/8	8	21250	98.08
¾	.7500	4 3/16	8 3/8	8	21251	95.50
7/8	.8750	4 7/8	9¾	8	21252	127.41

(continued)

List No. 1602 Helical Flute

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
¼	.2500	2	4	6	21291	$47.61
9/32	.2812	2 1/8	4¼	6	21292*	50.84
5/16	.3125	2¼	4½	6	21293	52.38
11/32	.3438	2 3/8	4¾	6	21294*	54.98
3/8	.3750	2½	5	6	21295	58.68
13/32	.4062	2 5/8	5¼	6	21296*	65.43
7/16	.4375	2¾	5½	6	21297	65.47
15/32	.4688	2 7/8	5¾	6	21298*	72.33
½	.5000	3	6	6	21299	70.49
9/16	.5625	3¼	6½	8	21300	82.77
5/8	.6250	3½	7	8	21301	92.08
11/16	.6875	3 7/8	7¾	8	21302	100.50
¾	.7500	4 3/16	8 3/8	8	21303	106.39
13/16	.8125	4 9/16	9 1/8	8	21304	116.11
7/8	.8750	4 7/8	9¾	8	21305	125.90
15/16	.9375	5 1/8	10¼	8	21306	141.20
1	1.0000	5 7/16	10 7/8	8	21307	155.39
1 1/8	1.1250	5 13/16	11 5/8	10	21308	202.40
1 1/4	1.2500	6 1/8	12¼	10	21309	249.90
1 3/8	1.3750	6 5/16	12 5/8	10	21310	294.80
1½	1.5000	6½	13	10	21311	317.50

* Available While Supplies Last

Hand Reamers (continued)

List No. 1601 Straight Flute

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
1	1.0000	5 7/16	10 7/8	8	21253	$140.13
1 1/8	1.1250	5 13/16	11 5/8	8	21254	183.18
1 1/4	1.2500	6 1/8	12 1/4	8	21255	224.91
1 3/8	1.3750	6 5/16	12 5/8	10	21256	265.84
1 1/2	1.5000	6 1/2	13	10	21257	313.79

Taper Pipe Reamers

High Speed Steel — Right Hand Cut
Left Hand Helical Flute

3/4" Taper per foot. For reaming holes to be tapped with American Standard taper pipe taps.

List No. 2116

STANDARD PACKAGE All sizes —1 each

SIZE	DIA. LARGE END	DIA. SMALL END	SHANK DIA.	FLUTE LENGTH	OAL	EDP NO	LIST PRICE
1/8	.362	.316	.4375	3/4	2 1/8	36081	$47.43
1/4	.472	.406	.5625	1 1/16	2 7/16	36082	54.29
3/8	.606	.540	.7000	1 1/16	2 9/16	36083	61.48
1/2	.751	.665	.6875	1 3/8	3 1/8	36084	77.66
3/4	.962	.876	.9063	1 3/8	3 1/4	36085	107.69
1	1.212	1.103	1.1250	1 3/4	3 3/4	36086	158.41
1 1/4	1.553	1.444	1.3125	1 3/4	4	36087	266.88
1 1/2	1.793	1.684	1.5000	1 3/4	4 1/4	36088	337.47
2	2.268	2.159	1.8750	1 3/4	4 1/2	36089	450.15

Shell Reamers

High Speed Steel – Right Hand Cut

Arbor holes tapered 1/8" per foot, for use with shell reamer arbors.

STANDARD PACKAGE All sizes —1 each

List No. 1625 Straight Flute

Straight Flute for most operations in a wide variety of materials

List No. 1627 Left Hand Helical Flute

Left Hand Helical Flute pushes chips out ahead of the reamer in through holes, bridges interruptions in the hole being reamed and provides better finish than straight flute reamers.

SIZE	OAL	HOLE DIA. LARGE END	FITS ARBOR NO.	NO. OF FLUTES	NO. 1625 EDP NO.	NO. 1625 LIST PRICE	NO. 1627 EDP NO.	NO. 1627 LIST PRICE
13/16	2 1/2	1/2	5	8	—	—	21432*	$105.49
15/16	2 1/2	1/2	5	8	—	—	21434*	121.53
1	2 1/2	1/2	5	8	21383*	$114.83	—	—
1 1/16	2 3/4	5/8	6	8	21384*	123.96	—	—
1 3/16	2 3/4	5/8	6	10	21386*	147.08	21438*	155.71
1 7/16	3	3/4	7	10	—	—	21442*	172.00
1 1/2	3	3/4	7	10	—	—	21443*	181.72
1 11/16	3 1/2	1	8	10	21394*	226.35	21446*	243.16

*Available While Supplies Last

(continued)

Shell Reamers (continued)

List No. 1625, 1627

SIZE	OAL	HOLE DIA. LARGE END	FITS ARBOR NO.	NO. OF FLUTES	NO. 1625 EDP NO.	NO. 1625 LIST PRICE	NO. 1627 EDP NO.	NO. 1627 LIST PRICE
1¾	3½	1	8	12	—	—	21447*	$258.04
1 13/16	3½	1	8	12	21396*	$255.81	21448*	304.18
1⅞	3½	1	8	12	21397*	272.84	—	—
2	3½	1	8	12	21399*	300.46	21451*	321.25

*Available While Supplies Last

Carbide Tipped Shell Reamers

Straight Flute

Carbide Tipped offers excellent wear resistance for general reaming of steel, plastics, and other abrasive non-ferrous materials. Longer tool life in production applications.

For use with shell reamer arbors. Arbor holes tapered 1/8" per foot.

List No. 5625

STANDARD PACKAGE All sizes —1 each

STANDARD TOLERANCE +.0003", -.0000"

SIZE	HOLE DIA. LG. END	L.O.F.	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
¾	⅜	1 7/16	2¼	6	55026*	$237.83
13/16	½	1 11/16	2½	6	55027*	241.38
⅞	½	1 11/16	2½	6	55028*	259.98
15/16	½	1 11/16	2½	8	55029*	259.98
1⅛	⅝	1 13/16	2¾	8	55032*	278.47
1 3/16	⅝	1 13/16	2¾	8	55033*	283.12
1 7/16	¾	2	3	8	55037*	335.06
1 9/16	¾	2	3	8	55039*	375.96
1⅝	¾	2	3	8	55040*	394.53

SIZE	HOLE DIA. LG. END	L.O.F.	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
1 1/16	1	2 1/32	3½	10	55041*	$427.00
1 3/16	1	2 1/32	3½	10	55043*	459.50
1⅞	1	2 1/32	3½	10	55044*	459.50
1 15/16	1	2 1/32	3½	10	55045*	491.98
2 3/16	1¼	2 7/16	3¾	12	55049*	575.54
2¼	1¼	2 7/16	3¾	12	55050*	575.54
2 5/16	1¼	2 7/16	3¾	12	55051*	608.01
2⅜	1¼	2 7/16	3¾	12	55052*	608.01
2 7/16	1¼	2 7/16	3¾	12	55053*	640.51

* Available While Supplies Last

Shell Reamer Arbors

For shell reamers with 1/8" taper per foot arbor holes

STANDARD PACKAGE All sizes —1 each

List No. 505 — Straight Shank

List No. 506 — Taper Shank

SIZE	FITS REAMER SIZE	OAL	EDP NO.	LIST NO. 505 SHANK DIA.	LIST PRICE	EDP NO.	LIST NO 506 MORSE. TAPER NO.	LIST PRICE
4	21/32 to 25/32	9	20081*	½	$107.51	20091*	2	$131.00
5	13/16 to 1 1/32	9½	20082*	⅝	131.08	—	—	—
6	1 1/16 to 1 9/32	10	20083*	¾	131.08	20093*	3	157.11
8	1 11/16 to 2	12	20085*	1⅛	159.51	—	—	—

* Available While Supplies Last

Feeds and Speeds for High Speed Steel Drills, Reamers and Taps

MATERIAL	BRINELL HARDNESS (BHN)	DRILLS			REAMERS		TAPS —SPEED (SFM) THREADS PER INCH			
		SPEED (SFM)	POINT	FEED	SPEED (SFM)	FEED	3-7½	8-15	16-24	25-UP
Aluminum	99-101	200-250	118°	M	150-160	M	50	100	150	200
Aluminum bronze	170-187	60	118°	M	40-45	M	12	25	45	60
Bakelite	—	80	60°-90°	M	50-60	M	50	100	150	200
Brass	192-202	200-250	118°	H	150-160	H	50	100	150	200
Bronze, common	166-183	200-250	118°	H	150-160	H	40	80	100	150
Bronze, phosphor, 1/2 hard	187-202	175-180	118°	M	130-140	M	25	40	50	80
Bronze, phosphor, soft	149-163	200-250	118°	H	150-160	H	40	80	100	150
Cast iron, soft	126	140-150	90°	H	100-110	H	30	60	90	140
Cast iron, medium soft	196	80-110	118°	M	50-65	M	25	40	50	80
Cast iron, hard	293-302	45-50	118°	L	67-75	L	10	20	30	40
Cast iron, chilled*	402	15	150°	L	8-10	L	5	5	10	10
Cast steel	286-302	40-50*	118°	L	70-75	L	20	30	40	50
Celluloid	—	100	90°	M	75-80	M	50	100	150	200
Copper	80-85	70	100°	L	45-55	L	40	80	100	150
Drop forgings (steel)	170-196	60	118°	M	40-45	M	12	25	45	60
Duralumin	90-104	200	118°	M	150-160	M	50	100	150	200
Everdur	179-207	60	118°	L	40-45	L	20	30	40	50
Machinery steel	170-196	110	118°	H	67-75	H	35	50	60	85
Magnet steel, soft	241-302	35-40	118°	M	20-25	M	20	40	50	75
Magnet steel, hard*	321-512	15	150°	L	10	L	5	10	15	25
Manganese steel, 7-13*	187-217	15	150°	L	10	L	15	20	25	30
Manganese copper, 30 Mn.*	134	15	150°	L	10-12	L	—	—	—	—
Malleable iron	112-126	85-90	118°	H	—	H	20	30	40	50
Mild steel, .20-.30C	170-202	110-120	118°	H	75-85	H	40	55	70	90
Molybdenum steel	196-235	55	125°	M	35-45	M	20	30	35	45
Monel metal	149-170	50	118°	M	35-38	M	8	10	15	20
Nickel, pure*	187-202	75	118°	L	40	L	25	40	50	80
Nickel steel, 3½%	196-241	60	118°	L	40-45	L	8	10	15	20
Rubber, hard	—	100	60°-90°	L	70-80	L	50	100	150	200
Screw stock, C.R.	170-196	110	118°	H	75	H	20	30	40	50
Spring steel	402	20	150°	L	12-15	L	10	10	15	15
Stainless steel	146-149	50	118°	M	30	M	8	10	15	20
Stainless steel, C.R.*	460-477	20	118°	L	15	L	8	10	15	20
Steel, .40 to .50 C	170-196	80	118°	M	8-10	M	20	30	40	50
Tool, S.A.E., and Forging steel	149	75	118°	H	35-40	H	25	35	45	55
Tool, S.A.E., and Forging steel	241	50	125°	M	12	M	15	15	25	25
Tool, S.A.E., and Forging steel*	402	15	150°	L	10	L	8	10	15	20
Zinc alloy	112-126	200-250	118°	M	150-175	M	50	100	150	200

* Use specially constructed heavy duty drills.

Drill Feed per Revolution (IPR)						Reamer Feed
REFERENCE SYMBOL	DIAMETER OF DRILL					ALL DIAMETERS
	UNDER ⅛	⅛ to ¼	¼ to ½	½ to 1	OVER 1″	Use a feed equal to two or three times that recommended for Drills.
L – Light	.001	.002	.003	.005	.006	
M – Medium	.0015	.003	.006	.010	.012	
H – Heavy	.0025	.005	.010	.020	.025	

SPEEDS and FEEDS shown are suggested starting points only and may be increased or decreased depending on actual material and machining conditions. Start conservatively and increase until the machining cycle is optimized.

TAP SPEEDS may be **increased** for coated taps, spiral point taps, fine pitch taps and when the percentage of thread is decreased.

TAP SPEEDS may need to be **reduced** for spiral flute taps, coarse pitch taps, bottoming taps, difficult materials, longer thread lengths and when the percentage of thread is increased.

THREAD FORMING TAPS generally form threads more efficiently at higher speeds. Suggested speeds are 50% to 100% higher then the suggested speeds for cutting taps in similar applications.

PIPE TAPS speeds should be between one-half and three-quarters of the speeds of taps of comparable diameter and pitch.

BURRS and ROUTERS

Carbide Burrs
1/4″ Shank

Single Cut
General Purpose—Recommended for steel, cast iron, ferrous materials. Offers good stock removal and smooth workpiece finish.

Double Cut
For rapid stock removal in tough applications. Design reduces the pulling action, reduces size of chips, ensures rapid stock removal.

List No. 5970
Single Cut

List No. 5970
Double Cut

STANDARD PACKAGE All sizes — 1 each

Cylinder Shape
No End Cut

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO. SNGL. CUT	EDP NO. DBL. CUT	LIST PRICE
1/8	SA-11	1/2	59715	59500	$15.21
1/8	SA-12	5/8	59816	59501	15.21
5/32	SA-13	5/8	59817	59502	15.21
3/16	SA-14	5/8	59818	59503	15.21
1/4	SA-1	5/8	59716	59504	13.37
1/4	SA-1L	1	59717	59505	19.82
5/16	SA-2	3/4	59718	59506	17.74
3/8	SA-3	3/4	59719	59507	17.74
3/8	SA-3L	1	59720	59508	24.43
3/8	SA-3X	1 1/2	59819	59509	28.80
7/16	SA-4	1	59820	59510	27.14
1/2	SA-5	1	59721	59511	27.14
5/8	SA-6	1	59722	59512	34.15
3/4	SA-15	1/2	59821	59513	56.23
3/4	SA-16	3/4	59723	59516	56.23
3/4	SA-7	1	59822	59517	56.23
7/8	SA-8	1	59823	59518	76.03
1	SA-9	1	59824	59519	76.03

Cylinder Shape
Radius End

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO. SNGL. CUT	EDP NO. DBL. CUT	LIST PRICE
1/8	SC-11	1/2	59724	59536	$16.13
1/8	SC-12	5/8	59843	59537	16.13
5/32	SC-13	5/8	59844	59538	16.13
3/16	SC-14	5/8	59845	59539	16.13
1/4	SC-1	5/8	59846	59540	15.21
1/4	SC-1L	1	59725	59541	19.82
5/16	SC-2	3/4	59726	59542	17.74
3/8	SC-3	3/4	59847	59543	20.73
3/8	SC-3L	1	59727	59544	22.11
3/8	SC-3X	1 1/2	59848	59545	31.70
7/16	SC-4	1	59849	59546	29.95
1/2	SC-5	1	59728	59547	31.06
5/8	SC-6	1	59729	59548	41.47
3/4	SC-15	1/2	59850	59550	61.06
3/4	SC-16	3/4	59730	59549	61.06
3/4	SC-7	1	59851	59551	61.06
1	SC-9	1	59852	59552	102.31

Cylinder Shape
End Cut

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO. SNGL. CUT	EDP NO. DBL. CUT	LIST PRICE
1/8	SB-11	1/2	59825	59875	$16.73
1/8	SB-12	5/8	59826	59876	16.73
5/32	SB-13	5/8	59827	59877	16.73
3/16	SB-14	5/8	59828	59878	16.73
1/4	SB-1	5/8	59829	59879	14.74
1/4	SB-1L	1	59830	59880	21.81
5/16	SB-2	3/4	59831	59881	19.82
3/8	SB-3	3/4	59832	59882	19.54
3/8	SB-3L	1	59833	59883	28.39
3/8	SB-3X	1 1/2	59834	59884	31.70
7/16	SB-4	1	59835	59885	31.94
1/2	SB-5	1	59836	59886	32.95
5/8	SB-6	1	59837	59887	37.56
3/4	SB-15	1/2	59838	59888	61.85
3/4	SB-16	3/4	59839	59889	61.85
3/4	SB-7	1	59840	59890	61.85
7/8	SB-8	1	59841	59891	83.64
1	SB-9	1	59842	59892	83.64

Ball Shape

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO. SNGL. CUT	EDP NO. DBL. CUT	LIST PRICE
1/8	SD-11	3/32	59731	59554	$16.13
3/16	SD-14	1/8	59732	59555	16.13
1/4	SD-1	1/4	59733	59556	15.21
5/16	SD-2	1/4	59734	59557	15.21
3/8	SD-3	5/16	59735	59558	15.81
7/16	SD-4	3/8	59853	59559	23.97
1/2	SD-5	7/16	59736	59560	23.97
5/8	SD-6	9/16	59737	59561	29.73
3/4	SD-7	11/16	59738	59562	39.36
1	SD-9	15/16	59854	59563	76.03

(continued)

Carbide Burrs 1/4″ Shank (continued)

List No. 5970

Oval Shape

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO. SNGL. CUT	EDP NO. DBL. CUT	LIST PRICE
3/16	SE-11	5/16	59739	59564	$16.59
1/4	SE-1	3/8	59740	59565	16.59
3/8	SE-3	3/4	59741	59566	23.04
1/2	SE-5	7/8	59742	59567	29.49
5/8	SE-6	1	59743	59568	43.37
3/4	SE-7	1	59744	59569	54.38

60° Cone Shape

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO. SNGL. CUT	EDP NO. DBL. CUT	LIST PRICE
1/4	SJ-1	3/16	59861	59793	$15.21
3/8	SJ-3	5/16	59862	59794	17.52
1/2	SJ-5	7/16	59863	59795	21.62
5/8	SJ-6	9/16	59864	59796	28.80
3/4	SJ-7	11/16	59865	59797	37.78
1	SJ-9	15/16	59866	59798	60.60

Tree Shape Radius End

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO. SNGL. CUT	EDP NO. DBL. CUT	LIST PRICE
1/8	SF-11	1/2	59855	59570	$15.67
1/4	SF-1	5/8	59745	59571	15.45
3/8	SF-3	3/4	59746	59572	20.01
7/16	SF-4	1	59856	59573	26.64
1/2	SF-13	3/4	59857	59575	28.58
1/2	SF-5	1	59747	59574	29.95
5/8	SF-6	1	59748	59576	41.47
3/4	SF-14	1 1/4	59749	59578	69.58
3/4	SF-15	1 1/2	59859	59579	75.81

90° Cone Shape

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO. SNGL. CUT	EDP NO. DBL. CUT	LIST PRICE
1/4	SK-1	1/8	59867	59800	$15.21
3/8	SK-3	3/16	59868	59801	18.21
1/2	SK-5	1/4	59869	59802	21.65
5/8	SK-6	5/16	59870	59803	28.80
3/4	SK-7	3/8	59871	59804	36.36
1	SK-9	1/2	59872	59805	60.60

Tree Shape Pointed End

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO. SNGL. CUT	EDP NO. DBL. CUT	LIST PRICE
1/4	SG-1	5/8	59750	59580	$15.21
5/16	SG-2	3/4	59751	59581	17.74
3/8	SG-3	3/4	59752	59582	21.34
1/2	SG-13	3/4	59753	59583	27.65
1/2	SG-5	1	59754	59584	29.04
5/8	SG-6	1	59755	59585	41.47
3/4	SG-7	1	59756	59586	52.99
3/4	SG-15	1 1/2	59860	59587	77.19

Taper Shape Radius End

14° Included Angle

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO. SNGL. CUT	EDP NO. DBL. CUT	LIST PRICE
1/4	SL-1	5/8	59757	59605	$15.21
5/16	SL-2	7/8	59758	59606	19.82
3/8	SL-3	1 1/16	59759	59607	23.50
1/2	SL-4	1 1/8	59760	59608	28.58
5/8	SL-5	1 3/16	59873	59609	56.23
5/8	SL-6	1 5/16	59761	59610	56.23
3/4	SL-7	1 1/2	59762	59611	78.10

Flame Shape

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO. SNGL. CUT	EDP NO. DBL. CUT	LIST PRICE
1/4	SH-1	5/8	59774	59780	$16.32
5/16	SH-2	3/4	59775	59781	19.95
1/2	SH-5	1 1/4	59776	59782	41.47
5/8	SH-6	1 7/16	59777	59783	56.69
3/4	SH-7	1 5/8	59778	59784	71.88

Cone Shape

DIA.	TOOL NO.	INCL. ANGLE	LENGTH OF CUT	EDP NO. SNGL. CUT	EDP NO. DBL. CUT	LIST PRICE
1/4	SM-1	22°	1/2	59763	59612	$14.74
1/4	SM-2	14°	3/4	59764	59613	15.21
1/4	SM-3	10°	1	59765	59614	15.67
3/8	SM-4	28°	5/8	59766	59615	23.50
1/2	SM-5	31°	7/8	59767	59616	29.49
5/8	SM-6	16°	1	59768	59617	39.17

(continued)

Carbide Burrs 1/4″ Shank (continued)

List No. 5970

Inverted Cone Shape

DIA.	TOOL NO.	INCL. ANGLE	LENGTH OF CUT	EDP NO. SNGL. CUT	EDP NO. DBL. CUT	LIST PRICE
1/4	SN-1	10°	5/16	59769	59618	$16.59
3/8	SN-2	13°	3/8	59770	59619	16.59
1/2	SN-4	28°	1/2	59771	59620	28.58
5/8	SN-6	18°	3/4	59772	59621	36.50
3/4	SN-7	30°	5/8	59773	59622	44.06

Carbide Burrs For Non-Ferrous Materials

1/4″ Shank

NF Burrs are designed for use on aluminum, non-ferrous metals, soft steel, reinforced plastics, and other soft materials. High flute design for easy chip flow and fast stock removal. Provides excellent work finish with minimum loading when cutting soft, sticky metals.

List 5970

STANDARD PACKAGE All sizes — 1 each

Cylinder Shape

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO.	LIST PRICE
1/4	SA-1-NF	3/4	59625	$22.11
3/8	SA-3-NF	3/4	59626	33.17
1/2	SA-5-NF	1	59627	49.54
5/8	SA-6-NF	1	59628	59.45
3/4	SA-7-NF	1	59629	81.82
3/4	SA-7-NF 3/8	1	59810*	99.09

Oval Shape

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO.	LIST PRICE
3/8	SE-3-NF	5/8	59640	$37.78
1/2	SE-5-NF	7/8	59641	49.54
5/8	SE-6-NF	1	59642	89.18
3/4	SE-7-NF	1	59643	121.89
3/4	SE-7-NF 3/8	1	59813*	135.72

Cylinder Shape Radius End

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO.	LIST PRICE
1/4	SC-1-NF	3/4	59630	$27.19
3/8	SC-3-NF	3/4	59631	34.56
1/2	SC-5-NF	1	59632	52.99
5/8	SC-6-NF	1	59633	79.27
3/4	SC-7-NF	1	59634	109.44
3/4	SC-7-NF 3/8	1	59811*	123.27

Tree Shape Radius End

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO.	LIST PRICE
1/4	SF-1-NF	3/4	59644	$27.19
3/8	SF-3-NF	3/4	59645	37.56
1/2	SF-5-NF	1	59646	51.84
5/8	SF-6-NF	1	59647	74.88
3/4	SF-14-NF	1 1/4	59648	106.68
3/4	SF-14-NF 3/8	1 1/4	59814*	106.68

Ball Shape

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO.	LIST PRICE
1/4	SD-1-NF	3/16	59635	$27.19
3/8	SD-3-NF	5/16	59636	28.80
1/2	SD-5-NF	7/16	59637	41.93
5/8	SD-6-NF	9/16	59638	74.66
3/4	SD-7-NF	11/16	59639	125.81
3/4	SD-7-NF3/8	11/16	59812*	139.63

Taper Shape Radius End

14° Included Angle

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO.	LIST PRICE
3/8	SL-3-NF	1 1/16	59649	$53.86
1/2	SL-4-NF	1 1/8	59650	65.43
5/8	SL-5-NF	1 3/16	59651	94.80
5/8	SL-6-NF	1 5/16	59652	120.74
3/4	SL-7-NF	1 1/2	59653	139.41
3/4	SF-7-NF3/8	1 1/2	59815*	153.24

***Note: Tool No. indicated with 3/8 are furnished with 3/8" shank.**

Long Shank Carbide Burrs
1/4″ × 6″ Long Steel Shank

Single Cut & Double Cut

List 5970

STANDARD PACKAGE All sizes — 1 each

Cylinder Shape

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO. SINGLE CUT	EDP NO. DOUBLE CUT	LIST PRICE
¼	SA-1L6	½	59655	59925	$21.43
⅜	SA-3L6	¾	59656	59926	28.11
½	SA-5L6	1	59657	59927	39.17

Tree Shape Radius End

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO. SINGLE CUT	EDP NO. DOUBLE CUT	LIST PRICE
¼	SF-1L6	½	59667	59937	$25.34
⅜	SF-3L6	¾	59668	59938	29.95
½	SF-5L6	1	59669	59939	40.32

Cylinder Shape Radius End

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO. SINGLE CUT	EDP NO. DOUBLE CUT	LIST PRICE
¼	SC-1L6	½	59658	59928	$23.50
⅜	SC-3L6	¾	59659	59929	29.73
½	SC-5L6	1	59660	59930	42.63

Tree Shape Pointed End

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO. SINGLE CUT	EDP NO. DOUBLE CUT	LIST PRICE
¼	SG-1L6	½	59670	59940	$25.34
⅜	SG-3L6	¾	59671	59941	29.95
½	SG-5L6	1	59672	59942	39.17

Ball Shape

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO. SINGLE CUT	EDP NO. DOUBLE CUT	LIST PRICE
¼	SD-1L6	3⁄16	59661	59931	$23.04
⅜	SD-3L6	5⁄16	59662	59932	26.97
½	SD-5L6	7⁄16	59663	59933	32.26

Flame Shape

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO. SINGLE CUT	EDP NO. DOUBLE CUT	LIST PRICE
5⁄16	SH-2L6	¾	59673	59943	$32.26
½	SH-5L6	⅞	59674	59944	52.99

Oval Shape

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO. SINGLE CUT	EDP NO. DOUBLE CUT	LIST PRICE
¼	SE-1L6	⅜	59664	59934	$24.65
⅜	SE-3L6	⅝	59665	59935	31.34
½	SE-5L6	⅞	59666	59936	40.32

Taper Shape Radius End — 14°

DIA.	TOOL NO.	LENGTH OF CUT	EDP NO. SINGLE CUT	EDP NO. DOUBLE CUT	LIST PRICE
¼	SL-1L6	⅜	59675	59945	$24.43
⅜	SL-3L6	⅝	59676	59946	35.49
½	SL-4L6	⅞	59677	59947	48.39

Carbide Burrs
1/4″ Dia. – 1/8″ Steel Shank

Single Cut

List 5970

STANDARD PACKAGE All sizes — 1 each

EDP NO.	59678	59679	59680	59681	59682	59683	59684	59685	59686
TOOL NO.	SA-51	SB-51	SC-51	SD-51	SE-51	SF-51	SG-51	SM-51	SN-51
LOC	½	¼	½	¼	⅜	½	½	½	¼
PRICE EA.	$11.74	11.74	11.74	11.74	11.74	11.74	11.74	11.74	11.74

Carbide Burrs – 1/8″ Shank

Double Cut

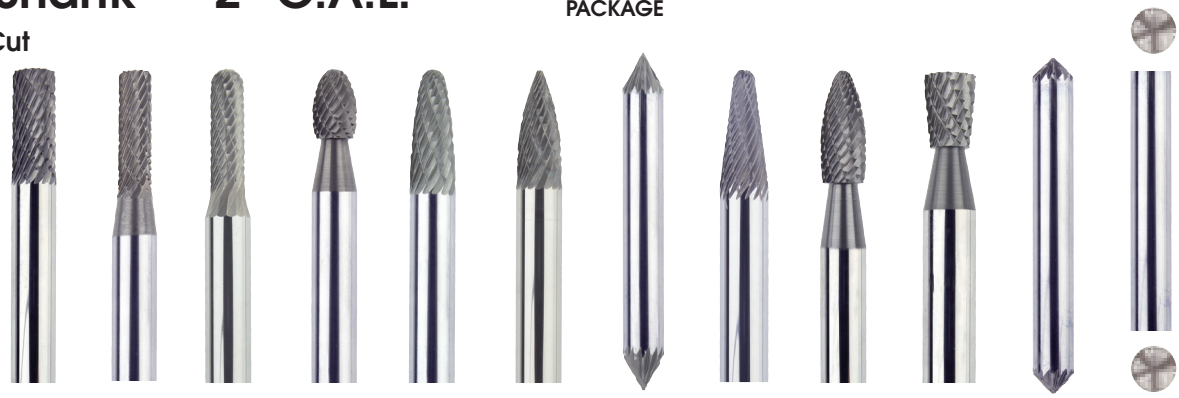
List 5970
STANDARD PACKAGE All sizes — 1 each

EDP NO.	59688	59689	59713	59690	59691	59692	59693	59694	59695	59696	59697	59698	59699	59700	59701	59702	59703	59714
TOOL NO.	SC-53	SD-53	SA-41	SA-43	SA-42	SC-42	SC-41	SD-42	SE-41	SF-41	SG-41	SJ-42	SL-41	SH-41	SN-42	SK-42	SB-41	SB-43
DIA.	3/16	3/16	1/16	1/8	3/32	1/8	3/32	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8
L.O.C.	1/2	5/32	1/4	5/8	1/2	5/8	1/2	1/8	3/16	1/4	1/4	3/16	13/32	3/16	1/8	1/8	1/8	5/8
PRICE EA.	$7.13	7.13	7.13	7.03	7.03	7.03	7.03	7.03	7.03	7.03	7.03	7.03	7.03	7.03	7.03	7.03	7.61	7.73

Carbide Burrs
1/4″ Shank – 2″ O.A.L.

Double Cut

List 5970
STANDARD PACKAGE All sizes — 1 each



EDP NO.	59504	59704	59706	59565	59571	59580	59707	59605	59708	59618	59709	59710
TOOL NO.	SA-1	SA-14	SC-14	SE-1	SF-1	SG-1	SJ-1	SL-1	SH-1	SN-1	SK-1	SQ-1
DIA.	1/4	3/16	3/16	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
L.O.C.	5/8	1/2	1/2	3/8	5/8	5/8	60°	1/2	3/8	1/4	82°	1/4
PRICE EA.	$13.37	15.21	16.13	16.59	15.45	15.21	15.21	15.21	16.59	16.59	15.21	14.74

Carbide Burr Sets

List 5970

Supplied in a premium hardwood case.

EDP	SET NO.	SHANK DIA.	INCLUDES	PRICE EA.
59687	C-300	1/8	SA-51, SB-51, SC-51, SD-51, SE-51, SF-51, SG-51, SM-51, SN-51	$137.88
59711	C-100	1/8	SA-43, SA-42, SC-42, SC-41, SD-42, SE-41, SF-41, SG-41, SJ-42, SL-41, SH-41, SN-42	112.90
59901	C-150	1/8	SA-42, SA-43, SC-42, SC-41, SF-42, SG-42, SM-43, SE-41, SD-42	107.69
59712	C-200	1/4	SA-1, SA-14, SC-1, SC-14, SD-1, SE-1, SF-1, SG-1, SK-1, SL-1, SH-1, SN-1	220.27
59903	C-350	1/8	SA-51, SC-51, SF-51, SG-51, SM-51, SD-51	107.69
59905	C-400	1/4	SA-1, SC-1, SF-1, SG-1, SM-2, SE-1, SL-1, SD-1	167.04
59907	C-450	1/4	SA-5, SC-5, SF-5, SG-5, SM-5, SE-5, SL-4, SD-5	263.74
59909	C-500	1/4	SA-5, SC-5, SD-5, SE-5, SG-5, SM-5, SL-4, SH-5	291.65
59911	C-550	1/4	SA-5, SC-1, SC-3, SD-3, SE-5, SH-5, SK-5, SG-1	265.94
59913	C-600	1/4	SA-1, SA-5, SC-1, SC-3, SC-5, SF-5, SL-3, SL-4	311.86
59915	C-650	1/4	SB-1, SC-3, SD-2, SE-5, SF-5, SL-4, SG-3, SM-5	301.10
59917	C-700	1/4	SA-1, SA-3, SA-5, SC-1, SC-3, SC-5, SF-1, SF-3, SF-5	283.51
59918	C-725	1/4	SA-5, SC-3, SC-5, SD-5, SF-3, SF-5, SG-3, SL-4	218.04
59919	C-750	1/4	SA-1, SA-3, SA-5, SC-1, SC-3, SC-5, SD-3, SD-5 SE-3, SF-1, SF-3, SF-5, SG-1, SG-3, SL-3, SL-4	449.23

Aircraft Router Bits

Features 2 downcut flutes with drill point for trimming, routing and other operations in aluminum, non-abrasive plastics and other materials.

List No. 6001
High Speed Steel
Left Hand Helix, Right Hand Cut

STANDARD PACKAGE 1/4″ — 12 each
5/16″ — 6 each

DIA.	DEC. EQUIV.	SHANK DIA.	L.O.C.	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
1/4	.2500	1/4	9/16	2 3/8	2	17251	$12.24
5/16	.3125	5/16	9/16	2 3/8	2	17252*	9.36

* Available while supplies last

Solid Carbide 2-Flute Routers

For use in a wide variety of materials including aluminum, magnesium, plexiglass, plastic, copper, hardwood, formica and hard rubber.

List No. 5905
Left Hand Helix, Right Hand Cut

STANDARD PACKAGE All sizes — 1 each

DIA.	DEC. EQUIV.	SHANK DIA.	L.O.C.	OAL	EDP NO.	LIST PRICE
1/8	.1250	1/8	1/2	1 1/2	57222*	$32.71
1/4	.2500	1/4	3/4	2 1/2	57224*	54.75
5/16	.3125	5/16	13/16	2 1/2	57225*	86.07
3/8	.3750	3/8	7/8	2 1/2	57226*	$92.33
7/16	.4375	7/16	1	2 1/2	57227*	114.22
1/2	.5000	1/2	1	3	57228*	136.87

* Available While Supplies Last

Solid Carbide Diamond Cut Fiberglass Routers

30 Degree left hand helix, right hand cut. For use in graphite composite laminates, polyester glass reinforced products, phenolic epoxy parts.

STANDARD PACKAGE All sizes — 1 each

List No. 5898 No End Cut Type 1

List No. 5899 Bur End Type 2

List No. 5890 End Mill Cut Type 3

List No. 5891 Drill Point Type 4

DIA.	SHANK DIA.	L.O.C.	OAL	5898 EDP NO.	5898 LIST PRICE	5899 EDP NO.	5899 LIST PRICE	5890 EDP NO.	5890 LIST PRICE	5891 EDP NO.	5891 LIST PRICE
1/16	1/8	3/16	1 1/2	57201*	$13.44	57211*	$15.21	57230*	$15.51	—	
1/8	1/8	7/16	1 1/2	57202*	13.63	57212*	15.36	57231*	16.58	57241*	$17.07
3/16	3/16	5/8	2	57203*	22.58	57213*	25.44	57232*	26.93	57242*	27.84
3/16	1/4	5/8	2	57206*	23.06	57216*	25.44	57233*	26.93	57243*	27.84
1/4	1/4	3/4	2	57205*	23.81	57215*	28.80	—	—	57244*	29.79
1/4	1/4	3/4	2 1/2	57204*	25.87	57214*	29.69	57235*	31.03	57245*	31.99
5/16	5/16	1	2 1/2	57207*	50.69	57217*	54.84	57236*	56.69	57246*	58.34
3/8	3/8	1	2 1/2	57208*	65.38	57218*	69.82	57237*	72.00	57247*	73.85
1/2	1/2	1	2 1/2	57209*	88.97	—	—	—	—	57248*	107.25

* Available While Supplies Last

Solid Carbide Burrs

APPLICATION DATA

STYLE OF CUT	MATERIAL						
	ALUMINUM	BRASS, COPPER	CAST IRON	PLASTICS	STEEL-UP TO 40-60 Rc	TITANIUM	ZINC
Single		☆	☆		☆	☆	
Double		☆	☆		☆	☆	
NF Style	☆			☆			☆

RECOMMENDED CUTTING SPEEDS

BURR DIAMETER	R.P.M.
1/16	55000-85000
3/32	50000-60000
1/8	35000-65000
3/16	30000-55000
1/4	25000-50000
5/16	18000-38000
3/8	17000-38000
7/16	13000-37000
1/2	14000-36000
5/8	11000-23000
3/4	8000-19000
1	7000-18000

Increase speeds for softer non-ferrous materials.
Decrease speeds for harder ferrous materials.

STYLES OF CUT

Double Cut

Most popular style. For rapid stock removal in tough applications. Design reduces the pulling action, reduces size of chips, ensures rapid stock removal.

Single Cut

General Purpose. Recommended for steel, cast iron, ferrous materials. Offers good stock removal and smooth workpiece finish.

Non-Ferrous Cut

For use on aluminum, non-ferrous metals, soft steel, reinforced plastics, and other soft materials. High flute design for easy chip flow and fast stock removal. Provides excellent work finish with minimum loading when cutting soft, sticky metals.

COUNTERBORES
COUNTERSINKS
CENTER DRILLS
SPOTTING DRILLS

Center Drills

High Speed Steel — Bright Finish
118° Point

Feature short flute length, short overall length and no body clearance. Can be chucked close to the point for maximum rigidity in centering and spotting applications

List No. 1443

STANDARD PACKAGE 1/16″ thru 3/8″ — 6 each
1/2″ — 1″ — 1 each

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
5/64	.0781	5/8	1 1/8	10276*	$1.45
7/64	.1094	13/16	1 1/4	10278*	1.63
1/8	.1250	13/16	1 1/4	10279*	1.81
9/64	.1406	13/16	1 1/4	10280*	1.81
11/64	.1719	1	1 1/2	10282*	2.16
13/64	.2031	1	1 1/2	10284*	2.20
9/32	.2812	1	1 1/2	10287*	$4.86
3/8	.3750	1	2	16001	9.79
1/2	.5000	1	2	16002	16.91
5/8	.6250	1 1/8	2 1/4	16003	26.88
3/4	.7500	1 1/8	2 1/4	16004	38.33
1	1.0000	1 1/4	2 1/2	16005	61.79

*Available While Supplies Last

NC Spotting Drills

High Speed Steel — Bright Finish
90° and 120° Points

Ideal for close tolerance NC spotting operations. Provides a more accurate and faster spotting location for follow-up drilling. Eliminates wandering.

List No. 1441

STANDARD PACKAGE 1/4″ & 3/8″ — 6 each
1/2″ — 1″ — 1 each

Short Length

SIZE	DEC. EQUIV.	L.O.F.	OAL	90° EDP NO.	90° LIST PRICE	120° EDP NO.	120° LIST PRICE
1/4	.2500	3/4	2 1/2	11900	$19.74	11906	$22.31
3/8	.3750	1 1/8	3 1/8	11901	24.31	11907	29.46
1/2	.5000	1 3/8	3 3/4	11902	34.32	11908	45.19
5/8	.6250	1 5/8	4 3/8	11903	$44.33	11909	$60.92
3/4	.7500	1 7/8	5	11904	56.63	11910	63.78
1	1.0000	2 1/4	6	11905	85.80	11911	90.09

Regular Length

SIZE	DEC. EQUIV.	L.O.F.	OAL	90° EDP NO.	90° LIST PRICE	120° EDP NO.	120° LIST PRICE
1/4	.2500	3/4	4	11912	$42.90	11918	$48.62
3/8	.3750	1 1/8	5	11913	45.76	11919	51.48
1/2	.5000	1 3/8	6	11914	51.05	11920	59.49
5/8	.6250	1 5/8	7	11915	$56.35	11921	$67.50
3/4	.7500	1 7/8	8	11916	68.65	11922	87.23
1	1.0000	2 1/4	8	11917	105.54	11923	125.27

Long Length

SIZE	DEC. EQUIV.	L.O.F.	OAL	90° EDP NO.	90° LIST PRICE	120° EDP NO.	120° LIST PRICE
3/8	.3750	1 1/8	7	—	—	11931*	$69.32
3/4	.7500	1 7/8	10	—	—	11934*	$109.04
1	1.0000	2 1/4	10	—	—	11935*	156.59

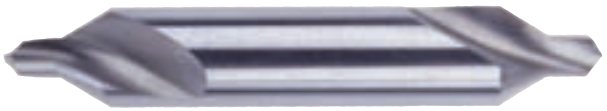
*Available While Supplies Last

Combined Drills and Countersinks

High Speed Steel — Bright Finish 60° Included Angle

Often called **"center drills"**. Designed for drilling center holes in the ends of work pieces to be held between standard 60° centers. **Bell Type** features an additional 120° chamfer at the body diameter to form a protected 60° center hole.

STANDARD PACKAGE
Plain Type & Bell Type
All Sizes — 6 each
Long Plain Type
1 thru 3 — 6 each
4 thru 8 — 1 each



List No. 1495 Plain Type

List No. 1498 Bell Type

List No. 1499 Long Plain Type

List No. 1495 Plain Type

SIZE	DRILL DIA.	BODY DIA.	OAL	EDP NO.	LIST PRICE
3/0	.021	1/8	1 1/4	25049	$10.94
2/0	.025	1/8	1 1/4	25050	8.52
0	.032	1/8	1 1/4	25051	8.52
1	3/64	1/8	1 1/4	25041	6.41
2	5/64	3/16	1 7/8	25042	6.71
3	7/64	1/4	2	25043	7.07
4	1/8	5/16	2 1/8	25044	7.37
5	3/16	7/16	2 3/4	25045	12.03
6	7/32	1/2	3	25046	17.82
7	1/4	5/8	3 1/4	25047	30.86
8	5/16	3/4	3 1/2	25048	40.07

List No. 1499 Long Plain Type

SIZE	DRILL DIA.	BODY DIA.	OAL	EDP NO.	LIST PRICE
1	3/64	1/8	3	25010	$21.09
1	3/64	1/8	4	25011	22.01
2	5/64	3/16	4	25012	24.16
2	5/64	3/16	5	25013	30.62
3	7/64	1/4	4	25014	25.52
3	7/64	1/4	5	25015	33.45
4	1/8	5/16	4	25016	27.90
4	1/8	5/16	5	25017	35.73
4	1/8	5/16	6	25018	41.29
5	3/16	7/16	5	25019	40.94
5	3/16	7/16	6	25020	45.82
6	7/32	1/2	5	25021	49.51
6	7/32	1/2	6	25022	52.17
7	1/4	5/8	6	25023	96.23
8	5/16	3/4	6	25024	105.66

List No. 1498 Bell Type

SIZE	DRILL DIA.	BODY DIA.	OAL	EDP NO.	LIST PRICE
11	3/64	1/8	1 1/4	25081	$8.83
12	1/16	3/16	1 7/8	25082	9.08
13	3/32	1/4	2	25083	9.29
14	7/64	5/16	2 1/8	25084	9.59
15	5/32	7/16	2 3/4	25085	14.68
16	3/16	1/2	3	25086	21.51
17	7/32	5/8	3 1/4	25087	38.26
18	1/4	3/4	3 1/2	25088	50.69

Combined Drill and Countersink Set

High Speed Steel

Includes Nos. 1, 2, 3, 4, and 5, Style 1495, Plain Type

List No. 8500

SIZE RANGE	SET NO.	EDP NO.	LIST PRICE
1-5	51H	25059	$40.83

Solid Carbide Combined Drills and Countersinks

Plain Type – 60° Included Angle

Solid Carbide offers excellent wear resistance, heat resistance and rigidity. Recommended for abrasive materials, difficult-to-drill materials and increased tool life in production applications.

STANDARD PACKAGE All sizes — 1 each

List No. 5495

SIZE	DRILL DIA.	BODY DIA.	OAL	EDP NO.	LIST PRICE
1	3/64	1/8	1 1/4	53901	$17.96
2	5/64	3/16	1 7/8	53902	28.00
3	7/64	1/4	2	53903	33.39
4	1/8	5/16	2 1/8	53904	45.78
5	3/16	7/16	2 3/4	53905	69.39
6	7/32	1/2	3	53906	100.87

M42 8% Cobalt Zero Flute Countersink & Deburring Tools

List No. 1753

For countersinking and deburring in a wide range of ferrous and non-ferrous materials. Radially relieved single cutting edge for fast stock removal without chatter in portable and machine applications.

M42 8% Cobalt offers increased wear and heat resistance in alloy steels, stainless steels and other abrasive and difficult materials. Longer tool life in all production applications.

Tools can be re-sharpened using an axial relief sharpening fixture or with a mounted grinding wheel inserted into the hole.

SIZE	DIA. OF CUT MIN.	DIA. OF CUT MAX.	BODY DIA.	SHANK DIA.	OAL	EDP NO. INCLUDED ANGLE 60°	82°	90°	LIST PRICE
DOUBLE END									
#0	.09	.23	¼	¼	1¾	25600	25610	25620	$20.61
SINGLE END									
#1	.15	.40	7⁄16	¼	1¾	25601	25611	25621	25.39
#2	.19	.52	9⁄16	¼	2	25602	25612	25622	31.63
#3	.28	.75	13⁄16	½	2⅝	25603	25613	25623	56.98
#4	.46	1.08	1⅛	½	3½	25604	25614	25624	95.92
5-Piece Set, Sizes #0 - #4 In Plastic Case						25609	25619	25629	218.97

STANDARD PACKAGE All sizes — 1 each

Single Flute Countersinks

High Speed Steel

For chamfering, deburring, and countersinking. Also to enlarge existing holes in thin sheet metal.

Designed for light portable work as well as machine use. Single flute construction provides smoother surface finish. Can be used when multi-flute countersinks chatter.

STANDARD PACKAGE All sizes — 1 each

List No. 1752

SIZE	SHANK DIA.	EDP NO. 60°	82°	90°	100°	LIST PRICE
¼	¼	25571	25572	25573	25574	$11.88
⅜	¼	25575	25576	25577	25578	13.55
½	¼	25579	25580	25581	25582	17.31
⅝	½	25583	25584	25585	25586	23.90
¾	½	25587	25588	25589	25590	31.90
1	½	25591	25592	25593	25594	54.79

Carbide Single Flute Countersinks

For countersinking, chamfering, and deburring holes. Produces a smoother finish. Can be used when multi-flute countersinks chatter.

The 1/8 and 1/4 diameters are solid carbide. The larger diameters are brazed construction.

Carbide offers excellent wear resistance, heat resistance and rigidity. Recommended for abrasive materials, difficult-to-drill materials and increased tool life in production applications

List No. 5752

STANDARD PACKAGE All sizes — 1 each

SIZE	SHANK DIA.	EDP NO. 60°	82°	90°	LIST PRICE
⅛	⅛	56101	56102	56103	$10.15
¼	¼	56104	56105	56106	16.65
⅜	¼	56107	56108	56109	31.75
½	¼	56110	56111	56112	45.80
¾	⅜	56113	56114	56115	85.30

Center Reamers

High Speed Steel – 3-Flute

Designed for countersinking holes for rivets, flat head screws and centers.

List No. 1750

STANDARD PACKAGE All sizes — 1 each

SIZE	SHANK DIA.	SHANK LENGTH	OAL	EDP NO. 60°	82°	90°	100°	LIST PRICE
¼	¼	¾	1½	23501	23502	23503	23504	$11.49
⅜	¼	⅞	1¾	23505	23506	23507	23508	13.58
½	⅜	1	2	23509	23510	23511	23512	17.44
⅝	⅜	1	2¼	23513	23514	23515	23516	25.29
¾	½	1¼	2⅝	23517	23518	23519	23520	33.56

Machine Countersinks

High Speed Steel – 4-Flute

Designed primarily for countersinking holes. The longer shank length is ideal for use in turret lathes for screw machine work.

STANDARD PACKAGE All sizes — 1 each

List No. 1751

SIZE	SHANK DIA.	SHANK LENGTH	OAL	EDP NO. 60°	EDP NO. 82°	LIST PRICE
½	½	2¼	3⅞	25551	25552	$37.98
⅝	½	2¼	4	25553	25554	42.74
¾	½	2¼	4⅛	25555	25556	54.60
⅞	½	2¼	4¼	25557	25558	68.89
1	½	2¼	4⅜	25559	25560	76.71

Interchangeable Pilot Counterbores

Short Series — High Speed Steel

For use with interchangeable pilots (list no. 776). For general purpose counterboring and spot facing.

List No. 1772 Straight Shank

List No. 1771 Taper Shank

STANDARD PACKAGE All sizes — 1 each

COUNTER-BORE SIZE	NO. OF FLUTES	OAL	ACCEPTS PILOT SH. DIA.	RANGE OF PILOTS DIA.	SHANK DIA.	LIST NO. 1772 EDP NO.	LIST NO. 1772 LIST PRICE	MORSE TAPER NO.	LIST NO. 1771 EDP NO.	LIST NO. 1771 LIST PRICE
3/16	3	3	3/32	1/8-3/16	15/64	25811	$49.72	—	—	—
7/32	3	3	3/32	1/8-7/32	15/64	25812	49.72	—	—	—
1/4	3	3 13/16	3/32	1/8-3/16	15/64	25813	51.26	1	25761*	$57.42
9/32	3	3 13/16	3/32	1/8-7/32	17/64	25814	51.26	1	25762*	57.42
5/16	3	3 13/16	3/32	1/8-1/4	19/64	25815	51.26	1	25763*	58.61
11/32	3	3 13/16	3/32	1/8-9/32	5/16	25816	53.89	1	25764*	60.20
3/8	3	4 1/16	5/32	3/16-5/16	5/16	25817	53.89	1	25765*	58.74
13/32	3	4 1/16	5/32	3/16-11/32	3/8	25818	56.97	1	25766*	62.15
7/16	3	4 1/16	5/32	3/16-3/8	3/8	25819	56.97	1	25767*	62.18
15/32	3	4 5/16	3/16	1/4-13/32	7/16	25820	60.19	1	25768*	65.73
1/2	3	4 5/16	3/16	1/4-7/16	7/16	25821	61.88	1	25769*	63.82
17/32	3	4 5/16	3/16	1/4-15/32	1/2	25822	66.94	1	25770*	71.48
9/16	3	4 5/16	3/16	1/4-1/2	1/2	25823	66.94	1	25771*	71.51
19/32	3	5 1/8	3/16	1/4-17/32	1/2	25824	71.40	2	25772*	76.27
5/8	3	5 1/8	3/16	1/4-9/16	1/2	25825	71.40	2	25773*	76.30
21/32	3	5 1/8	3/16	1/4-5/8	1/2	25826	79.72	2	25774*	84.37
11/16	3	5 1/8	3/16	1/4-5/8	1/2	25827	79.72	2	25775*	83.78
23/32	3	5 3/8	1/4	5/16-21/32	1/2	25828	82.09	2	25776*	86.88
3/4	3	5 3/8	1/4	5/16-11/16	1/2	25829	82.09	2	25777*	86.78
25/32	3	5 3/8	1/4	5/16-23/32	5/8	25830	86.66	2	25778*	91.75
13/16	3	5 3/8	1/4	5/16-3/4	5/8	25831	83.97	2	25779*	91.77
7/8	3	5 3/8	1/4	5/16-13/16	3/4	25833	87.67	2	25780*	96.08
15/16	3	6 1/8	1/4	5/16-7/8	3/4	25835	92.28	3	25781*	100.70
1	3	6 3/8	5/16	3/8-15/16	3/4	25837	110.63	3	25782*	120.64
1 1/16	3	6 3/8	5/16	3/8-1 1/16	3/4	25838	129.30	3	25783*	134.96
1 1/8	3	6 3/8	5/16	3/8-1 1/16	1	25839	134.65	3	25784*	140.72
1 3/16	3	6 3/8	5/16	3/8-1 1/8	1	25840	141.15	3	25785*	145.73
1 1/4	5	6 5/8	3/8	7/16-1 3/16	1	25841	165.62	3	25786*	172.87
1 5/16	5	6 5/8	3/8	7/16-1 3/16	—	—	—	3	25787*	183.37
1 3/8	5	6 5/8	3/8	7/16-1 5/16	1	25842	188.47	—	—	—
1 1/2	5	7 7/8	3/8	7/16-1 7/16	1 1/4	25843	211.24	4	25789*	213.96
1 5/8	5	8 1/8	7/16	1/2-1 9/16	1 1/4	25844	287.84	4	25790*	291.40
1 3/4	5	8 1/8	7/16	1/2-1 11/16	1 1/4	25845	309.52	4	25791*	313.53
1 7/8	5	8 1/8	7/16	1/2-1 13/16	1 1/2	25846	340.59	4	25792*	344.95

*Available While Supplies last

(continued)

Interchangeable Pilot Counterbores (continued)

List No. 1771, 1772

COUNTER-BORE SIZE	NO. OF FLUTES	OAL	ACCEPTS PILOT SH. DIA.	RANGE OF PILOTS DIA.	SHANK DIA.	LIST NO. 1772 EDP NO.	LIST PRICE	MORSE TAPER NO.	LIST NO. 1771 EDP NO.	LIST PRICE
2	5	8 3/8	1/2	9/16-1 15/16	1 1/2	25847	$384.43	4	25793*	$390.17
2 1/8	5	9 7/8	1/2	9/16-2 1/16	—	—	—	5	25794*	484.76
2 1/4	5	9 7/8	1/2	9/16-2 3/16	—	—	—	5	25795*	516.48
2 3/8	5	9 7/8	1/2	9/16-2 5/16	—	—	—	5	25796*	554.29
2 1/2	5	9 7/8	1/2	9/16-2 7/16	—	—	—	5	25797*	590.15

* Available While Supplies Last

Carbide Tipped Interchangeable Pilot Counterbores

For use with interchangeable pilots (list no. 776).

Carbide Tipped offers excellent wear resistance. Recommended for counterboring and spot facing in cast iron, non-ferrous metals and other abrasive non-ferrous materials.

NOT FOR USE IN STEEL

STANDARD TOLERANCE — plus .001" minus .0000".

List No. 5779 Straight Shank

List No. 5780 Taper Shank

STANDARD PACKAGE All sizes — 1 each

COUNTER-BORE SIZE	FLUTE LENGTH	OAL	ACCEPTS PILOT SHANK DIA.	MINIMUM DIA. AT CENTER	SHANK DIA	LIST NO. 5779 EDP NO.	LIST PRICE	MORSE TAPER NO.	LIST NO. 5780 EDP NO.	LIST PRICE
1/4	3/4	3 11/16	3/32	.114	15/64	56401	$88.91	1	56451	$104.10
5/16	3/4	3 11/16	3/32	.114	19/64	56402	98.78	1	56452	113.74
3/8	1	4 1/16	5/32	.187	5/16	56403	113.61	1	56453	127.42
7/16	1	4 1/16	5/32	.187	3/8	56404	121.11	1	56454	135.91
1/2	1 1/4	4 5/16	3/16	.245	7/16	56405	134.26	1	56455	150.08
9/16	1 1/4	4 5/16	3/16	.245	1/2	56406	138.36	1	56456	152.86
5/8	1 1/4	5 1/8	3/16	.245	1/2	56407	142.20	2	56457	156.92
11/16	1 1/4	5 1/8	3/16	.245	1/2	56408	147.97	2	56458	165.66
3/4	1 1/4	5 3/8	1/4	.245	1/2	56409	151.40	2	56459	168.41
13/16	1 1/4	5 3/8	1/4	.307	5/8	56410	154.49	2	56460	171.29
7/8	1 1/4	5 3/8	1/4	.307	3/4	56411	163.76	2	56461	180.13
15/16	1 1/4	6 1/8	1/4	.307	3/4	56412	167.20	3	56462	184.99
1	1 3/8	6 3/8	5/16	.370	3/4	56413	171.95	3	56463	189.44
1 1/16	1 3/8	6 3/8	5/16	.370	1	56414	173.84	3	56464	191.85
1 1/8	1 3/8	6 3/8	5/16	.370	1	56415	178.24	3	56465	197.82
1 3/16	1 3/8	6 3/8	5/16	.432	1	56416	185.51	3	56466	204.67
1 1/4	1 1/2	6 5/8	3/8	.432	1	56417	191.09	3	56467	209.61
1 5/16	1 1/2	6 5/8	3/8	.432	1	56418	198.58	3	56468	216.49
1 3/8	1 1/2	6 5/8	3/8	.432	1	56419	208.95	3	56469	236.37
1 7/16	1 1/2	7 7/8	3/8	.432	1 1/4	56420	210.64	4	56470	232.20
1 1/2	1 1/2	7 7/8	3/8	.432	1 1/4	56421	226.11	4	56471	247.88
1 9/16	1 3/4	8 1/8	7/16	.495	1 1/4	56422*	232.73	—	—	—
1 5/8	1 3/4	8 1/8	7/16	.495	1 1/4	56423*	237.60	4	56473*	258.81

* Available While Supplies Last

Interchangeable Pilots For Counterbores

Carbon Steel

List No. 776

STANDARD PACKAGE All sizes — 1 each

PILOT SIZE	SHANK DIAMETER 3/32 EDP NO.	3/32 LIST PRICE	5/32 EDP NO.	5/32 LIST PRICE	3/16 EDP NO.	3/16 LIST PRICE	1/4 EDP NO.	1/4 LIST PRICE	5/16 EDP NO.	5/16 LIST PRICE	3/8 EDP NO.	3/8 LIST PRICE	7/16 EDP NO.	7/16 LIST PRICE
1/8	26002	$17.68												
5/32	26003	14.36												
3/16	26004	14.68	26009	$14.68										
7/32	26005	16.61	26010	16.61										
1/4	26006	16.61	26011	16.61	26018	$16.61								
9/32	26007	17.68	26012	17.68	26019	17.68								
5/16			26013	17.68	26020	17.68	26032	$17.68						
11/32			26014	17.68	26021	17.68	26033	17.68						
3/8			26015	19.50	26022	19.50	26034	19.50	26050	$19.50				
13/32					26023	19.50	26035	19.50						
7/16					26024	19.93	26036	19.93	26052	19.93				
15/32					26025	19.93	26037	19.93	26053	19.93				
1/2					26026	22.82	26038	22.82	26054	22.82	26072	$22.82		
17/32					26027	26.57	26039	26.57	26055	26.57	26073*	26.57		
9/16					26028	29.89	26040	29.89	26056	29.89				
19/32					26029*	32.79	26041*	32.79						
5/8					26030	32.79	26042	32.79	26058	32.79				
21/32							26043	33.54	26059	33.54				
11/16							26044	33.54	26060	33.54	26078	33.54		
23/32									26061	38.04				
3/4							26046	38.04	26062	38.04	26080	38.04		
13/16							26047	42.75	26063	42.75	26081	42.75	26102	$42.75
7/8							26048	47.25	26064	47.25	26082	47.25	26103	47.25
15/16									26065	49.82	26083	49.82		
1									26066	51.64				
1 1/16											26085	53.46		
1 1/8											26086	64.50		

*Available While Supplies Last

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Call Morse Cutting Tools for all of your special tap needs.
To expedite your quote please provide the following information:

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TYPE of TAP _____ SURFACE TREATMENT _____

MATERIAL to be THREADED _____ HARDNESS _____

BLIND or THROUGH HOLE _____ LENGTH of THREAD _____

# of HOLES to TAP _____ TAPPING EQUIPMENT USED _____

CURRENT TAP USED _____ TAPPING PROBLEM _____

Cap Screw Counterbores

High Speed Steel — Straight Shank — 4-Flute

For producing counterbored clearance holes for the heads of socket head cap screws. Recommended for a wide range of material types.

Bold indicates standard pilot tolerance.

List No. 1766

STANDARD PACKAGE All sizes — 1 each

CUTTER DIA.	FOR CAP SCREW SIZE	PILOT TOLERANCE	PILOT DIA.	PILOT LENGTH	CUTTER DIA. FLUTE LENGTH	SHANK DIA.	OAL	EDP NUMBER	LIST PRICE
.183	**4**	Standard	.1120	1/8	9/16	.1562	3 7/8	**25718**	$24.48
.215	4	+1/32 Over	.1430	1/8	9/16	.1562	3 7/8	**25719**	24.48
.205	**5**	Standard	.1250	5/32	5/8	.1875	4 1/8	**25720**	24.48
.237	5	+1/32 Over	.1560	5/32	5/8	.1875	4 1/8	**25721**	24.48
.227	**6**	Standard	.1380	3/16	3/4	.2188	4 5/8	**25722**	25.92
.259	6	+1/32 Over	.1690	3/16	3/4	.2188	4 5/8	**25723**	25.92
.270	**8**	Standard	.1640	7/32	3/4	.2500	5	**25724**	27.77
.302	8	+1/32 Over	.1950	7/32	3/4	.2500	5	**25725**	27.77
.312	**10**	Standard	.1900	1/4	7/8	.2812	5 1/4	**25726**	28.38
.344	10	+1/32 Over	.2210	1/4	7/8	.2812	5 1/4	**25727**	28.38
.380	**1/4**	Standard	.2500	9/32	1	.3125	5 5/8	**25741**	29.83
.412	1/4	+1/32 Over	.2810	9/32	1	.3125	5 5/8	**25728**	29.83
.474	**5/16**	Standard	.3125	5/16	1	.3750	6 1/8	**25742**	37.24
.504	5/16	+1/32 Over	.3430	5/16	1	.3750	6 1/8	**25729**	37.24
.569	**3/8**	Standard	.3750	3/8	1 1/4	.5000	6 1/2	**25743**	40.72
.601	3/8	+1/32 Over	.4060	3/8	1 1/4	.5000	6 1/2	**25730**	40.72
.661	**7/16**	Standard	.4370	7/16	1 1/4	.5000	7	**25744**	48.95
.691	7/16	+1/32 Over	.4680	7/16	1 1/4	.5000	7	**25731**	48.95
.755	**1/2**	Standard	.5000	1/2	1 1/2	.5000	7 1/2	**25745**	56.06
.787	1/2	+1/32 Over	.5310	1/2	1 1/2	.5000	7 1/2	**25732**	56.06
.969	**5/8**	Standard	.6250	5/8	1 1/2	.6250	7 5/8	**25733**	91.45
1.000	5/8	+1/32 Over	.6560	5/8	1 1/2	.6250	7 5/8	**25734**	91.45
1.156	**3/4**	Standard	.7500	3/4	1 5/8	.7500	7 3/4	**25735**	106.38
1.188	3/4	+1/32 Over	.7810	3/4	1 5/8	.7500	7 3/4	**25736**	106.38
1.344	**7/8**	Standard	.8750	7/8	1 7/8	.8750	8	**25737**	129.58
1.375	7/8	+1/32 Over	.9060	7/8	1 7/8	.8750	8	**25738**	129.58
1.531	**1**	Standard	1.0000	1	2	1.0000	8 1/2	**25739**	164.36
1.563	1	+1/32 Over	1.0310	1	2	1.0000	8 1/2	**25740**	164.36

List No. 1766 — Metric

CUTTER DIA.	FOR CAP SCREW SIZE	PILOT DIA.	PILOT LENGTH	CUTTER DIA. FLUTE LENGTH	SHANK DIA.	OAL	EDP NUMBER	LIST PRICE
.2362	3mm	.1377	5/32	5/8	.1875	4 1/8	**25746**	$24.86
.2953	4mm	.1772	7/32	3/4	.2500	5	**25747**	28.20
.3543	5mm	.2165	9/32	1	.3125	5 5/8	**25748**	30.29
.4134	6mm	.2559	5/16	1	.3750	6 1/8	**25749**	37.81
.5315	8mm	.3346	3/8	1 1/4	.5000	6 1/2	**25750**	41.35
.6496	10mm	.4134	7/16	1 1/4	.5000	7	**25751**	49.70
.7283	12mm	.4921	1/2	1 1/2	.5000	7 1/2	**25752**	56.91
.9645	16mm	.6500	5/8	1 1/2	.6250	7 5/8	**25754**	92.85
1.2010	20mm	.8070	7/8	1 7/8	.8750	8	**25756**	131.56
1.4370	24mm	.9650	1	2	1.0000	8 1/2	**25758**	166.89

TAPS & DIES

High Production Spiral Point SHEARTAP™

Premium High Speed Steel Plug Style

Primarily designed for tapping through holes. The spiral point forces the chips ahead of the tap.

List No. 2090 — Steam Oxide Over Nitride

List No. 2090G — TiN Coated

New and completely reengineered for improved performance – the **NEW "ShearTap"** offers exceptional value for high volume production tapping in carbon steels, and stainless steels up to 35 Rc hardness.

Steam Oxide Over Nitride resists chip welding, increases lubricity and helps to retain cutting fluid. **TiN Coating** increases hardness and lubricity for improved thread quality, higher speeds and longer tool life.

STANDARD PACKAGE **Machine Screw Sizes** — 12 each
Fractional Sizes 1/4" thru 1/2" — 12 each
9/16" thru 3/4" — 3 each
7/8" thru 2" —1 each

ShearTap Cutting Speeds: Page 133

						SURFACE TREATED					TIN COATED				
SIZE	THREAD TYPE	NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	H2	H3	H4	H5	LIST	H2	H3	H4	H5	LIST
#4-40	NC	2	.313	.250	1⅞	34400	34401	—	34402	$13.71	94400	94401	—	94402	$15.52
#6-32	NC	2	.375	.313	2	34404	34405	—	34406	11.52	94404	94405	—	94406	14.07
#8-32	NC	3	.375	.375	2⅛	34407	34408	—	34409	11.62	94407	94408	—	94409	16.18
#10-24	NC	3	.500	.375	2⅜	—	34410	—	—	11.62	—	94410	—	—	16.18
#10-32	NF	3	.500	.375	2⅜	34411	34412	—	34413	11.62	94411	94412	—	94413	16.18
1/4-20	NC	3	.625	.375	2½	34416	34417	—	34418	12.81	94416	94417	—	94418	17.28
1/4-28	NF	3	.625	.375	2½	34419	34420	34421	—	12.81	94419	94420	94421	—	17.28
5/16-18	NC	3	.688	.438	2²³⁄₃₂	—	34422	—	34423	14.10	—	94422	—	94423	21.63
5/16-24	NF	3	.688	.438	2²³⁄₃₂	—	34424	34425	-	14.10	—	94424	94425	—	21.63
3/8-16	NC	3	.750	.500	2¹⁵⁄₁₆	—	34426	—	34427	15.91	—	94426	—	94427	23.30
3/8-24	NF	3	.750	.500	2¹⁵⁄₁₆	—	34428	34429	—	15.91	—	94428	94429	—	23.30
7/16-14	NC	3	.875	.563	3⅝₃₂	—	34430	—	34431	20.33	—	94430	—	94431	27.38
7/16-20	NF	3	.875	.563	3⅝₃₂	—	34432	—	34433	20.33	—	94432	—	94433	27.38
1/2-13	NC	3	.938	.719	3⅜	—	34434	—	34435	23.48	—	94434	—	94435	30.29
1/2-20	NF	3	.938	.719	3⅜	—	34436	—	34437	23.48	—	94436	—	94437	30.29
9/16-12	NC	4	1.000	.673	3¹⁹⁄₃₂	—	34438	—	—	37.95	—	94438	—	—	51.21
9/16-18	NF	4	1.000	.673	3¹⁹⁄₃₂	—	34439	—	—	37.95	—	94439	—	—	51.21
5/8-11	NC	4	1.125	.673	3¹³⁄₁₆	—	34440	—	—	42.19	—	94440	—	—	55.12
5/8-18	NF	4	1.125	.673	3¹³⁄₁₆	—	34441	—	—	42.19	—	94441	—	—	55.12
3/4-10	NC	4	1.219	.766	4¼	—	34444	—	—	60.52	—	94444	—	—	74.33
3/4-16	NF	4	1.219	.766	4¼	—	34445	—	—	60.52	—	94445	—	—	74.33
7/8-9	NC	4	1.344	.875	4¹¹⁄₁₆	—	—	34500	—	89.67	—	—	94500	—	111.65
7/8-14	NF	4	1.344	.875	4¹¹⁄₁₆	—	—	34501	—	89.67	—	—	94501	—	111.65
1-8	NC	4	1.500	1.000	5⅛	—	—	34502	—	117.58	—	—	94502	—	146.90
1-12	NF	4	1.500	1.000	5⅛	—	—	34503	—	117.58	—	—	94503	—	146.90
1⅛-7	NC	4	1.719	.843	5⁷⁄₁₆	—	—	34504	—	182.42	—	—	94504	—	215.38
1⅛-12	NF	4	1.719	.843	5⁷⁄₁₆	—	—	34505	—	182.42	—	—	94505	—	215.38
1¼-7	NC	4	1.719	.843	5¾	—	—	34506	—	195.51	—	—	94506	—	244.30
1¼-12	NF	4	1.719	.843	5¾	—	—	34507	—	195.51	—	—	94507	—	244.30
1⅜-6	NC	4	2.000	1.000	6⅛₁₆	—	—	34508	—	305.93	—	—	94508	—	371.87
1⅜-12	NF	4	2.000	1.000	6⅛₁₆	—	—	34509	—	305.93	—	—	94509	—	371.87
1½-6	NC	6	2.000	1.000	6⅜	—	—	34510	—	358.42	—	—	94510	—	424.35
1½-12	NF	6	2.000	1.000	6⅜	—	—	34511	—	358.42	—	—	94511	—	424.35
1¾-5*	NC	6	2.406	.782	7	—	—	—	34512*	485.49	—	—	—	94512*	606.80
2-4½*	NC	6	2.688	.874	7⅝	—	—	—	34514*	774.29	—	—	—	94514*	939.12

*H7 Pitch Dia. Limit (Sizes 1¾-5 and 2-4½)

High Production Spiral Flute SHEARTAP™

Premium High Speed Steel – 48° Helix Angle Semi-Bottoming Style

Primarily designed for tapping blind holes. The spiral flutes draw the chips out of the hole.

New and completely reengineered for improved performance – the **NEW "ShearTap"** offers exceptional value for high volume production tapping in carbon steels, and stainless steels up to 35 Rc Hardness

Steam Oxide Over Nitride resists chip welding, increases lubricity and helps to retain cutting fluid. **TiN Coating** increases hardness and lubricity for improved thread quality, higher speeds and longer tool life.

List No. 2091 — Steam Oxide Over Nitride

List No. 2091G — TiN Coated

STANDARD PACKAGE
Machine Screw Sizes — 12 each
Fractional Sizes 1/4" thru 1/2" — 12 each
9/16" thru 3/4" — 3 each
7/8" thru 2" —1 each

						SURFACE TREATED					TiN COATED				
SIZE	THREAD TYPE	NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	H2	H3	H4	H5	LIST	H2	H3	H4	H5	LIST
#4-40	NC	3	.236	.327	1⅞	34450	34451	—	—	$22.86	94450	94451	—	—	$23.96
#6-32	NC	3	.236	.452	2	34453	34454	—	34455	17.48	94453	94454	—	94455	19.56
#8-32	NC	3	.236	.514	2⅛	34456	34457	—	34458	17.48	94456	94457	—	94458	21.58
#10-24	NC	3	.354	.521	2⅜	34459	34460	—	—	17.48	94459	94460	—	—	21.58
#10-32	NF	3	.354	.521	2⅜	34461	34462	—	34463	17.48	94461	94462	—	94463	21.58
1/4-20	NC	3	.433	.567	2½	—	34466	—	34467	19.38	—	94466	—	94467	23.34
1/4-28	NF	3	.433	.567	2½	—	34468	34469	—	19.38	—	94468	94469	—	23.34
5/16-18	NC	3	.472	.653	2²³⁄₃₂	—	34470	—	34471	21.76	—	94470	—	94471	28.70
5/16-24	NF	3	.472	.653	2²³⁄₃₂	—	34472	34473	—	21.76	—	94472	94473	—	28.70
3/8-16	NC	3	.551	.699	2¹⁵⁄₁₆	—	34474	—	34475	23.90	—	94474	—	94475	30.68
3/8-24	NF	3	.551	.699	2¹⁵⁄₁₆	—	34476	34477	—	23.90	—	94476	94477	—	30.68
7/16-14	NC	3	.591	.847	3⅝₃₂	—	34478	—	34479	30.91	—	94478	—	94479	37.14
7/16-20	NF	3	.591	.847	3⅝₃₂	—	34480	—	34481	30.91	—	94480	—	94481	37.14
1/2-13	NC	3	.630	1.026	3⅜	—	34482	—	34483	35.81	—	94482	—	94483	41.67
1/2-20	NF	3	.630	1.026	3⅜	—	34484	—	34485	35.81	—	94484	—	94485	41.67
9/16-12	NC	3	.690	.983	3¹⁹⁄₃₂	—	34486	—	—	55.10	—	94486	—	—	67.03
9/16-18	NF	3	.690	.983	3¹⁹⁄₃₂	—	34487	—	—	55.10	—	94487	—	—	67.03
5/8-11	NC	3	.745	1.052	3¹³⁄₁₆	—	34488	—	—	64.57	—	94488	—	—	75.78
5/8-18	NF	3	.745	1.052	3¹³⁄₁₆	—	34489	—	—	64.57	—	94489	—	—	75.78
3/4-10	NC	4	.820	1.165	4¼	—	34492	—	—	80.43	—	94492	—	—	92.70
3/4-16	NF	4	.820	1.165	4¼	—	34493	—	—	80.43	—	94493	—	—	92.70
7/8-9	NC	4	.911	1.308	4¹¹⁄₁₆	—	—	34520	—	116.92	—	—	94520	—	138.90
7/8-14	NF	4	.911	1.308	4¹¹⁄₁₆	—	—	34521	—	116.92	—	—	94521	—	138.90
1-8	NC	4	1.025	1.475	5⅛	—	—	34522	—	152.31	—	—	94522	—	185.27
1-12	NF	4	1.025	1.475	5⅛	—	—	34523	—	152.31	—	—	94523	—	185.27
1⅛-7	NC	4	1.143	1.419	5⁷⁄₁₆	—	—	34524	—	238.02	—	—	94524	—	270.99
1⅛-12	NF	4	1.143	1.419	5⁷⁄₁₆	—	—	34525	—	238.02	—	—	94525	—	270.99
1¼-7	NC	4	1.143	1.419	5¾	—	—	34526	—	286.45	—	—	94526	—	347.67
1¼-12	NF	4	1.143	1.419	5¾	—	—	34527	—	286.45	—	—	94527	—	347.67
1⅜-6	NC	4	1.333	1.667	6⅛₁₆	—	—	34528	—	373.41	—	—	94528	—	439.34
1⅜-12	NF	4	1.333	1.667	6⅛₁₆	—	—	34529	—	373.41	—	—	94529	—	439.34
1½-6	NC	4	1.333	1.667	6⅜	—	—	34530	—	440.88	—	—	94530	—	503.91
1½-12	NF	4	1.333	1.667	6⅜	—	—	34531	—	440.88	—	—	94531	—	503.91
1¾-5*	NC	6	1.600	1.588	7	—	—	—	34532*	654.07	—	—	—	94532*	777.14
2-4½*	NC	6	1.777	1.588	7⅝	—	—	—	34534*	1029.01	—	—	—	94534*	1193.85

***H7 Pitch Dia. Limit (Sizes 1¾-5 and 2-4½)**

Metric Spiral Point SHEARTAP™

List No. 2090M — Steam Oxide Over Nitride
List No. 2090G — TiN Coated

SIZE	PITCH	PITCH DIA. LIMIT	NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	SURFACE TREATED EDP NO.	SURFACE TREATED LIST	TiN COATED EDP NO.	TiN COATED LIST
M3	0.5	D3	2	.313	.313	1 5/16	35240	$13.87	95240	$15.81
M3.5	0.6	D4	2	.375	.313	2	35241	13.25	95241	15.86
M4	0.7	D4	3	.375	.375	2 1/8	35242	12.62	95242	17.48
M5	0.8	D4	3	.500	.375	2 3/8	35243	13.35	95243	18.14
M6	1	D5	3	.625	.375	2 1/2	35244	13.97	95244	18.71
M7	1	D5	3	.688	.438	2 23/32	35245	14.70	95245	22.81
M8	1	D5	3	.688	.438	2 23/32	35246	15.38	95246	23.43
M8	1.25	D5	3	.688	.438	2 23/32	35247	15.38	95247	23.43
M10	1.25	D5	3	.750	.500	2 15/16	35248	19.84	95248	27.52
M10	1.5	D6	3	.750	.500	2 15/16	35249	19.84	95249	27.52
M12	1.25	D5	3	.938	.719	3 3/8	35250	25.56	95250	32.76
M12	1.75	D6	3	.938	.719	3 3/8	35251	25.56	95251	32.76
M14	1.5	D6	4	1.000	.673	3 19/32	35252	42.13	95252	56.14
M14	2	D7	4	1.000	.673	3 19/32	35253	42.13	95253	56.14
M16	1.5	D6	4	1.125	.673	3 13/16	35254	46.29	95254	59.95
M16	2	D7	4	1.125	.673	3 13/16	35255	46.29	95255	59.95
M18	1.5	D6	4	1.125	.719	4 1/32	35256	56.13	95256	69.27
M18	2.5	D7	4	1.125	.719	4 1/32	35257	56.13	95257	69.27
M20	1.5	D6	4	1.188	.812	4 15/32	35280	94.51	95280	118.10
M20	2.5	D7	4	1.188	.812	4 15/32	35281	94.51	95281	118.10
M22	1.5	D6	4	1.188	1.031	4 11/16	35282	130.64	95282	163.30
M22	2.5	D7	4	1.188	1.031	4 11/16	35283	130.64	95283	163.30
M24	2	D7	4	1.422	.797	4 29/32	35284	137.54	95284	170.51
M24	3	D8	4	1.422	.797	4 29/32	35285	137.54	95285	170.51

STANDARD PACKAGE
M3-M12 – 12 each
M14-M18 – 3 each
M20-M24 – 1 each

ShearTap Cutting Speeds: Page 133

Metric Spiral Flute SHEARTAP™

List No. 2091M — Steam Oxide Over Nitride
List No. 2091G — TiN Coated

SIZE	PITCH	PITCH DIA. LIMIT	NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	SURFACE TREATED EDP NO.	SURFACE TREATED LIST	TiN COATED EDP NO.	TiN COATED LIST
M3	0.5	D3	3	.236	.389	1 5/16	35258	$21.09	95258	$22.43
M3.5	0.6	D4	3	.236	.452	2	35259	20.10	95259	22.14
M4	0.7	D4	3	.236	.514	2 1/8	35260	19.07	95260	23.38
M5	0.8	D4	3	.354	.521	2 3/8	35261	20.42	95261	24.62
M6	1	D5	3	.433	.567	2 1/2	35262	21.09	95262	25.24
M7	1	D5	3	.472	.653	2 23/32	35263	22.39	95263	29.86
M8	1	D5	3	.472	.653	2 23/32	35264	23.69	95264	31.05
M8	1.25	D5	3	.472	.653	2 23/32	35265	23.69	95265	31.05
M10	1.25	D5	3	.551	.699	2 15/16	35266	28.10	95266	35.10
M10	1.5	D6	3	.551	.699	2 15/16	35267	28.10	95267	35.10
M12	1.25	D5	3	.630	1.026	3 3/8	35268	39.07	95268	45.14
M12	1.75	D6	3	.630	1.026	3 3/8	35269	39.07	95269	45.14
M14	1.5	D6	3	.690	.983	3 19/32	35270	60.68	95270	73.14
M14	2	D7	3	.690	.983	3 19/32	35271	60.68	95271	73.14
M16	1.5	D6	3	.745	1.052	3 13/16	35272	70.75	95272	82.38
M16	2	D7	3	.745	1.052	3 13/16	35273	70.75	95273	82.38
M18	1.5	D6	4	.813	.983	4 1/32	35274	87.90	95274	100.57
M18	2.5	D7	4	.813	.983	4 1/32	35275	87.90	95275	100.57
M20	1.5	D6	4	.790	1.210	4 15/32	35290	126.59	95290	158.20
M20	2.5	D7	4	.790	1.210	4 15/32	35291	126.59	95291	158.20
M22	1.5	D6	4	.790	1.428	4 11/16	35292	154.62	95292	186.13
M22	2.5	D7	4	.790	1.428	4 11/16	35293	154.62	95293	186.13
M24	2	D7	4	.940	1.279	4 29/32	35294	166.86	95294	195.43
M24	3	D8	4	.940	1.279	4 29/32	35295	166.86	95295	195.43

STANDARD PACKAGE
M3-M12 – 12 each
M14-M18 – 3 each
M20-M24 – 1 each

Pitch diameter limits are those recommended for 6H class of thread.

Eight Pitch High Production SHEARTAP™

Eight Pitch taps are often required for applications in the power generation industry and general construction.

New and completely reengineered for improved performance – the **NEW "ShearTap"** offers exceptional value for high volume production tapping in carbon steels and stainless steels up to 35 Rc Hardness.

Steam Oxide Over Nitride resists chip welding, increases lubricity and helps to retain cutting fluid. **TiN Coating** increases hardness and lubricity for improved thread quality, higher speeds and longer tool life.

List No. 2090 — Steam Oxide Over Nitride
List No. 2090G — TiN Coated

Spiral Point Eight Pitch SHEARTAP™

Plug Style

Primarily designed for tapping through holes. The spiral point forces the chips ahead of the tap.

SIZE	NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	PITCH DIA. LIMIT	SURFACE TREATED EDP NO.	SURFACE TREATED LIST	TiN COATED EDP NO.	TiN COATED LIST
1-1/8-8	4	1.719	.843	5 7/16	H5	34650	$182.42	94650	$215.38
1-1/4-8	4	1.719	.843	5 3/4	H5	34651	195.51	94651	244.30
1-3/8-8	4	2.000	1.000	6 1/16	H5	34652	305.93	94652	371.87
1-1/2-8	6	2.000	1.000	6 3/8	H5	34653	358.42	94653	424.35
1-5/8-8	6	2.000	1.187	6 11/16	H6	34654	421.95	94654	515.55
1-3/4-8	6	2.406	.782	7	H6	34655	485.49	94655	606.80
1-7/8-8	6	2.406	1.156	7 5/16	H6	34656	629.85	94656	772.95
2-8	6	2.688	.874	7 5/8	H6	34657	774.29	94657	939.12

Spiral Flute Eight Pitch SHEARTAP™

48° Helix Angle
Semi-Bottoming Style

Primarily designed for tapping blind holes. The spiral flutes draw the chips out of the hole.

Eight Pitch taps are often required for applications in the power generation industry and general construction.

List No. 2091 — Steam Oxide Over Nitride
List No. 2091G — TiN Coated

SIZE	NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	PITCH DIA. LIMIT	SURFACE TREATED EDP NO.	SURFACE TREATED LIST	TiN COATED EDP NO.	TiN COATED LIST
1-1/8-8	4	1.143	1.419	5 7/16	H5	34660	$238.02	94660	$270.99
1-1/4-8	4	1.143	1.419	5 3/4	H5	34661	286.45	94661	347.67
1-3/8-8	4	1.333	1.667	6 1/16	H5	34662	373.41	94662	439.34
1-1/2-8	4	1.333	1.667	6 3/8	H5	34663	440.88	94663	503.91
1-5/8-8	6	1.333	1.854	6 11/16	H6	34664	547.45	94664	640.50
1-3/4-8	6	1.600	1.588	7	H6	34665	654.07	94665	777.14
1-7/8-8	6	1.600	1.962	7 5/16	H6	34666	841.50	94666	985.45
2-8	6	1.777	1.588	7 5/8	H6	34667	1,029.01	94667	1,193.85

Oversize Spiral Point SHEARTAP™

List No. 2090 — Steam Oxide Over Nitride

(see pages 129 & 131 for dimensions and specifications)

Oversize Spiral Flute SHEARTAP™

List No. 2091 — Steam Oxide Over Nitride

(see pages 130 & 131 for dimensions and specifications)

SIZE	THREAD TYPE	PITCH DIA. LIMIT	Spiral Point EDP NO.	Spiral Point LIST	Spiral Flute EDP NO.	Spiral Flute LIST
6-32	NC	H7	34542	$11.52	34592	$17.48
8-32	NC	H7	34544	11.62	34594	17.48
10-24	NC	H7	34546	11.62	34596	17.48
10-32	NF	H7	34548	11.62	34598	17.48
1/4-20	NC	H7	34550	12.81	34600	19.38
1/4-20	NC	H11	34551	12.81	34601	19.38
1/4-28	NF	H7	34552	12.81	34602	19.38
1/4-28	NF	H11	34553	12.81	34603	19.38
5/16-18	NC	H7	34554	14.10	34604	21.76
5/16-18	NC	H11	34555	14.10	34605	21.76
5/16-24	NF	H7	34556	14.10	34606	21.76
5/16-24	NF	H11	34557	14.10	34607	21.76
3/8-16	NC	H7	34558	15.91	34608	23.90
3/8-16	NC	H11	34559	15.91	34609	23.90
3/8-24	NF	H7	34560	15.91	34610	23.90
3/8-24	NF	H11	34561	15.91	34611	23.90
7/16-14	NC	H11	34563	20.33	34613	30.91
7/16-20	NF	H11	34565	20.33	34615	30.91
1/2-13	NC	H11	34567	23.48	34617	35.81
1/2-20	NF	H11	34569	23.48	34619	35.81
9/16-12	NC	H11	34571	37.95	34621	55.10
9/16-18	NF	H11	34573	37.95	34623	55.10
5/8-11	NC	H11	34575	42.19	34625	64.57
5/8-18	NF	H11	34577	42.19	34627	64.57
3/4-10	NC	H11	34579	60.52	34629	80.43
3/4-16	NF	H11	34581	60.52	34631	80.43
7/8-9	NC	H11	34583	89.67	34633	116.92
7/8-14	NF	H11	34585	89.67	34635	116.92
1-8	NC	H11	34587	117.58	34637	152.31
1-12	NF	H11	34589	117.58	34639	152.31
Metric						
M3 × 0.5		H7	34670	13.87	34680	21.09
M4 × 0.7		H7	34671	12.62	34681	19.07
M5 × 0.8		H7	34672	13.35	34682	20.42
M6 × 1		H11	34673	13.97	34683	21.09
M8 × 1.25		H11	34674	15.38	34684	23.69
M10 × 1.5		H11	34675	19.84	34685	28.10
M12 × 1.75		H11	34676	25.56	34686	39.07

PITCH DIA. LIMIT	AMOUNT LARGER THAN BASIC PITCH DIA.
H7	.0030"-.0035"
H11	.0050"-.0055"

Oversize taps are mainly used for parts that will be plated or heat treated after tapping. Also used in materials that tend to shrink after tapping.

Metric Spiral Point
List No. 2090M
Steam Oxide Over Nitride

Metric Spiral Flute
List No. 2091M
Steam Oxide Over Nitride

SHEARTAP™ Cutting Speeds

MATERIAL	HARDNESS BHN	EXAMPLES	SFM*
Carbon Steel	200	1010, 1018	40–65
	200–300	1046, 1050	30–50
Stainless Steel	300	302, 303, 304, 310, 316	15–25
	300	405, 409	15–25
	300	440, 403	15–25

SPEEDS shown are suggested starting points only and may be increased or decreased depending on actual material and machining conditions. Start conservatively and increase until the machining cycle is optimized.

SPEEDS may be **increased** for coated taps, spiral point taps, fine pitch taps and when the percentage of thread is decreased.

SPEEDS may need to be **reduced** for spiral flute taps, coarse pitch taps, bottoming taps, difficult materials, longer thread lengths and when the percentage of thread is increased.

HPT HIGH PERFORMANCE TAPS

MATERIAL SPECIFIC GEOMETRY DESIGNED TO OPTIMIZE YOUR TAPPING APPLICATIONS

Application specific geometries engineered for high performance, high productivity tapping in a variety of materials. Morse Cutting Tools offers a complete selection of styles, sizes and "H" limits including metric sizes enabling you to choose the right tap to optimize your tapping application.

Powder metallurgy high speed steel, unique geometry, surface finish and tool coating ensure consistent, predictable performance, superior thread quality and excellent tool life for lower cost per tapped hole.

P/M POWDER METALLURGY HIGH SPEED STEEL

Premium Steel Engineered For

Hardness / Wear Resistance / Tool Life
Heat Resistance / Toughness and Strength
Performance Under Difficult Cutting Conditions
Higher Cutting Speeds / Increased Productivity

SURFACE FINISHES / TOOL COATINGS

Steam Oxide Finish increases wear resistance, reduces friction, loading and galling, helps retain cutting fluids, improves thread quality and extends tool life.

Steam Oxide Over Nitride Finish helps toughen the hard abrasion resistant nitrided base. Also reduces friction, loading and galling, helps retain cutting fluids, improves thread quality and extends tool life.

TiCN - Titanium Carbonitride Coating increases wear resistance, reduces friction and galling, reduces tapping torque, improves thread quality and allows increased cutting speeds for greatly increased productivity and tool life.

CrN - Chromium Nitride Coating increases tool life and thread quality in softer materials including aluminum.

APPLICATIONS

FOR ALUMINUM

Spiral Point / Spiral Flute / Bright Finish / CrN (Chromium Nitride) Coated

Recommended for all types of aluminum alloys

FOR EXOTIC ALLOYS

Spiral Point / Spiral Flute / Steam Oxide Finish / TiCN Coated

Recommended for steels, steel alloys, stainless steels, titanium alloys, nickel and nickel base alloys, other exotic alloys and a wide variety of materials up to 32Rc hardness.

FOR HARD MATERIALS

Spiral Point / Spiral Flute / Steam Oxide Finish / TiCN Coated

Recommended for harder (32Rc- 45Rc) materials including steel alloys, titanium alloys, nickel base high temperature alloys, tool and mold steels and stainless steels

FOR CAST IRON

Straight Flute / Steam Oxide Over Nitride Finish

Recommended for all types of gray, ductile and malleable cast iron

GEOMETRY

Spiral Point Taps are designed for efficient tapping of through holes and blind holes with adequate depth for chip accumulation at the bottom of the hole. The shearing action of the point provides freer cutting action and ejects the chips ahead of the tap, eliminating chip disposal problems and chip damage to the threads. Shallower flutes also result in greater tap strength allowing for higher cutting speeds.

Spiral Flute Taps are designed to lift the chips out of the hole in blind hole tapping, eliminating chip disposal problems which can result in damaged threads and broken taps. They will also bridge openings, keyways and other interruptions in the tapped hole.

Plug Style (3-5 thread chamfer) is the most common chamfer used for tapping applications in through holes and blind holes with sufficient bottom clearance.

Semi-Bottoming Style (2-2-1/2 thread chamfer) allows threading close to the bottom of blind holes but cuts more efficiently than standard bottoming taps due to a slightly longer chamfer which distributes the cutting load over a greater number of teeth.

Semi-Interrupted Threads help to break the chips and enhance coolant flow to the cutting teeth for reduced chance of torn threads and improved thread quality.

CNC Reduced Neck Design enhances chip evacuation and cutting fluid flow to the cutting teeth for reduced friction, heat and galling. Also reduces contact between the tap and the workpiece.

Spiral Point
HPT High Performance Taps
For Aluminum

Plug Style

Recommended for all types of aluminum alloys.

Premium Powder Metallurgy High Speed Steel
Bright Finish and CrN (Chromium Nitride) Coated
Semi-Interrupted Thread (3-Flute taps only)

List No. 2092 Bright Finish

List No. 2092S
CrN – Chromium Nitride Coated

Primarily designed for tapping through holes. The spiral point forces the chips ahead of the tap.

Size	TPI NC	TPI NF	No. of Flutes	Thread Length	Neck Length	OAL	Bright Finish LIST NO. 2092 H1	H2	H3	H4	H5	List Price	CrN Coated LIST NO. 2092S H1	H2	H3	H4	H5	List Price
4	40	—	2	5/16	1/4	1 7/8	—	30000	—	—	—	$12.55	—	60700	—	—	—	$15.10
4	—	48	2	5/16	1/4	1 7/8	30001	30002	—	—	—	12.55	60701	60702	—	—	—	15.10
5	40	—	2	5/16	5/16	1 15/16	—	30003	—	—	—	12.55	—	60703	—	—	—	15.10
6	32	—	2	3/8	5/16	2	—	30004	30005	—	—	10.25	—	60704	60705	—	—	12.30
6	—	40	2	3/8	5/16	2	—	30006	—	—	—	10.25	—	60706	—	—	—	12.30
8	32	—	3	3/8	3/8	2 1/8	—	30007	30008	—	—	9.30	—	60707	60708	—	—	12.00
8	—	36	3	3/8	3/8	2 1/8	—	30009	—	—	—	9.30	—	60709	—	—	—	12.00
10	24	—	3	1/2	3/8	2 3/8	—	—	30010	—	—	9.30	—	—	60710	—	—	12.00
10	—	32	3	1/2	3/8	2 3/8	—	30011	30012	—	—	9.30	—	60711	60712	—	—	12.00
1/4	20	—	3	5/8	3/8	2 1/2	—	—	30013	—	30014	10.45	—	—	60713	—	60714	13.20
1/4	—	28	3	5/8	3/8	2 1/2	—	—	30015	30016	—	10.45	—	—	60715	60716	—	13.20
5/16	18	—	3	11/16	7/16	2 23/32	—	—	30017	—	30018	10.15	—	—	60717	—	60718	14.45
5/16	—	24	3	11/16	7/16	2 23/32	—	—	30019	30020	—	10.15	—	—	60719	60720	—	14.45
3/8	16	—	3	3/4	1/2	2 15/16	—	—	30021	—	30022	11.90	—	—	60721	—	60722	16.20
3/8	—	24	3	3/4	1/2	2 15/16	—	—	30023	30024	—	11.90	—	—	60723	60724	—	16.20
7/16	14	—	3	7/8	9/16	3 5/32	—	—	30025	—	30026	16.15	—	—	60725	—	60726	20.50
7/16	—	20	3	7/8	9/16	3 5/32	—	—	30027	—	30028	16.15	—	—	60727	—	60728	20.50
1/2	13	—	3	15/16	23/32	3 3/8	—	—	30029	—	30030	19.35	—	—	60729	—	60730	23.65
1/2	—	20	3	15/16	23/32	3 3/8	—	—	30031	—	30032	19.35	—	—	60731	—	60732	23.65

Metric

List No. 2092M Bright Finish

List No. 2092MS CrN – Chromium Nitride Coated

Size	Pitch	Pitch Dia. Limit	No. of Flutes	Thread Length	Neck Length	OAL	Bright Finish LIST NO. 2092M EDP NO.	List Price	CrN Coated LIST NO. 2092MS EDP NO.	List Price
M3	0.5	D3	2	5/16	5/16	1 15/16	30050	$11.70	60750	$14.05
M4	0.7	D4	3	3/8	3/8	2 1/8	30051	9.30	60751	12.00
M5	0.8	D4	3	1/2	3/8	2 3/8	30052	9.90	60752	12.65
M6	1.0	D5	3	5/8	3/8	2 1/2	30053	10.45	60753	13.20
M8	1.0	D5	3	11/16	7/16	2 23/32	30054	10.15	60754	14.45
M8	1.25	D5	3	11/16	7/16	2 23/32	30055	10.15	60755	14.45
M10	1.5	D6	3	3/4	1/2	2 5/16	30056	14.20	60756	18.50
M12	1.5	D5	3	15/16	23/32	3 3/8	30057	19.35	60757	23.65
M12	1.75	D6	3	15/16	23/32	3 3/8	30058	19.35	60758	23.65

Semi-Interrupted Thread on 3-Flute Taps Only

Spiral Flute
HPT High Performance Taps
For Aluminum

Semi-Bottoming Style

Recommended for all types of aluminum alloys.

Premium Powder Metallurgy High Speed Steel Bright Finish and CrN (Chromium Nitride) Coated Semi-Interrupted Thread (3-Flute taps only).

List No. 2093 Bright Finish

List No. 2093S
CrN – Chromium Nitride Coated

Primarily designed for tapping blind holes. The spiral flutes draw the chips out of the hole.

Size	TPI NC	TPI NF	No. of Flutes	Thread Length	Neck Length	OAL	Bright Finish LIST NO. 2093 H1	H2	H3	H4	H5	List Price	CrN Coated LIST NO. 2093S H1	H2	H3	H4	H5	List Price
4	40	—	2	15/64	21/64	1 7/8	—	30070	—	—	—	$18.30	—	60770	—	—	—	$21.95
4	—	48	2	15/64	21/64	1 7/8	30071	30072	—	—	—	18.30	60771	60772	—	—	—	21.95
5	40	—	2	15/64	25/64	1 15/16	—	30073	—	—	—	18.30	—	60773	—	—	—	21.95
6	32	—	2	15/64	29/64	2	—	30074	30075	—	—	14.85	—	60774	60775	—	—	17.85
6	—	40	2	15/64	29/64	2	—	30076	—	—	—	14.85	—	60776	—	—	—	17.85
8	32	—	2	15/64	33/64	2 1/8	—	30077	30078	—	—	13.90	—	60777	60778	—	—	16.70
8	—	36	2	15/64	33/64	2 1/8	—	30079	—	—	—	13.90	—	60779	—	—	—	16.70
10	24	—	2	11/32	17/32	2 3/8	—	—	30080	—	—	13.90	—	—	60780	—	—	16.70
10	—	32	2	11/32	17/32	2 3/8	—	30081	30082	—	—	13.90	—	60781	60782	—	—	16.70
1/4	20	—	2	7/16	9/16	2 1/2	—	—	30083	—	30084	15.65	—	—	60783	—	60784	18.80
1/4	—	28	2	7/16	9/16	2 1/2	—	—	30085	30086	—	15.65	—	—	60785	60786	—	18.80
5/16	18	—	2	15/32	21/32	2 23/32	—	—	30087	—	30088	16.15	—	—	60787	—	60788	20.50
5/16	—	24	2	15/32	21/32	2 23/32	—	—	30089	30090	—	16.15	—	—	60789	60790	—	20.50
3/8	16	—	2	35/64	45/64	2 15/16	—	—	30091	—	30092	18.20	—	—	60791	—	60792	22.50
3/8	—	24	2	35/64	45/64	2 15/16	—	—	30093	30094	—	18.20	—	—	60793	60794	—	22.50
7/16	14	—	3	19/32	27/32	3 5/32	—	—	30095	—	30096	24.55	—	—	60795	—	60796	29.50
7/16	—	20	3	19/32	27/32	3 5/32	—	—	30097	—	30098	24.55	—	—	60797	—	60798	29.50
1/2	13	—	3	5/8	1 1/32	3 3/8	—	—	30099	—	30100	29.15	—	—	60799	—	60800	34.95
1/2	—	20	3	5/8	1 1/32	3 3/8	—	—	30101	—	30102	29.15	—	—	60801	—	60802	34.95

Cutting Speeds: Page 149

Metric

List No. 2093M Bright Finish

List No. 2093MS CrN – Chromium Nitride Coated

Size	Pitch	Pitch Dia. Limit	No. of Flutes	Thread Length	Neck Length	OAL	Bright Finish LIST NO. 2093M EDP NO.	List Price	CrN Coated LIST NO. 2093MS EDP NO.	List Price
M3	0.5	D3	2	15/64	25/64	1 15/16	30120	$16.90	60820	$20.30
M4	0.7	D4	2	15/64	33/64	2 1/8	30121	13.90	60821	16.70
M5	0.8	D4	2	23/64	17/32	2 3/8	30122	15.05	60822	18.10
M6	1.0	D5	2	7/16	9/16	2 1/2	30123	15.65	60823	18.80
M8	1.0	D5	2	15/32	21/32	2 23/32	30124	16.15	60824	20.50
M8	1.25	D5	2	15/32	21/32	2 23/32	30125	16.15	60825	20.50
M10	1.5	D6	2	35/64	11/16	2 15/16	30126	19.95	60826	24.25
M12	1.5	D5	3	5/8	1 1/64	3 3/8	30127	29.15	60827	34.95
M12	1.75	D6	3	5/8	1 1/64	3 3/8	30128	29.15	60828	34.95

Semi-Interrupted Thread on 3-Flute Taps Only

Spiral Point
HPT High Performance Taps
For Exotic Alloys

Plug Style

Recommended for steels, steel alloys, stainless steels, titanium alloys, nickel and nickel base alloys, other exotic alloys and a wide variety of materials up to 32Rc hardness.

Premium Powder Metallurgy High Speed Steel
Steam Oxide Finish and TiCN Coated

List No. 2095 Steam Oxide Finish

List No. 2095C
TiCN – Titanium Carbonitride Coated

Primarily designed for tapping through holes. The spiral point forces the chips ahead of the tap.

Size	TPI NC	TPI NF	No. of Flutes	Thread Length	Neck Length	OAL	Steam Oxide Finish LIST NO. 2095 H2	H3	H4	H5	List Price	TiCN Coated LIST NO. 2095C H2	H3	H4	H5	List Price
4	40	—	2	5/16	1/4	1 7/8	30200	—	—	—	$16.05	60840	—	—	—	$19.30
5	40	—	2	5/16	5/16	1 15/16	30201	—	—	—	16.05	60841	—	—	—	19.30
6	32	—	2	3/8	5/16	2	30202	30203	—	—	13.55	60842	60843	—	—	16.30
8	32	—	3	3/8	3/8	2 1/8	30204	30205	—	—	13.55	60844	60845	—	—	17.95
10	24	—	3	1/2	3/8	2 3/8	—	30206	—	—	13.85	—	60846	—	—	18.25
10	—	32	3	1/2	3/8	2 3/8	30208	30209	—	—	13.85	60848	60849	—	—	18.25
1/4	20	—	3	5/8	3/8	2 1/2	—	30210	—	30211	18.15	—	60850	—	60851	22.55
1/4	—	28	3	5/8	3/8	2 1/2	—	30212	30213	—	18.15	—	60852	60853	—	22.55
5/16	18	—	3	1 1/16	7/16	2 23/32	—	30214	—	30215	19.70	—	60854	—	60855	26.55
5/16	—	24	3	1 1/16	7/16	2 23/32	—	30216	30217	—	19.70	—	60856	60857	—	26.55
3/8	16	—	3	3/4	1/2	2 15/16	—	30218	—	30219	22.15	—	60858	—	60859	29.00
3/8	—	24	3	3/4	1/2	2 15/16	—	30220	30221	—	22.15	—	60860	60861	—	29.00
7/16	14	—	3	7/8	9/16	3 5/32	—	30222	—	30223	29.25	—	60862	—	60863	36.10
7/16	—	20	3	7/8	9/16	3 5/32	—	30224	—	30225	29.25	—	60864	—	60865	36.10
1/2	13	—	3	15/16	23/32	3 3/8	—	30226	—	30227	33.75	—	60866	—	60867	40.60
1/2	—	20	3	15/16	23/32	3 3/8	—	30228	—	30229	33.75	—	60868	—	60869	40.60
9/16	12	—	4	1	43/64	3 19/32	—	30230	—	30231	41.55	—	60870	—	60871	54.50
9/16	—	18	4	1	43/64	3 19/32	—	30232	—	30233	41.55	—	60872	—	60873	54.50
5/8	11	—	4	1 1/8	43/64	3 13/16	—	30234	—	30235	51.65	—	60874	—	60875	64.60
5/8	—	18	4	1 1/8	43/64	3 13/16	—	30236	—	30237	51.65	—	60876	—	60877	64.60
3/4	10	—	4	1 7/32	49/64	4 1/4	—	30238	—	30239	81.40	—	60878	—	60879	97.70
3/4	—	16	4	1 7/32	49/64	4 1/4	—	30240	—	30241	81.40	—	60880	—	60881	97.70

Metric

List No. 2095M Steam Oxide Finish

List No. 2095MC TiCN – Titanium Carbonitride Coated

Size	Pitch	Pitch Dia. Limit	No. of Flutes	Thread Length	Neck Length	OAL	Steam Oxide Finish LIST NO. 2095M EDP NO.	List Price	TiCN Coated LIST NO. 2095MC EDP NO.	List Price
M3	0.5	D3	2	5/16	5/16	1 15/16	30260	$18.20	60900	$21.85
M4	0.7	D4	3	3/8	3/8	2 1/8	30261	14.15	60901	18.55
M5	0.8	D4	3	1/2	3/8	2 3/8	30262	16.75	60902	21.15
M6	1.0	D5	3	5/8	3/8	2 1/2	30263	18.15	60903	22.55
M8	1.0	D5	3	1 1/16	7/16	2 23/32	30264	20.05	60904	26.90
M8	1.25	D5	3	1 1/16	7/16	2 23/32	30265	20.05	60905	26.90
M10	1.5	D6	3	3/4	1/2	2 15/16	30266	25.40	60906	32.25
M12	1.5	D5	3	15/16	23/32	3 3/8	30267	33.65	60907	40.50
M12	1.75	D6	3	15/16	23/32	3 3/8	30268	33.65	60908	40.50

Spiral Flute
HPT High Performance Taps
For Exotic Alloys

Semi-Bottoming Style

Recommended for steels, steel alloys, stainless steels, titanium alloys, nickel and nickel base alloys, other exotic alloys and a wide variety of materials up to 32Rc hardness.

Premium Powder Metallurgy High Speed Steel
Steam Oxide Finish and TiCN Coated

List No. 2096 Steam Oxide Finish

List No. 2096C
TiCN – Titanium Carbonitride Coated

Primarily designed for tapping blind holes. The spiral flutes draw the chips out of the hole.

Size	TPI NC	TPI NF	No. of Flutes	Thread Length	Neck Length	OAL	Steam Oxide Finish LIST NO. 2096 H2	H3	H4	H5	List Price	TiCN Coated LIST NO. 2096C H2	H3	H4	H5	List Price
4	40	—	3	15/64	21/64	1 7/8	30280	—	—	—	$21.70	60920	—	—	—	$26.05
5	40	—	3	15/64	25/64	1 15/16	30281	—	—	—	21.60	60921	—	—	—	25.95
6	32	—	3	15/64	29/64	2	30282	30283	—	—	17.80	60922	60923	—	—	21.40
8	32	—	3	15/64	33/64	2 1/8	30284	30285	—	—	17.85	60924	60925	—	—	22.25
10	24	—	3	23/64	17/32	2 3/8	—	30286	—	—	18.10	—	60926	—	—	22.50
10	—	32	3	23/64	17/32	2 3/8	30288	30289	—	—	18.10	60928	60929	—	—	22.50
1/4	20	—	3	7/16	9/16	2 1/2	—	30290	—	30291	19.85	—	60930	—	60931	24.25
1/4	—	28	3	7/16	9/16	2 1/2	—	30292	30293	—	19.85	—	60932	60933	—	24.25
5/16	18	—	3	15/32	21/32	2 23/32	—	30294	—	30295	22.15	—	60934	—	60935	29.00
5/16	—	24	3	15/32	21/32	2 23/32	—	30296	30297	—	22.15	—	60936	60937	—	29.00
3/8	16	—	3	35/64	11/16	2 15/16	—	30298	—	30299	24.80	—	60938	—	60939	31.65
3/8	—	24	3	35/64	11/16	2 15/16	—	30300	30301	—	24.80	—	60940	60941	—	31.65
7/16	14	—	3	19/32	27/32	3 5/32	—	30302	—	30303	30.85	—	60942	—	60943	37.70
7/16	—	20	3	19/32	27/32	3 5/32	—	30304	—	30305	30.85	—	60944	—	60945	37.70
1/2	13	—	3	5/8	1 1/64	3 3/8	—	30306	—	30307	36.55	—	60946	—	60947	43.90
1/2	—	20	3	5/8	1 1/64	3 3/8	—	30308	—	30309	36.55	—	60948	—	60949	43.90
9/16	12	—	3	11/16	63/64	3 19/32	—	30310	—	30311	49.00	—	60950	—	60951	61.95
9/16	—	18	3	11/16	63/64	3 19/32	—	30312	—	30313	49.00	—	60952	—	60953	61.95
5/8	11	—	3	3/4	1 3/64	3 13/16	—	30314	—	30315	63.80	—	60954	—	60955	76.75
5/8	—	18	3	3/4	1 3/64	3 13/16	—	30316	—	30317	63.80	—	60956	—	60957	76.75
3/4	10	—	3	13/16	1 5/32	4 1/4	—	30318	—	30319	81.40	—	60958	—	60959	97.70
3/4	—	16	3	13/16	1 5/32	4 1/4	—	30320	—	30321	81.40	—	60960	—	60961	97.70

Metric

Cutting Speeds: Page 149

List No. 2096M Steam Oxide Finish

List No. 2096MC TiCN – Titanium Carbonitride Coated

Size	Pitch	Pitch Dia. Limit	No. of Flutes	Thread Length	Neck Length	OAL	Steam Oxide Finish LIST NO. 2096M EDP NO.	List Price	TiCN Coated LIST NO. 2096MC EDP NO.	List Price
M3	0.5	D3	3	15/64	25/64	1 15/16	30340	$18.20	60980	$21.85
M4	0.7	D4	3	15/64	33/64	2 1/8	30341	14.15	60981	18.55
M5	0.8	D4	3	23/64	17/32	2 3/8	30342	16.75	60982	21.15
M6	1.0	D5	3	7/16	9/16	2 1/2	30343	19.85	60983	24.25
M8	1.0	D5	3	15/32	21/32	2 23/32	30344	21.95	60984	28.80
M8	1.25	D5	3	15/32	21/32	2 23/32	30345	21.95	60985	28.80
M10	1.5	D6	3	35/64	11/16	2 15/16	30346	27.70	60986	34.55
M12	1.5	D5	3	5/8	1 1/64	3 3/8	30347	36.80	60987	44.20
M12	1.75	D6	3	5/8	1 1/64	3 3/8	30348	36.80	60988	44.20

Spiral Point
HPT High Performance Taps
For Hard Materials

Plug Style

Recommended for harder 32Rc-45Rc materials including steel alloys, titanium alloys, nickel base high temp alloys, tool and mold steels and stainless steels.

Premium Powder Metallurgy High Speed Steel
Steam Oxide Finish and TiCN Coated

List No. 2097 Steam Oxide Finish

List No. 2097C
TiCN - Titanium Carbonitride Coated

Primarily designed for tapping through holes. The spiral point forces the chips ahead of the tap.

Size	TPI NC	TPI NF	No. of Flutes	Thread Length	Neck Length	OAL	Steam Oxide Finish LIST NO. 2097 H2	H3	H4	H5	List Price	TiCN Coated LIST NO. 2097C H2	H3	H4	H5	List Price
4	40	—	2	5/16	1/4	1 7/8	30360	—	—	—	$16.40	61000	—	—	—	$19.70
5	40	—	3	5/16	5/16	1 15/16	30361	—	—	—	16.40	61001	—	—	—	19.70
6	32	—	3	3/8	5/16	2	30362	30363	—	—	13.95	61002	61003	—	—	16.75
8	32	—	3	3/8	3/8	2 1/8	30364	30365	—	—	14.05	61004	61005	—	—	18.15
10	24	—	3	1/2	3/8	2 3/8	—	30366	—	—	14.40	—	61006	—	—	18.50
10	—	32	3	1/2	3/8	2 3/8	30368	30369	—	—	14.40	61008	61009	—	—	18.50
1/4	20	—	3	5/8	3/8	2 1/2	—	30370	—	30371	18.40	—	61010	—	61011	22.50
1/4	—	28	3	5/8	3/8	2 1/2	—	30372	30373	—	18.40	—	61012	61013	—	22.50
5/16	18	—	3	11/16	7/16	2 23/32	—	30374	—	30375	20.45	—	61014	—	61015	26.85
5/16	—	24	3	11/16	7/16	2 23/32	—	30376	30377	—	20.45	—	61016	61017	—	26.85
3/8	16	—	3	3/4	1/2	2 15/16	—	30378	—	30379	22.30	—	61018	—	61019	28.70
3/8	—	24	3	3/4	1/2	2 15/16	—	30380	30381	—	22.30	—	61020	61021	—	28.70
7/16	14	—	3	7/8	9/16	3 5/32	—	30382	—	30383	28.95	—	61022	—	61023	35.35
7/16	—	20	3	7/8	9/16	3 5/32	—	30384	—	30385	28.95	—	61024	—	61025	35.35
1/2	13	—	3	15/16	23/32	3 3/8	—	30386	—	30387	33.50	—	61026	—	61027	40.20
1/2	—	20	3	15/16	23/32	3 3/8	—	30388	—	30389	33.50	—	61028	—	61029	40.20
9/16	12	—	4	1	43/64	3 19/32	—	30390	—	30391	42.05	—	61030	—	61031	54.15
9/16	—	18	4	1	43/64	3 19/32	—	30392	—	30393	42.05	—	61032	—	61033	54.15
5/8	11	—	4	1 1/8	43/64	3 13/16	—	30394	—	30395	52.35	—	61034	—	61035	64.45
5/8	—	18	4	1 1/8	43/64	3 13/16	—	30396	—	30397	52.35	—	61036	—	61037	64.45
3/4	10	—	4	1 7/32	49/64	4 1/4	—	30398	—	30399	82.45	—	61038	—	61039	98.95
3/4	—	16	4	1 7/32	49/64	4 1/4	—	30400	—	30401	82.45	—	61040	—	61041	98.95

Metric

List No. 2097M Steam Oxide Finish

List No. 2097MC TiCN – Titanium Carbonitride Coated

Size	Pitch	Pitch Dia. Limit	No. of Flutes	Thread Length	Neck Length	OAL	Steam Oxide Finish LIST NO. 2097M EDP NO.	List Price	TiCN Coated LIST NO. 2097MC EDP NO.	List Price
M3	0.5	D3	2	5/16	5/16	1 15/16	30420	$17.15	61060	$20.60
M4	0.7	D4	3	3/8	3/8	2 1/8	30421	14.50	61061	18.60
M5	0.8	D4	3	1/2	3/8	2 3/8	30422	16.25	61062	20.35
M6	1.0	D5	3	5/8	3/8	2 1/2	30423	20.25	61063	24.35
M8	1.0	D5	3	11/16	7/16	2 23/32	30424	21.70	61064	28.10
M8	1.25	D5	3	11/16	7/16	2 23/32	30425	21.70	61065	28.10
M10	1.5	D6	3	3/4	1/2	2 15/16	30426	32.10	61066	38.55
M12	1.5	D5	3	15/16	23/32	3 3/8	30427	36.10	61067	43.35
M12	1.75	D6	3	15/16	23/32	3 3/8	30428	36.10	61068	43.35

Spiral Flute
HPT High Performance Taps
For Hard Materials

Semi-Bottoming Style

Recommended for harder 32Rc-45Rc materials including steel alloys, titanium alloys, nickel base high temp alloys, tool and mold steels and stainless steels.

Premium Powder Metallurgy High Speed Steel
Steam Oxide Finish and TiCN Coated

List No. 2098 Steam Oxide Finish

List No. 2098C
TiCN – Titanium Carbonitride Coated

Primarily designed for tapping blind holes. The spiral flutes draw the chips out of the hole.

Size	TPI NC	TPI NF	No. of Flutes	Thread Length	Neck Length	OAL	Steam Oxide Finish LIST NO. 2098 H2	H3	H4	H5	List Price	TiCN Coated LIST NO. 2098C H2	H3	H4	H5	List Price
4	40	—	2	5/16	1/4	1 7/8	30440	—	—	—	$22.00	61080	—	—	—	$26.40
5	40	—	2	5/16	5/16	1 15/16	30441	—	—	—	22.00	61081	—	—	—	26.40
6	32	—	2	3/8	5/16	2	30442	30443	—	—	18.00	61082	61083	—	—	21.60
8	32	—	2	3/8	3/8	2 1/8	30444	30445	—	—	18.05	61084	61085	—	—	22.15
10	24	—	3	1/2	3/8	2 3/8	—	30446	—	—	18.65	—	61086	—	—	22.75
10	—	32	3	1/2	3/8	2 3/8	30448	30449	—	—	18.65	61088	61089	—	—	22.75
1/4	20	—	3	5/8	3/8	2 1/2	—	30450	—	30451	20.40	—	61090	—	61091	24.50
1/4	—	28	3	5/8	3/8	2 1/2	—	30452	30453	—	20.40	—	61092	61093	—	24.50
5/16	18	—	3	11/16	7/16	2 23/32	—	30454	—	30455	22.75	—	61094	—	61095	29.15
5/16	—	24	3	11/16	7/16	2 23/32	—	30456	30457	—	22.75	—	61096	61097	—	29.15
3/8	16	—	3	3/4	1/2	2 15/16	—	30458	—	30459	25.45	—	61098	—	61099	31.85
3/8	—	24	3	3/4	1/2	2 15/16	—	30460	30461	—	25.45	—	61100	61101	—	31.85
7/16	14	—	3	7/8	9/16	3 5/32	—	30462	—	30463	31.70	—	61102	—	61103	38.10
7/16	—	20	3	7/8	9/16	3 5/32	—	30464	—	30465	31.70	—	61104	—	61105	38.10
1/2	13	—	3	15/16	23/32	3 3/8	—	30466	—	30467	37.60	—	61106	—	61107	45.15
1/2	—	20	3	15/16	23/32	3 3/8	—	30468	—	30469	37.60	—	61108	—	61109	45.15
9/16	12	—	4	1	43/64	3 19/32	—	30470	—	30471	49.65	—	61110	—	61111	61.75
9/16	—	18	4	1	43/64	3 19/32	—	30472	—	30473	49.65	—	61112	—	61113	61.75
5/8	11	—	4	1 1/8	43/64	3 13/16	—	30474	—	30475	64.65	—	61114	—	61115	77.60
5/8	—	18	4	1 1/8	43/64	3 13/16	—	30476	—	30477	64.65	—	61116	—	61117	77.60
3/4	10	—	4	1 7/32	49/64	4 1/4	—	30478	—	30479	82.45	—	61118	—	61119	98.95
3/4	—	16	4	1 7/32	49/64	4 1/4	—	30480	—	30481	82.45	—	61120	—	61121	98.95

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Metric

List No. 2098M Steam Oxide Finish
List No. 2098MC TiCN – Titanium Carbonitride Coated

Size	Pitch	Pitch Dia. Limit	No. of Flutes	Thread Length	Neck Length	OAL	Steam Oxide Finish LIST NO. 2098M EDP NO.	List Price	TiCN Coated LIST NO. 2098MC EDP NO.	List Price
M3	0.5	D3	2	5/16	5/16	1 15/16	30490	$22.95	61140	$27.55
M4	0.7	D4	2	3/8	3/8	2 1/8	30491	18.30	61141	22.40
M5	0.8	D4	3	1/2	3/8	2 3/8	30492	20.25	61142	24.35
M6	1.0	D5	3	5/8	3/8	2 1/2	30493	20.60	61143	24.75
M8	1.0	D5	3	11/16	7/16	2 23/32	30494	23.75	61144	30.15
M8	1.25	D5	3	11/16	7/16	2 23/32	30495	23.75	61145	30.15
M10	1.5	D6	3	3/4	1/2	2 15/16	30496	36.55	61146	43.90
M12	1.5	D5	3	15/16	23/32	3 3/8	30497	42.25	61147	50.70
M12	1.75	D6	3	15/16	23/32	3 3/8	30498	42.25	61148	50.70

Straight Flute
HPT High Performance Taps
For Cast Iron

Semi-Bottoming Style

Recommended for all types of gray, ductile and malleable cast iron.

Premium Powder Metallurgy High Speed Steel
Steam Oxide over Nitride Finish

List No. 2094 Steam Oxide Over Nitride

Size	TPI NC	TPI NF	No. of Flutes	Thread Length	Neck Length	OAL	Steam Oxide Over Nitride LIST NO. 2094 H2	H3	H4	H5	List Price
10	24	—	3	½	⅜	2⅜	—	30140	—	—	$10.85
10	—	32	3	½	⅜	2⅜	30141	30142	—	—	10.85
1/4	20	—	4	⅝	⅜	2½	—	30143	—	30144	11.95
1/4	—	28	4	⅝	⅜	2½	—	30145	30146	—	11.95
5/16	18	—	4	11/16	7/16	2 23/32	—	30147	—	30148	13.15
5/16	—	24	4	11/16	7/16	2 23/32	—	30149	30150	—	13.15
3/8	16	—	4	¾	½	2 15/16	—	30151	—	30152	14.80
3/8	—	24	4	¾	½	2 15/16	—	30153	30154	—	14.80
7/16	14	—	4	⅞	9/16	3 5/32	—	30155	—	30156	18.90
7/16	—	20	4	⅞	9/16	3 5/32	—	30157	—	30158	18.90
1/2	13	—	4	15/16	23/32	3⅜	—	30159	—	30160	21.90
1/2	—	20	4	15/16	23/32	3⅜	—	30161	—	30162	21.90

Cutting Speeds: Page 149

Metric

List No. 2094M Steam Oxide Over Nitride

Size	Pitch	Pitch Dia. Limit	No. of Flutes	Thread Length	Neck Length	OAL	Steam Oxide Over Nitride LIST NO. 2094M EDP NO.	List Price
M6	1.0	D5	4	⅝	⅜	2½	30180	$11.95
M8	1.0	D5	4	11/16	7/16	2 23/32	30181	13.15
M8	1.25	D5	4	11/16	7/16	2 23/32	30182	13.15
M10	1.5	D6	4	¾	½	2 15/16	30183	17.00
M12	1.5	D5	4	15/16	23/32	3⅜	30184	21.90
M12	1.75	D6	4	15/16	23/32	3⅜	30185	21.90

Spiral Flute HPT High Performance Taper Pipe Taps

Recommended for low to medium carbon steels, alloy steels, tool steels, stainless steels, titanium alloys and many other materials up to 35Rc hardness.

Premium Powder Metallurgy high speed steel for increased toughness, wear resistance and heat resistance in a wide range of materials up to 35Rc hardness. **Enhanced Geometry** especially recommended for tapping **Stainless Steel.**

EXTRA Length

Steam Oxide Surface Treatment increases wear resistance, reduces friction, acts as a lubricant, reduces galling and chip welding, improves chip flow and increases tap lubricant retention. **NOT RECOMMENDED FOR NON-FERROUS MATERIALS.**

STANDARD PACKAGE All Sizes — 1 each

List No. 2099

Premium Powder Metallurgy High Speed Steel
Bright Finish and Steam Oxide Finish
15° Helix Angle
2-3½ Thread Chamfer

Optional Tool Coatings available to optimize specific tapping applications

Extra Length – longer than standard USCTI length — provides extra reach in tapping applications

ANSI Shank – made to standard American dimensions — fits standard tap holders

NPT/ANPT Taper Pipe Thread

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NPT taper pipe taps are commonly used for tapping pipe fittings and couplings. Assembly requires the use of a thread sealant to ensure a tight seal.

SIZE	THREAD LENGTH	OAL	NO. OF FLUTES	BRIGHT EDP NO.	BRIGHT LIST PRICE	SURFACE TREATED EDP NO.	SURFACE TREATED LIST PRICE
1/16-27	11/16	2 9/16	4	36220	$20.63	36230	$20.63
1/8-27* (Sm. Sk.)	3/4	2 3/4	4	36221	20.63	36231	20.63
1/8-27* (Lg. Sk.)	3/4	2 3/4	4	36222	20.63	36232	20.63
1/4-18	1 1/16	3	4	36223	22.71	36233	22.71
3/8-18	1 1/16	3 1/8	4	36224	30.04	36234	30.04
1/2-14	1 3/8	3 15/16	4	36225	47.78	36235	47.78
3/4-14	1 3/8	4 1/8	5	36226	66.73	36236	66.73
1-11½	1 3/4	4 1/2	5	36227	101.51	36237	101.51

*Large shank furnished unless otherwise specified.

NPTF Dryseal Taper Pipe Thread

NPTF Dryseal taper pipe taps produce threads where a tight seal is achieved during assembly by metal-to-metal contact. Used for applications requiring a tight seal without the use of thread sealants.

List No. 2099

STANDARD PACKAGE All Sizes — 1 each

SIZE	THREAD LENGTH	OAL	NO. OF FLUTES	BRIGHT EDP NO.	BRIGHT LIST PRICE	SURFACE TREATED EDP NO.	SURFACE TREATED LIST PRICE
1/16-27	11/16	2 9/16	4	36240	$20.63	36250	$20.63
1/8-27* (Sm. Sk.)	3/4	2 3/4	4	36241	20.63	36251	20.63
1/8-27* (Lg. Sk.)	3/4	2 3/4	4	36242	20.63	36252	20.63
1/4-18	1 1/16	3	4	36243	22.71	36253	22.71
3/8-18	1 1/16	3 1/8	4	36244	30.04	36254	30.04
1/2-14	1 3/8	3 15/16	4	36245	47.78	36255	47.78
3/4-14	1 3/8	4 1/8	5	36246	66.73	36256	66.73
1-11½	1 3/4	4 1/2	5	36247	101.51	36257	101.51

*Large shank furnished unless otherwise specified.

Spiral Point - DIN Length
HPT High Performance Taps

Plug Style
DIN Length — ANSI Shank

Recommended for steels, steel alloys, stainless steels, titanium alloys and a wide variety of materials up to 36Rc hardness.

Premium Powder Metallurgy High Speed Steel

Steam Oxide Finish and TiCN Coated

CNC Reduced Neck Design

DIN Length – longer than standard USCTI length – provides extra reach in tapping applications

ANSI Shank – made to standard American dimensions – fits standard tap holders

List No. 2088 Steam Oxide Finish

List No. 2088C
TiCN - Titanium Carbonitride Coated

Primarily designed for tapping through holes. The spiral point forces the chips ahead of the tap.

DIN Length

STANDARD PACKAGE All Sizes — 1 each

SIZE	TPI NC	TPI NF	NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	Steam Oxide Finish LIST NO. 2088 H2	H3	H4	H5	LIST PRICE	TiCN Coated LIST NO. 2088C H2	H3	H4	H5	LIST PRICE
4	40	—	2	.433	.276	2.205	30530	—	—	—	$7.04	61160	—	—	—	$10.06
6	32	—	2	.472	.315	2.205	30532	30533	—	—	5.85	61162	61163	—	—	8.87
8	32	—	3	.512	.315	2.480	30534	30535	—	—	5.85	61164	61165	—	—	9.82
10	24	—	3	.591	.393	2.756	—	30536	—	—	5.85	—	61166	—	—	10.85
10	—	32	3	.512	.472	2.756	30537	30538	—	—	5.85	61167	61168	—	—	10.85
1/4	20	—	3	.669	.512	3.150	—	30539	—	30540	6.51	—	61169	—	61170	11.51
1/4	—	28	3	.669	.512	3.150	—	30541	30542	—	6.51	—	61171	61172	—	11.51
5/16	18	—	3	.787	.591	3.543	—	30543	—	30544	7.26	—	61173	—	61174	14.80
5/16	—	24	3	.669	.709	3.543	—	30545	30546	—	7.26	—	61175	61176	—	14.80
3/8	16	—	3	.866	.669	3.937	—	30547	—	30548	8.23	—	61177	—	61178	15.77
3/8	—	24	3	.709	.826	3.937	—	30549	30550	—	8.23	—	61179	61180	—	15.77
7/16	14	—	3	.866	*	3.937	—	30551	—	30552	10.69	—	61181	—	61182	18.23
7/16	—	20	3	.866	*	3.937	—	30553	—	30554	10.69	—	61183	—	61184	18.23
1/2	13	—	3	.984	*	4.331	—	30555	—	30556	12.36	—	61185	—	61186	19.90
1/2	—	20	3	.866	*	3.937	—	30557	—	30558	12.36	—	61187	—	61188	19.90
9/16	12	—	4	1.024	*	4.331	—	30559	—	30560	17.38	—	61189	—	61190	29.05
9/16	—	18	4	.866	*	3.937	—	30561	—	30562	17.38	—	61191	—	61192	29.05
5/8	11	—	4	1.063	*	4.331	—	30563	—	30564	22.40	—	61193	—	61194	34.07
5/8	—	18	4	.866	*	3.937	—	30565	—	30566	22.40	—	61195	—	61196	34.07
3/4	10	—	4	1.181	*	4.921	—	30567	—	30568	35.14	—	61197	—	61198	52.92
3/4	—	16	4	.984	*	4.331	—	30569	—	30570	35.14	—	61199	—	61200	52.92
7/8	9	—	4	1.126	*	5.512	—	—	30571	—	39.74	—	—	61201	—	55.14
7/8	—	14	4	1.024	*	4.921	—	—	30572	—	39.74	—	—	61202	—	55.14
1	8	—	4	1.417	*	6.299	—	—	30573	—	44.35	—	—	61203	—	67.28
1	—	12	4	1.102	*	5.512	—	—	30574	—	44.35	—	—	61204	—	67.28

SIZE	PITCH	PITCH DIA. LIMIT	NO. OF FLUTES	THREAD LENGTH MM	NECK LENGTH MM	OAL MM	Steam Oxide Finish List No. 2088M EDP NO.	LIST PRICE	TiCN Coated List No. 2088MC EDP NO.	LIST PRICE
M4	0.7	D4	3	13	8	63	30576	$8.12	61206	$12.08
M5	0.8	D4	3	15	10	70	30577	8.12	61207	13.12
M6	1.0	D5	3	17	13	80	30578	8.12	61208	13.12
M8	1.25	D5	3	20	15	90	30579	9.11	61209	16.65
M10	1.5	D6	3	22	17	100	30580	12.68	61210	20.22
M12	1.25	D5	3	22	*	100	30581	15.22	61211	22.76
M12	1.5	D5	3	22	*	100	30582	15.22	61212	22.76
M12	1.75	D6	3	24	*	110	30583	15.22	61213	22.76
M14	1.5	D6	4	22	*	100	30584	22.66	61214	34.33
M14	2	D7	4	26	*	110	30585	22.66	61215	34.33
M16	2	D7	4	27	*	110	30586	27.46	61216	39.13
M18	1.5	D6	4	25	*	110	30587	38.51	61217	51.61
M20	2.5	D7	4	32	*	140	30588	55.18	61218	76.21
M24	3	D8	4	34	*	160	30589	71.47	61219	92.50

* Reduced Shank (shank diameter is smaller than minor pitch diameter)

Spiral Flute – DIN Length
HPT High Performance Taps

Semi-Bottoming Style
DIN Length — ANSI Shank

Recommended for steels, steel alloys, stainless steels, titanium alloys and a wide variety of materials up to 36Rc hardness.

Premium Powder Metallurgy High Speed Steel

Steam Oxide Finish and TiCN Coated

CNC Reduced Neck Design

DIN Length – longer than standard USCTI length – provides extra reach in tapping applications

ANSI Shank – made to sandard American dimensions – fits standard tap holders

List No. 2089 Steam Oxide Finish

List No. 2089C
TiCN - Titanium Carbonitride Coated

Primarily designed for tapping blind holes. The spiral flutes draw the chips out of the hole.

DIN Length

STANDARD PACKAGE All Sizes — 1 each

	TPI						Steam Oxide Finish LIST NO. 2089					TiCN Coated LIST NO. 2089C				
SIZE	NC	NF	NO. OF FLUTES	THREAD LENGTH	NECK LENGTH	OAL	H2	H3	H4	H5	LIST PRICE	H2	H3	H4	H5	LIST PRICE
4	40	—	3	.236	.473	2.205	30600	—	—	—	$10.54	61230	—	—	—	$13.55
6	32	—	3	.236	.551	2.205	30602	30603	—	—	8.59	61232	61233	—	—	11.61
8	32	—	3	.236	.591	2.480	30604	30605	—	—	8.59	61234	61235	—	—	12.56
10	24	—	3	.354	.630	2.756	—	30606	—	—	8.59	—	61236	—	—	13.59
10	—	32	3	.354	.630	2.756	30607	30608	—	—	8.59	61237	61238	—	—	13.59
1/4	20	—	3	.433	.748	3.150	—	30609	—	30610	9.33	—	61239	—	61240	14.33
1/4	—	28	3	.433	.748	3.150	—	30611	30612	—	9.33	—	61241	61242	—	14.33
5/16	18	—	3	.472	.906	3.543	—	30613	—	30614	11.45	—	61243	—	61244	18.99
5/16	—	24	3	.472	.906	3.543	—	30615	30616	—	11.45	—	61245	61246	—	18.99
3/8	16	—	3	.551	.984	3.937	—	30617	—	30618	13.29	—	61247	—	61248	20.83
3/8	—	24	3	.551	.984	3.937	—	30619	30620	—	13.29	—	61249	61250	—	20.83
7/16	14	—	3	.591	*	3.937	—	30621	—	30622	19.86	—	61251	—	61252	27.40
7/16	—	20	3	.591	*	3.937	—	30623	—	30624	19.86	—	61253	—	61254	27.40
1/2	13	—	3	.630	*	4.331	—	30625	—	30626	23.41	—	61255	—	61256	30.95
1/2	—	20	3	.630	*	3.937	—	30627	—	30628	23.41	—	61257	—	61258	30.95
9/16	12	—	3	.690	*	4.331	—	30629	—	30630	32.32	—	61259	—	61260	43.99
9/16	—	18	3	.690	*	3.937	—	30631	—	30632	32.32	—	61261	—	61262	43.99
5/8	11	—	3	.745	*	4.331	—	30633	—	30634	41.23	—	61263	—	61264	52.90
5/8	—	18	3	.745	*	3.937	—	30635	—	30636	41.23	—	61265	—	61266	52.90
3/4	10	—	3	.820	*	4.921	—	30637	—	30638	53.00	—	61267	—	61268	70.77
3/4	—	16	3	.820	*	4.331	—	30639	—	30640	53.00	—	61269	—	61270	70.77
7/8	9	—	4	.911	*	5.512	—	—	30641	—	59.76	—	—	61271	—	75.16
7/8	—	14	4	.911	*	4.921	—	—	30642	—	59.76	—	—	61272	—	75.16
1	8	—	4	1.025	*	6.299	—	—	30643	—	66.53	—	—	61273	—	89.46
1	—	12	4	1.025	*	5.512	—	—	30644	—	66.53	—	—	61274	—	89.46

SIZE	PITCH	PITCH DIA. LIMIT	NO. OF FLUTES	THREAD LENGTH MM	NECK LENGTH MM	OAL MM	Steam Oxide Finish List No. 2089M EDP NO.	Steam Oxide Finish List No. 2089M LIST PRICE	TiCN Coated List No. 2089MC EDP NO.	TiCN Coated List No. 2089MC LIST PRICE
M4	0.7	D4	3	6	15	63	30646	$12.16	61276	$16.13
M5	0.8	D4	3	9	16	70	30647	12.16	61277	17.16
M6	1.0	D5	3	11	19	80	30648	12.16	61278	17.16
M8	1.25	D5	3	12	23	90	30649	13.17	61279	20.71
M10	1.5	D6	3	14	25	100	30650	18.59	61280	26.13
M12	1.25	D5	3	16	*	100	30651	22.40	61281	29.94
M12	1.5	D5	3	16	*	100	30652	22.40	61282	29.94
M12	1.75	D6	3	16	*	110	30653	22.40	61283	29.94
M14	1.5	D6	3	18	*	100	30654	33.79	61284	45.46
M14	2	D7	3	18	*	110	30655	33.79	61285	45.46
M16	2	D7	3	19	*	110	30656	39.68	61286	51.35
M18	1.5	D6	3	21	*	110	30657	57.44	61287	70.54
M20	2.5	D7	3	21	*	140	30658	78.97	61288	100.00
M24	3	D8	4	26	*	160	30659	101.03	61289	122.06

* Reduced Shank (shank diameter is smaller than minor pitch diameter)

Thread Forming — DIN Length
HPT High Performance Taps

Premium Powder Metallurgy High Speed Steel
CNC Reduced Neck Design
DIN Length, ANSI Shank

List No. 2106 Bright Finish
List No. 2106G TiN Coated
List No. 2106C TiCN Coated
List No. 2106T TiALN Coated

DIN Length

Thread Forming taps cold form rather than cut the threads. Advantages include no chips to dispose of, stronger higher quality threads, increased tapping speeds, longer tap life and reduced tap breakage.

DIN Length — longer than standard USCTI length — provides extra reach in tapping applications

ANSI Shank — made to standard American dimensions — fits standard tap holders

Lube Grooves provides a path for lubrication and act as vents to relieve pressure in blind hole tapping.

Plug Style (4 threads tapered) for through holes and blind holes with adequate depth. The longer taper lead is easier starting, requires less torque, produces less burr above the mouth of the tapped hole and increases tool life.

Bottoming Style (2 threads tapered) for blind holes.

Powder Metallurgy High Speed Steel for enhanced performance and increased tool life under difficult tapping conditions. Recommended for a wide variety of ductile materials up to 28Rc hardness.

NOTE: Thread forming taps require a larger **tap drill size** than cutting taps because the material flows during the thread forming process. It may be necessary to experiment to determine the required hole size to produce a specific percent of thread. **Countersinking** before tapping is recommended because the forming process usually displaces material above the mouth of the tapped hole.

STANDARD PACKAGE All Sizes — 1 each

Cutting Speeds: Page 149

TAP DRILL SIZES: Page 184
CLASS OF FIT RECOMMEDATIONS: Page 186

Machine Screw — Plug Style

SIZE	THREADS PER INCH NC UNC	THREADS PER INCH NF UNF	PITCH DIA. LIMIT	THREAD LENGTH	NECK LENGTH	OAL	NO. OF LUBE GROOVES	BRIGHT EDP NO.	BRIGHT LIST PRICE	TiN COATED EDP NO.	TiN COATED LIST PRICE	TiCN COATED EDP NO.	TiCN COATED LIST PRICE	TiALN COATED EDP NO.	TiALN COATED LIST PRICE
4	40	—	H3	.433	.276	2.205	3	30670	$13.87	94680	$15.76	61460	$17.16	61620	$17.16
	40	—	H5	.433	.276	2.205	3	30671	13.87	94681	15.76	61461	17.16	61621	17.16
6	32	—	H3	.472	.315	2.205	3	30672	11.43	94682	13.31	61462	14.72	61622	14.72
	32	—	H5	.472	.315	2.205	3	30673	11.43	94683	13.31	61463	14.72	61623	14.72
8	32	—	H3	.512	.315	2.480	3	30674	11.43	94684	14.03	61464	15.76	61624	15.76
	32	—	H5	.512	.315	2.480	3	30675	11.43	94685	14.03	61465	15.76	61625	15.76
10	24	—	H4	.591	.393	2.756	4	30676	11.43	94686	14.68	61466	16.88	61626	16.88
	24	—	H6	.591	.393	2.756	4	30677	11.43	94687	14.68	61467	16.88	61627	16.88
	—	32	H4	.512	.472	2.756	4	30678	11.43	94688	14.68	61468	16.88	61628	16.88
	—	32	H6	.512	.472	2.756	4	30679	11.43	94689	14.68	61469	16.88	61629	16.88

(continued)

Titanium Nitride (TiN) Coating results in an extremely hard surface with high lubricity for increased tool life. Improved thread quality, reduced torque and increased tapping speeds for greater productivity.

Titanium Carbonitride (TiCN) Coating is harder than TiN coating for more abrasive materials but has a lower temperature resistance.

Titanium Aluminum Nitride (TiALN) Coating is especially recommended for applications generating higher temperatures.

Thread Forming HPT High Performance Taps (continued)

DIN Length

Machine Screw — Bottoming Style

SIZE	THREADS PER INCH NC UNC	THREADS PER INCH NF UNF	PITCH DIA. LIMIT	THREAD LENGTH	NECK LENGTH	OAL	NO. OF LUBE GROOVES	BRIGHT EDP NO.	BRIGHT LIST PRICE	TiN COATED EDP NO.	TiN COATED LIST PRICE	TiCN COATED EDP NO.	TiCN COATED LIST PRICE	TiALN COATED EDP NO.	TiALN COATED LIST PRICE
4	40	—	H3	.433	.276	2.205	3	30750	$13.87	94760	$15.76	61540	$17.16	61700	$17.16
	40	—	H5	.433	.276	2.205	3	30751	13.87	94761	15.76	61541	17.16	61701	17.16
6	32	—	H3	.472	.315	2.205	3	30752	11.43	94762	13.31	61542	14.72	61702	14.72
	32	—	H5	.472	.315	2.205	3	30753	11.43	94763	13.31	61543	14.72	61703	14.72
8	32	—	H3	.512	.315	2.480	3	30754	11.43	94764	14.03	61544	15.76	61704	15.76
	32	—	H5	.512	.315	2.480	3	30755	11.43	94765	14.03	61545	15.76	61705	15.76
10	24	—	H4	.591	.393	2.756	4	30756	11.43	94766	14.68	61546	16.88	61706	16.88
	24	—	H6	.591	.393	2.756	4	30757	11.43	94767	14.68	61547	16.88	61707	16.88
	—	32	H4	.512	.472	2.756	4	30758	11.43	94768	14.68	61548	16.88	61708	16.88
	—	32	H6	.512	.472	2.756	4	30759	11.43	94769	14.68	61549	16.88	61709	16.88

Fractional — Plug Style

SIZE	THREADS PER INCH NC UNC	THREADS PER INCH NF UNF	PITCH DIA. LIMIT	THREAD LENGTH	NECK LENGTH	OAL	NO. OF LUBE GROOVES	BRIGHT EDP NO.	BRIGHT LIST PRICE	TiN COATED EDP NO.	TiN COATED LIST PRICE	TiCN COATED EDP NO.	TiCN COATED LIST PRICE	TiALN COATED EDP NO.	TiALN COATED LIST PRICE
1/4	20	—	H4	.669	.512	3.150	4	30690	$11.47	94700	$14.72	61480	$16.93	61640	$16.93
	20	—	H6	.669	.512	3.150	4	30691	11.47	94701	14.72	61481	16.93	61641	16.93
	—	28	H4	.669	.512	3.150	4	30692	11.47	94702	14.72	61482	16.93	61642	16.93
	—	28	H6	.669	.512	3.150	4	30693	11.47	94703	14.72	61483	16.93	61643	16.93
5/16	18	—	H5	.787	.591	3.543	4	30694	13.44	94704	18.33	61484	21.67	61644	21.67
	18	—	H7	.787	.591	3.543	4	30695	13.44	94705	18.33	61485	21.67	61645	21.67
	—	24	H5	.669	.591	3.543	4	30696	13.44	94706	18.33	61486	21.67	61646	21.67
	—	24	H7	.669	.591	3.543	4	30697	13.44	94707	18.33	61487	21.67	61647	21.67
3/8	16	—	H5	.866	.669	3.937	4	30698	14.78	94708	19.68	61488	23.01	61648	23.01
	16	—	H7	.866	.669	3.937	4	30699	14.78	94709	19.68	61489	23.01	61649	23.01
	—	24	H5	.709	.826	3.937	4	30700	14.78	94710	19.68	61490	23.01	61650	23.01
	—	24	H7	.709	.826	3.937	4	30701	14.78	94711	19.68	61491	23.01	61651	23.01
7/16	14	—	H5	.866	*	3.937	4	30702	20.71	94712	25.61	61492	28.94	61652	28.94
	14	—	H8	.866	*	3.937	4	30703	20.71	94713	25.61	61493	28.94	61653	28.94
	—	20	H5	.866	*	3.937	4	30704	20.71	94714	25.61	61494	28.94	61654	28.94
	—	20	H8	.866	*	3.937	4	30705	20.71	94715	25.61	61495	28.94	61655	28.94
1/2	13	—	H5	.984	*	4.331	4	30706	22.68	94716	27.58	61496	30.91	61656	30.91
	13	—	H8	.984	*	4.331	4	30707	22.68	94717	27.58	61497	30.91	61657	30.91
	—	20	H5	.866	*	3.937	4	30708	22.68	94718	27.58	61498	30.91	61658	30.91
	—	20	H8	.866	*	3.937	4	30709	22.68	94719	27.58	61499	30.91	61659	30.91
5/8	11	—	H7	1.063	*	4.331	6	30710	39.94	94720	46.71	61500	52.66	61660	52.66
	11	—	H10	1.063	*	4.331	6	30711	39.94	94721	46.71	61501	52.66	61661	52.66
	—	18	H7	.866	*	3.937	6	30712	39.94	94722	46.71	61502	52.66	61662	52.66
	—	18	H10	.866	*	3.937	6	30713	39.94	94723	46.71	61503	52.66	61663	52.66
3/4	10	—	H7	1.181	*	4.921	6	30714	51.41	94724	63.10	61504	70.80	61664	70.80
	10	—	H10	1.181	*	4.921	6	30715	51.41	94725	63.10	61505	70.80	61665	70.80
	—	16	H7	.984	*	4.331	6	30716	51.41	94726	63.10	61506	70.80	61666	70.80
	—	16	H10	.984	*	4.331	6	30717	51.41	94727	63.10	61507	70.80	61667	70.80

* Reduced Shank (shank diameter is smaller than minor pitch diameter)

(continued)

Thread Forming HPT High Performance Taps (continued)

DIN Length

Fractional — Bottoming Style

SIZE	THREADS PER INCH NC UNC	NF UNF	PITCH DIA. LIMIT	THREAD LENGTH	NECK LENGTH	OAL	NO. OF LUBE GROOVES	BRIGHT EDP NO.	BRIGHT LIST PRICE	TiN COATED EDP NO.	TiN COATED LIST PRICE	TiCN COATED EDP NO.	TiCN COATED LIST PRICE	TiALN COATED EDP NO.	TiALN COATED LIST PRICE
1/4	20	—	H4	.669	.512	3.150	4	30770	$11.47	94780	$14.72	61560	$16.93	61720	$16.93
	20	—	H6	.669	.512	3.150	4	30771	11.47	94781	14.72	61561	16.93	61721	16.93
	—	28	H4	.669	.512	3.150	4	30772	11.47	94782	14.72	61562	16.93	61722	16.93
	—	28	H6	.669	.512	3.150	4	30773	11.47	94783	14.72	61563	16.93	61723	16.93
5/16	18	—	H5	.787	.591	3.543	4	30774	13.44	94784	18.33	61564	21.67	61724	21.67
	18	—	H7	.787	.591	3.543	4	30775	13.44	94785	18.33	61565	21.67	61725	21.67
	—	24	H5	.669	.591	3.543	4	30776	13.44	94786	18.33	61566	21.67	61726	21.67
	—	24	H7	.669	.591	3.543	4	30777	13.44	94787	18.33	61567	21.67	61727	21.67
3/8	16	—	H5	.866	.669	3.937	4	30778	14.78	94788	19.68	61568	23.01	61728	23.01
	16	—	H7	.866	.669	3.937	4	30779	14.78	94789	19.68	61569	23.01	61729	23.01
	—	24	H5	.709	.826	3.937	4	30780	14.78	94790	19.68	61570	23.01	61730	23.01
	—	24	H7	.709	.826	3.937	4	30781	14.78	94791	19.68	61571	23.01	61731	23.01
7/16	14	—	H5	.866	*	3.937	4	30782	20.71	94792	25.61	61572	28.94	61732	28.94
	14	—	H8	.866	*	3.937	4	30783	20.71	94793	25.61	61573	28.94	61733	28.94
	—	20	H5	.866	*	3.937	4	30784	20.71	94794	25.61	61574	28.94	61734	28.94
	—	20	H8	.866	*	3.937	4	30785	20.71	94795	25.61	61575	28.94	61735	28.94
1/2	13	—	H5	.984	*	4.331	4	30786	22.68	94796	27.58	61576	30.91	61736	30.91
	13	—	H8	.984	*	4.331	4	30787	22.68	94797	27.58	61577	30.91	61737	30.91
	—	20	H5	.866	*	3.937	4	30788	22.68	94798	27.58	61578	30.91	61738	30.91
	—	20	H8	.866	*	3.937	4	30789	22.68	94799	27.58	61579	30.91	61739	30.91
5/8	11	—	H7	1.063	*	4.331	6	30790	39.94	94800	46.71	61580	52.66	61740	52.66
	11	—	H10	1.063	*	4.331	6	30791	39.94	94801	46.71	61581	52.66	61741	52.66
	—	18	H7	.866	*	3.937	6	30792	39.94	94802	46.71	61582	52.66	61742	52.66
	—	18	H10	.866	*	3.937	6	30793	39.94	94803	46.71	61583	52.66	61743	52.66
3/4	10	—	H7	1.181	*	4.921	6	30794	51.41	94804	63.10	61584	70.80	61744	70.80
	10	—	H10	1.181	*	4.921	6	30795	51.41	94805	63.10	61585	70.80	61745	70.80
	—	16	H7	.984	*	4.331	6	30796	51.41	94806	63.10	61586	70.80	61746	70.80
	—	16	H10	.984	*	4.331	6	30797	51.41	94807	63.10	61587	70.80	61747	70.80

Metric — Plug Style

SIZE	PITCH	PITCH DIA. LIMIT	THREAD LENGTH MM	NECK LENGTH MM	OAL MM	NO. OF LUBE GROOVES	BRIGHT EDP NO.	BRIGHT LIST PRICE	TiN COATED EDP NO.	TiN COATED LIST PRICE	TiCN COATED EDP NO.	TiCN COATED LIST PRICE	TiALN COATED EDP NO.	TiALN COATED LIST PRICE
M4	0.7	D6	13	8	63	3	30730	$11.26	94740	$13.85	61520	$15.58	61680	$15.58
M5	0.8	D7	15	10	70	4	30731	11.80	94741	15.04	61521	17.25	61681	17.25
M6	1	D8	17	13	80	4	30732	11.47	94742	14.72	61522	16.93	61682	16.93
M8	1.25	D9	20	15	90	4	30733	13.44	94743	18.33	61523	21.67	61683	21.67
M10	1.5	D10	22	17	100	4	30734	16.56	94744	21.45	61524	24.78	61684	24.78
M12	1.75	D11	24	*	110	4	30735	22.71	94745	27.60	61525	30.93	61685	30.93
M14	2	D11	26	*	110	6	30736	30.22	94746	36.99	61526	42.94	61686	42.94
M16	2	D12	27	*	110	6	30737	41.75	94747	48.53	61527	54.48	61687	54.48
M20	2.5	D12	32	*	140	6	30738	58.07	94748	71.97	61528	81.02	61688	81.02

Metric — Bottoming Style

SIZE	PITCH	PITCH DIA. LIMIT	THREAD LENGTH MM	NECK LENGTH MM	OAL MM	NO. OF LUBE GROOVES	BRIGHT EDP NO.	BRIGHT LIST PRICE	TiN COATED EDP NO.	TiN COATED LIST PRICE	TiCN COATED EDP NO.	TiCN COATED LIST PRICE	TiALN COATED EDP NO.	TiALN COATED LIST PRICE
M4	0.7	D6	13	8	63	3	30810	$11.26	94820	$13.85	61600	$15.58	61760	$15.58
M5	0.8	D7	15	10	70	4	30811	11.80	94821	15.04	61601	17.25	61761	17.25
M6	1	D8	17	13	80	4	30812	11.47	94822	14.72	61602	16.93	61762	16.93
M8	1.25	D9	20	15	90	4	30813	13.44	94823	18.33	61603	21.67	61763	21.67
M10	1.5	D10	22	17	100	4	30814	16.56	94824	21.45	61604	24.78	61764	24.78
M12	1.75	D11	24	*	110	4	30815	22.71	94825	27.60	61605	30.93	61765	30.93
M14	2	D11	26	*	110	6	30816	30.22	94826	36.99	61606	42.94	61766	42.94
M16	2	D12	27	*	110	6	30817	41.75	94827	48.53	61607	54.48	61767	54.48
M20	2.5	D12	32	*	140	6	30818	58.07	94828	71.97	61608	81.02	61768	81.02

* Reduced Shank (shank diameter is smaller than minor pitch diameter)

APPLICATION CHART FOR HPT HIGH PERFORMANCE TAPS

Material			Hardness		Cutting Speed SFM	Recommended Morse Tap
Type		Examples	BHN	RC		
Steel	Tool Steels Mold Steels	O1; A2; D2; H13; P20	275-325	28-35	7-20	High Performance Hard materials
			330-420	36-45	3-10	
	Alloy Steels Hardened Steel	Hard 1340; 4140; 4150; 4340; 8660; 50B40; 50100; 51100; 51B860; 52100	275-420	28-45	15-25	
Stainless Steel	Austenitic	200 series; 300 series	<275	<28	15-35	High Performance Exotic Alloys
	Martensitic Ferritic	400 series; 416Se; 420F; 420FSe; 440F; 440FSe	<275	<28	20-35	
	Hardened	17-4PH; 15-5; 17-7PH; AM350	275-420	28-45	5-15	High Performance Hard Materials
Nickel Alloys, Wrought & Cast	—	Nickel 200; 201; 205; 211; 220 Monel 400; 401; 404; 405 Duranickel 301	<200	<20	10-25	High Performance Exotic Alloys
	—	Inconel 600; 601; 625; 702; 718; 722; 804; 855;	200-300	20-32	5-15	
	—		300-420	32-45	3-12	High Performance Hard Materials
Titanium Alloys Wrought	—	99.5; 99.2; 98.9; 99.0 Ti-0.2 Pd; Ti Code-12	<275	<28	25-45	High Performance Exotic Alloys
	—	Ti-8MN; Ti-6AL4V 6 AR 4 V; Ti-8AL 1MO-1V 5 Al 2.55 Sn; Ti-1AL-8V-5FR	275-330	28-36	10-25	
	—		330-420	36-45	2-8	High Performance Hard Materials
Cast Iron	Gray Ferritic Pearlitic	ASTM A48 class 20; 25; 30; 35; 40; 45; 50; SAIJ 431C Grade G1800; 2500; 3000; 3500; 4000	<260	<26	35-60	High Performance Cast Iron
	Ductile Ferritic Pearlitic	ASTM A536 Grades 60-40-18; 65-45-12; 80-55-06	<260	<26	20-40	
	Malleable	ASTM A-47; Grades 32510; 35018 ASTM A 220; Grades 40010; 45006; 60004; 70003; 80002	<260	<26	10-30	
Aluminum Alloys	Wrought	1060; 1100; 1145; 1175; 1235; 2011; 2014; 2017; 2018; 3003; 3005; 5005; 6053; 6061; 6066; 6101; 7001; 7005; 7049; 7075; 7079; 7175; 7178	—	—	70-100	High Performance Aluminum
	Cast	208; 213; 224; 242; 295; 360.0; A380.0; B443.0; 514; 520; 705; 707; A850.0; B850.0	—	—	60-80	

SPEEDS shown are suggested starting points only and may be increased or decreased depending on actual material and machining conditions. Start conservatively and increase until the machining cycle is optimized.

SPEEDS may be **increased** for coated taps, spiral point taps, fine pitch taps and when the percentage of thread is decreased.

SPEEDS may need to be **reduced** for spiral flute taps, coarse pitch taps, bottoming taps, difficult materials, longer thread lengths and when the percentage of thread is increased.

THREAD FORMING TAPS generally form threads more efficiently at higher speeds. Suggested speeds are 50% to 100% higher then the suggested speeds for cutting taps in similar applications.

PIPE TAPS speeds should be between one-half and three-quarters of the speeds of taps of comparable diameter and pitch.

Straight Flute Hand Taps

Ground Thread — High Speed Steel

Straight Flute hand taps are used for hand tapping and machine tapping in through holes or blind holes in a wide variety of materials.

Available in sets, taper (8-10 thread chamfer), plug (3-5 thread chamfer) or bottoming (1-2 thread chamfer).

List No. 2068 — Machine Screw

STANDARD PACKAGE All sizes — 12 each
Sets (Taper Plug Bottom)

Bold type indicates standard H limit.

SIZE	THREADS PER INCH NC UNC	THREADS PER INCH NF UNF	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	EDP NO. SETS	SETS LIST PRICE	EDP NO. TAPER	EDP NO. PLUG	EDP NO. BOTTOM	LIST PRICE
0	—	80	2	H1	5/16	1 5/8	**33901**	$39.55	**33601**	**33701**	**33801**	$13.62
	—	80	2	H2	5/16	1 5/8	**—**	—	**—**	**33702**	**33802**	13.62
1	64	—	2	H1	3/8	1 11/16	**33902**	39.39	**33602**	**33703**	**33803**	11.93
	64	—	2	H2	3/8	1 11/16	**—**	—	**—**	**33704**	**—**	11.93
	—	72	2	H1	3/8	1 11/16	**33903**	35.79	**33603**	**33705**	**33804**	11.93
	—	72	2	H2	3/8	1 11/16	**—**	—	**—**	**33706**	**33805**	11.93
2	56	—	3	H1	7/16	1 3/4	**33904**	33.99	**33604**	**33707**	**33806**	11.33
	56	—	3	H2	7/16	1 3/4	**—**	—	**33605**	**33708**	**33807**	11.33
	—	64	3	H2	7/16	1 3/4	**33905**	33.99	**33606**	**33710**	**33809**	11.33
3	48	—	3	H1	1/2	1 13/16	**—**	—	**—**	**33711**	**—**	8.95
	48	—	3	H2	1/2	1 13/16	**33906**	23.68	**33607**	**33712**	**33810**	7.86
	—	56	3	H2	1/2	1 13/16	**33907**	27.14	**33608**	**33714**	**33812**	8.95
4	40	—	3	H2	9/16	1 7/8	**33909**	20.22	**33610**	**33716**	**33814**	6.74
	—	48	3	H2	9/16	1 7/8	**33910**	21.83	**33611**	**33719**	**33816**	7.28
	—	*36	3	H2	9/16	1 7/8	**33911**	21.83	**33612**	**33720**	**33817**	7.28
5	40	—	3	H1	5/8	1 15/16	**—**	—	**—**	**33721**	**—**	7.28
	40	—	3	H2	5/8	1 15/16	**33912**	19.87	**33613**	**33722**	**33818**	6.61
	—	44	3	H2	5/8	1 15/16	**33913**	21.83	**33614**	**33724**	**33820**	7.28
6	32	—	3	H1	11/16	2	**33914**	18.61	**33615**	**33726**	**33821**	6.21
	32	—	3	H2	11/16	2	**33915**	15.76	**33616**	**33727**	**33822**	5.30
	32	—	3	H3	11/16	2	**33916**	15.39	**33617**	**33728**	**33823**	5.13
	—	40	3	H1	11/16	2	**—**	—	**—**	**33731**	**—**	6.21
	—	40	3	H2	11/16	2	**33917**	16.32	**33618**	**33732**	**33826**	5.44
8	32	—	4	H1	3/4	2 1/8	**33918**	18.62	**33619**	**33734**	**33827**	6.21
	32	—	4	H2	3/4	2 1/8	**33919**	16.10	**33620**	**33735**	**33828**	5.37
	32	—	4	H3	3/4	2 1/8	**33920**	15.39	**33621**	**33736**	**33829**	5.13
	—	36	4	H2	3/4	2 1/8	**33921**	16.10	**33622**	**33742**	**33835**	5.37
10	24	—	4	H1	7/8	2 3/8	**33922**	16.46	**33623**	**33743**	**33836**	5.48
	24	—	4	H2	7/8	2 3/8	**33923**	16.46	**33624**	**33744**	**33837**	5.48
	24	—	4	H3	7/8	2 3/8	**33924**	16.10	**33625**	**33745**	**33838**	5.37
	—	32	4	H1	7/8	2 3/8	**33925**	16.54	**33626**	**33751**	**33842**	5.50
	—	32	4	H2	7/8	2 3/8	**33926**	16.54	**33627**	**33752**	**33843**	5.50
	—	32	4	H3	7/8	2 3/8	**33927**	15.83	**33628**	**33753**	**33844**	5.27
12	24	—	4	H3	15/16	2 3/8	**33928**	16.73	**33629**	**33758**	**33849**	5.56
	—	28	4	H3	15/16	2 3/8	**33929**	18.97	**33630**	**33759**	**33850**	6.32

*NS

Optional Flutes Straight Flute Hand Taps

Ground Thread — High Speed Steel

Straight Flute hand taps are used for hand tapping and machine tapping in through holes or blind holes in a wide variety of materials.

Optional Flutes taps feature fewer flutes than standard taps for added chip capacity in deeper hole tapping.

List No. 2068 — Machine Screw

STANDARD PACKAGE All sizes — 12 each

Available in plug (3-5 thread chamfer), or bottoming (1-2 thread chamfer).

Bold type indicates standard H limit.

SIZE	THREADS PER INCH NC UNC	NF UNF	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	EDP NUMBER PLUG	EDP NUMBER BOTTOM	LIST PRICE
2	56	—	2	H2	7/16	1¾	**33709**	**33808**	$12.51
4	40	—	2	H2	9/16	1⅞	**33717**	**33815**	7.86
5	40	—	2	H2	5/8	1 15/16	**33723**	**33819**	7.86
6	32	—	2	H2	11/16	2	**33729**	**33824**	6.90
	32	—	2	H3	11/16	2	**33730**	**33825**	5.95
	—	40	2	H2	11/16	2	**33733**	**—**	6.85
8	32	—	2	H2	¾	2⅛	**33740**	**33833**	6.85
	32	—	2	H3	¾	2⅛	**33741**	**33834**	6.21
	32	—	3	H2	¾	2⅛	**33738**	**33831***	6.85
	32	—	3	H3	¾	2⅛	**33739**	**33832**	5.93
10	24	—	2	H2	⅞	2⅜	**33749**	**33840**	6.85
	24	—	2	H3	⅞	2⅜	**33750**	**33841**	6.21
	24	—	3	H2	⅞	2⅜	**33747**	**—**	6.21
	24	—	3	H3	⅞	2⅜	**33748**	**33839**	6.21
	—	32	2	H2	⅞	2⅜	**33756**	**33847**	6.87
	—	32	2	H3	⅞	2⅜	**33757**	**33848**	6.54
	—	32	3	H2	⅞	2⅜	**33754**	**33845**	6.87
	—	32	3	H3	⅞	2⅜	**33755**	**33846**	6.19

*Available While Supplies Last

Surface Treated Straight Flute Hand Taps

Ground Thread — High Speed Steel

Straight Flute hand taps are used for hand tapping and machine tapping in through holes or blind holes in a wide variety of materials.

Steam Oxide Surface Treatment increases wear resistance, reduces friction, acts as a lubricant, reduces galling and chip welding, improves chip flow and increases tap lubricant retention. **NOT RECOMMENDED FOR NON-FERROUS MATERIALS.**

List No. 2068X Machine Screw Steam Oxide Treated

STANDARD PACKAGE All sizes — 12 each

Available in plug (3-5 thread chamfer), or bottoming (1-2 thread chamfer)

Bold type indicates standard H limit

SIZE	THREADS PER INCH NC-UNC	NF-UNF	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	EDP NUMBER PLUG	EDP NUMBER BOTTOM	LIST PRICE
6	32	—	3	H3	11/16	2	**32558**	**32573**	$5.13
	—	40	3	H2	11/16	2	**32559**	**32574**	5.44
8	32	—	4	H3	¾	2⅛	**32560**	**32575**	5.13
	—	36	4	H2	¾	2⅛	**32561**	**32576**	5.37
10	24	—	4	H3	⅞	2⅜	**32562**	**32577**	5.37
	—	32	4	H3	⅞	2⅜	**32563**	**32578**	5.27

Titanium Nitride (TiN) Coated Straight Flute Hand Taps

Ground Thread — High Speed Steel

Straight Flute hand taps are used for hand tapping and machine tapping in through holes or blind holes in a wide variety of materials.

Titanium Nitride (TiN) Coating results in an extremely hard surface with high lubricity for increased tool life, improved thread quality, reduced torque and increased tapping speeds for greater productivity.

List No. 2068G — Machine Screw

STANDARD PACKAGE All sizes — 12 each

Available in plug (3-5 thread chamfer), or bottoming (1-2 thread chamfer).

SIZE	THREADS PER INCH NC UNC	THREADS PER INCH NF UNF	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	EDP NUMBER PLUG	EDP NUMBER BOTTOM.	LIST PRICE
0	—	80	2	H1	5/16	1 5/8	92460	92480	$15.58
1	64	—	2	H1	3/8	1 11/16	92461	92481	13.88
	—	72	2	H1	3/8	1 11/16	92462	92482	13.88
2	56	—	3	H2	7/16	1 3/4	92463	92483	13.28
	—	64	3	H2	7/16	1 3/4	92464	92484	13.28
3	48	—	3	H2	1/2	1 13/16	92465	92485	9.82
	—	56	3	H2	1/2	1 13/16	92466	92486	10.91
4	40	—	3	H2	9/16	1 7/8	92467	92487	8.69
	—	48	3	H2	9/16	1 7/8	92468	92488	9.24
	—	36*	3	H2	9/16	1 7/8	92469	92489	9.24
5	40	—	3	H2	5/8	1 15/16	92470	92490	8.57
	—	44	3	H2	5/8	1 15/16	92471	92491	9.24
6	32	—	3	H3	11/16	2	92472	92492	8.78
	—	40	3	H2	11/16	2	92473	92493	9.09
8	32	—	4	H3	3/4	2 1/8	92474	92494	8.78
	—	36	4	H2	3/4	2 1/8	92475	92495	9.02
10	24	—	4	H3	7/8	2 3/8	92476	92496	9.02
	—	32	4	H3	7/8	2 3/8	92477	92497	8.92
12	24		4	H3	15/16	2 3/8	92478	92498	9.21
	—	28	4	H3	15/16	2 3/8	92479	92499	9.97

*NS

SPECIAL TAPS FAST QUOTE SERVICE

Call Morse Cutting Tools for all of your special tap needs.
To expedite your quote please provide the following information:

TAP SIZE _____ CLASS of FIT or H LIMIT _____ # of FLUTES _____

TYPE of TAP _____ SURFACE TREATMENT _____

MATERIAL to be THREADED _____ HARDNESS _____

BLIND or THROUGH HOLE _____ LENGTH of THREAD _____

# of HOLES to TAP _____ TAPPING EQUIPMENT USED _____

CURRENT TAP USED _____ TAPPING PROBLEM _____

Straight Flute Hand Taps

Ground Thread — High Speed Steel

Straight Flute hand taps are used for hand tapping and machine tapping in through holes or blind holes in a wide variety of materials.

Available in sets or taper (8-10 thread chamfer), plug (3-5 thread chamfer), or bottoming (1-2 thread chamfer)

List No. 2046 Fractional

STANDARD PACKAGE
1/4" thru 1/2" — 12 each
9/16" thru 3/4" — 3 each
7/8" thru 1½" — 1 each
Sets (Taper Plug Bott)

Bold type indicates standard H limit.

SIZE	THREADS PER INCH NC UNC	NF UNF	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	SETS EDP NO.	SETS LIST PRICE	EDP NUMBER TAPER	PLUG	BOTTOM	LIST PRICE
¼	20	—	4	H1	1	2½	—	—	32301	32402	32601	$7.10
	20	—	4	H2	1	2½	—	—	32302	32404	32602	6.83
	20	—	4	H3	1	2½	32701	$17.32	32303	32407	32605	5.76
	20	—	4	H5	1	2½	—	—	—	32409	—	6.80
	—	28	4	H1	1	2½	—	—	—	32410	32607	7.10
	—	28	4	H2	1	2½	—	—	—	32411	32608	6.80
	—	28	4	H3	1	2½	32702	17.71	32304	32414	32611	5.92
	—	28	4	H4	1	2½	—	—	—	32415	32612	7.10
5/16	18	—	4	H2	1⅛	2 23/32	—	—	—	32418	32614	7.86
	18	—	4	H3	1⅛	2 23/32	32703	21.30	32305	32421	32617	7.10
	18	—	4	H5	1⅛	2 23/32	—	—	—	32422	32618	7.86
	—	24	4	H2	1⅛	2 23/32	—	—	—	32424	—	7.86
	—	24	4	H3	1⅛	2 23/32	32704	21.30	32306	32426	32621	6.98
	—	24	4	H4	1⅛	2 23/32	—	—	—	32427	32622*	7.86
⅜	16	—	4	H1	1¼	2 15/16	—	—	—	32429	32623*	10.26
	16	—	4	H2	1¼	2 15/16	—	—	—	32430	32624	8.95
	16	—	4	H3	1¼	2 15/16	32705	23.61	32307	32432	32626	7.86
	16	—	4	H5	1¼	2 15/16	—	—	—	32434	32627	8.95
	—	24	4	H1	1¼	2 15/16	—	—	—	32435	—	10.26
	—	24	4	H2	1¼	2 15/16	—	—	—	32436	32629	8.95
	—	24	4	H3	1¼	2 15/16	32706	23.61	32308	32438	32631	7.86
	—	24	4	H4	1¼	2 15/16	—	—	—	32439	32632*	8.95
7/16	14	—	4	H3	1 7/16	3 5/32	32707	40.45	32309	32441	32633	13.48
	14	—	4	H5	1 7/16	3 5/32	—	—	—	32442	32634	14.85
	—	20	4	H3	1 7/16	3 5/32	32708	40.45	32310	32444	32635	13.48
	—	20	4	H5	1 7/16	3 5/32	—	—	—	32445	32636	14.85
½	13	—	4	H1	1 21/32	3⅜	—	—	—	32446	—	17.28
	13	—	4	H3	1 21/32	3⅜	32709	48.32	32311	32449	32640	14.13
	13	—	4	H5	1 21/32	3⅜	—	—	—	32450	32641	17.28
	—	20	4	H1	1 21/32	3⅜	—	—	—	32451	32642	17.28
	—	20	4	H3	1 21/32	3⅜	32710	48.64	32312	32453	32643	16.10
	—	20	4	H5	1 21/32	3⅜	—	—	—	32454	—	17.28
9/16	12	—	4	H3	1 21/32	3 19/32	32711	71.57	32313	32455	32644	23.86
	12	—	4	H5	1 21/32	3 19/32	—	—	—	32456	—	25.00
	—	18	4	H2	1 21/32	3 19/32	—	—	—	32457	—	25.00
	—	18	4	H3	1 21/32	3 19/32	32712	71.57	32314	32458	32645	23.86
	—	18	4	H5	1 21/32	3 19/32	—	—	—	32459	—	25.00
⅝	11	—	4	H2	1 13/16	3 13/16	—	—	—	32460	—	32.80
	11	—	4	H3	1 13/16	3 13/16	32713	85.88	32315	32461	32647	28.63
	11	—	4	H5	1 13/16	3 13/16	—	—	—	32462	32648	32.80
	—	18	4	H2	1 13/16	3 13/16	—	—	—	32463	—	32.80
	—	18	4	H3	1 13/16	3 13/16	32714	85.88	32316	32464	32649	28.63
	—	18	4	H5	1 13/16	3 13/16	—	—	—	32465	32650	32.80

*Available While Supplies Last

(continued)

Straight Flute Hand Taps (continued)

List No. 2046 Fractional

SIZE	NC UNC	THREADS PER INCH NF UNF	NS	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	SETS EDP NO.	SETS LIST PRICE	EDP NUMBER TAPER	EDP NUMBER PLUG	EDP NUMBER BOTTOM	LIST PRICE
11/16	—	—	11	4	H3	1 13/16	4 1/32	32715	$107.36	32317	32466	32651	$35.79
	—	—	16	4	H3	1 13/16	4 1/32	32716	107.36	32318	32467	32652	35.79
3/4	10	—	—	4	H3	2	4 1/4	32717	118.81	32319	32469	32653	39.61
	10	—	—	4	H5	2	4 1/4	—	—	—	32470	32654	42.35
	—	16	—	4	H1	2	4 1/4	—	—	—	32471	—	42.35
	—	16	—	4	H2	2	4 1/4	—	—	—	32472	—	42.35
	—	16	—	4	H3	2	4 1/4	32718	118.81	32320	32473	32655	39.61
	—	16	—	4	H5	2	4 1/4	—	—	—	32474	32656	42.35
7/8	9	—	—	4	H4	2 7/32	4 11/16	32719	167.30	32321	32475	32657	55.76
	9	—	—	4	H6	2 7/32	4 11/16	—	—	—	32476	—	58.46
	—	14	—	4	H2	2 7/32	4 11/16	—	—	—	32477	—	58.46
	—	14	—	4	H4	2 7/32	4 11/16	32720	167.30	32322	32478	32658	55.76
	—	14	—	4	H6	2 7/32	4 11/16	—	—	—	32479*	—	50.96
1	8	—	—	4	H4	2 1/2	5 1/8	32721	213.95	32323	32480	32659	71.33
	8	—	—	4	H6	2 1/2	5 1/8	—	—	—	32481	—	76.70
	—	12	—	4	H4	2 1/2	5 1/8	32722	221.87	32324	32482	32660	76.70
	—	—	14	4	H4	2 1/2	5 1/8	32723	221.87	32325	32484	32661	73.95
1 1/8	7	—	—	4	H4	2 9/16	5 7/16	32724	382.57	32326	32485	32662	131.22
	—	12	—	4	H4	2 9/16	5 7/16	32725	382.57	32327	32486	32663	127.52
1 1/4	7	—	—	4	H4	2 9/16	5 3/4	32726	467.92	32328	32487	32664	157.64
	—	12	—	6	H4	2 9/16	5 3/4	32727	467.92	32329	32488	32665	162.13
1 3/8	6	—	—	4	H4	3	6 1/16	32728	578.68	32330	32489	32666	197.43
	—	12	—	6	H4	3	6 1/16	32729	578.68	32331	32490	32667	200.52
1 1/2	6	—	—	4	H4	3	6 3/8	32730	667.48	32332	32491	32668	230.27
	—	12	—	6	H4	3	6 3/8	32731	667.48	32333	32492	32669	231.31

* Available While Supplies Last

Optional Flutes Straight Flute Hand Taps

Straight Flute hand taps are used for hand tapping and machine tapping in through holes or blind holes in a wide variety of materials.

Optional Flutes taps feature fewer flutes than standard taps for added chip capacity in deeper hole tapping.

List No. 2046 — Fractional

STANDARD PACKAGE All sizes — 12 each

Ground Thread—High Speed Steel

SIZE	THREADS PER INCH NC-UNC	THREADS PER INCH NF-UNF	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	EDP NUMBER PLUG	EDP NUMBER BOTTOM	LIST PRICE
1/4	20	—	2	H3	1	2 1/2	32405	32603	$7.98
	20	—	3	H3	1	2 1/2	32406	32604	7.98
	20	—	3	H5	1	2 1/2	32408	32606	7.98
	—	28	2	H3	1	2 1/2	32412	32609	7.98
	—	28	3	H3	1	2 1/2	32413	32610	7.98
5/16	18	—	2	H3	1 1/8	2 23/32	—	32615	10.00
	18	—	3	H3	1 1/8	2 23/32	32420	32616	10.00
	—	24	3	H3	1 1/8	2 23/32	32425	32620	10.00
3/8	16	—	3	H3	1 1/4	2 15/16	32431	32625	10.04
	—	24	3	H3	1 1/4	2 15/16	32437	32630	11.54
7/16	14	—	3	H3	1 7/16	3 5/32	32440	—	16.70
	—	20	3	H3	1 7/16	3 5/32	32443	—	16.70
1/2	13	—	3	H3	1 21/32	3 3/8	32448	32639	20.25
	—	20	3	H3	1 21/32	3 3/8	32452	—	20.25

Eight Pitch Straight Flute Hand Taps

Ground Thread — High Speed Steel

Straight Flute hand taps are used for hand tapping and machine tapping in through holes or blind holes in a wide variety of materials.

Eight Pitch taps are often required for applications in the power generation industry and general construction.

List No. 2046 Fractional

STANDARD PACKAGE **All sizes —** 1 each

Available in taper (8-10 thread chamfer), plug (3-5 chamfer), or bottoming (1-2 thread chamfer)

SIZE	THREADS PER INCH	NO. OF FLUTES	PITCH DIA. LIMIT	EDP NO. TAPER	EDP NO. PLUG	EDP NO. BOTTOM	LIST PRICE
1	8	4	H4	32323	32480	32659	$71.33
1⅛	8	4	H5	32334	32508	32501	95.64
1¼	8	4	H5	32336	32509	32502	118.23
1⅜	8	4	H5	32338	32510	32503	148.07
1½	8	6	H5	32340	32511	32504	172.71
1⅝	8	6	H6	—	32512	32505	179.53
1¾	8	6	H6	32344	32513	32506	200.25
1⅞	8	6	H6	—	32514	32507	236.85
2	8	6	H6	32348	32515	32516	251.53

Surface Treated Straight Flute Hand Taps

Ground Thread — High Speed Steel

Straight Flute hand taps are used for hand tapping and machine tapping in through holes or blind holes in a wide variety of materials.

Steam Oxide Surface Treatment increases wear resistance, reduces friction, acts as a lubricant, reduces galling and chip welding, improves chip flow and increases tap lubricant retention. **NOT RECOMMENDED FOR NON-FERROUS MATERIALS**

List No. 2046X — Fractional Steam Oxide Treated

STANDARD PACKAGE 1/4″ thru 1/2″ — 12 each
5/8″ thru 3/4″ — 3 each

Available in plug (3-5 thread chamfer), or bottoming (1-2 thread chamfer)

SIZE	THREADS PER INCH NC UNC	THREADS PER INCH NF UNF	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	EDP NO. PLUG	EDP NO. BOTTOMING	LIST PRICE
¼	20	—	4	H3	1	2½	32520	32535	$5.76
	—	28	4	H3	1	2½	32521	32536	5.92
5/16	18	—	4	H3	1⅛	2 23/32	32522	32537	7.10
	—	24	4	H3	1⅛	2 23/32	32523	32538	6.98
⅜	16	—	4	H3	1¼	2 15/16	32524	32539	7.86
	—	24	4	H3	1¼	2 15/16	32525	32540	7.86
½	13	—	4	H3	1 21/32	3⅜	32526	32541	14.13
	—	20	4	H3	1 21/32	3⅜	32527	32542	16.10
⅝	11	—	4	H3	1 13/16	3 13/16	32528	32543	28.63
	—	18	4	H3	1 13/16	3 13/16	32529	32544	28.63
¾	10	—	4	H3	2	4¼	32530	32545	39.61
	—	16	4	H3	2	4¼	32531	32546	39.61

Titanium Nitride (TiN) Coated Straight Flute Hand Taps

Straight Flute hand taps are used for hand tapping and machine tapping in through holes or blind holes in a wide variety of materials.

Titanium Nitride (TiN) Coating results in an extremely hard surface with high lubricity for increased tool life, improved thread quality, reduced torque and increased tapping speeds for greater productivity.

List No. 2046G Fractional

STANDARD PACKAGE ¼ - ½ — 12 each
9/16 - ¾ — 3 each
⅞ - 1 — 1 each

Ground Thread – High Speed Steel

SIZE	PITCH DIA. LIMIT	THREAD LENGTH	OAL	NO. OF FLUTES	EDP NO. PLUG	EDP NO. BOTTOM	LIST PRICE
¼ - 20	H3	1	2½	4	92400	92430	$9.41
¼ - 28	H3	1	2½	4	92401	92431	9.57
5/16 - 18	H3	1⅛	2 23/32	4	92402	92432	12.67
5/16 - 24	H3	1⅛	2 23/32	4	92403	92433	12.54
⅜ - 16	H3	1¼	2 15/16	4	92404	92434	13.43
⅜ - 24	H3	1¼	2 15/16	4	92405	92435	13.43
7/16 - 14	H3	1 7/16	3 5/32	4	92406	92436	19.04
7/16 - 20	H3	1 7/16	3 5/32	4	92407	92437	19.04
½ - 13	H3	1 21/32	3⅜	4	92408	92438	19.70
½ - 20	H3	1 21/32	3⅜	4	92409	92439	21.66
9/16 - 12	H3	1 21/32	3 19/32	4	92410	92440	33.87
9/16 - 18	H3	1 21/32	3 19/32	4	92411	92441	33.87
⅝ - 11	H3	1 13/16	3 13/16	4	92412	92442	38.65
⅝ - 18	H3	1 13/16	3 13/16	4	92413	92443	38.65
11/16 - 11	H3	2	4¼	4	92414	92444	45.80
11/16 - 16	H3	2	4¼	4	92415	92445	45.80
¾ - 10	H3	2	4¼	4	92416	92446	49.63
¾ - 16	H3	2	4¼	4	92417	92447	52.36
⅞ - 9	H4	2 7/32	4 11/16	4	92418	92448	71.34
⅞ - 14	H4	2 7/32	4 11/16	4	92419	92449	71.34
1 - 8	H4	2½	5⅛	4	92420	92450	97.14
1 - 14	H4	2½	5⅛	4	92421	92451	97.14

+.005″ Oversize Straight Flute Hand Taps

Straight Flute hand taps are used for hand tapping and machine tapping in through holes or blind holes in a wide variety of materials.

+.005″ Oversize (H11) taps are mainly used for parts that will be plated or heat treated after tapping. Also used in materials that tend to shrink after tapping.

List No. 2014 Machine Screw & Fractional

STANDARD PACKAGE **Machine screw sizes:** 12 each
Fractional sizes: 1/4″ thru 1/2″ — 12 each
5/8″ — 3 each

Ground Thread — High Speed Steel Plug Style

List No. 2014 Machine Screw

SIZE	THREADS PER INCH NC UNC	THREADS PER INCH NF UNF	PITCH DIA. LIMIT	THREAD LENGTH	OAL	NO. OF FLUTES	EDP NO. PLUG	LIST PRICE
6	32	—	GH11	11/16	2	3	34222	$6.25
8	32	—	GH11	¾	2⅛	4	34223	6.25
10	24	—	GH11	⅞	2⅜	4	34225	6.62
10	—	32	GH11	⅞	2⅜	4	34226	6.62

List No. 2014 Fractional

SIZE	THREADS PER INCH NC UNC	THREADS PER INCH NF UNF	PITCH DIA. LIMIT	THREAD LENGTH	OAL	NO. OF FLUTES	EDP NO. PLUG	LIST PRICE
¼	20	—	GH11	1	2½	4	34301	$7.96
5/16	18	—	GH11	1⅛	2 23/32	4	34303	9.16
⅜	16	—	GH11	1¼	2 15/16	4	34305	10.47
½	13	—	GH11	1 21/32	3⅜	4	34309	18.60
⅝	11	—	GH11	1 13/16	3 13/16	4	34313	31.88

Metric Straight Flute Hand Taps

Ground Thread — High Speed Steel

Straight Flute hand taps are used for hand tapping and machine tapping in through holes or blind holes in a wide variety of materials.

Available in sets or taper (8-10 thread chamfer), plug (3-5 thread chamfer), or bottoming (1-2 thread chamfer).

List No. 7500

STANDARD PACKAGE
M1.6 thru M12 — 12 each
M14 thru M16 — 3 each
M18 thru M39 — 1 each
Sets (Taper, Plug, Bottom)

SIZE	PITCH DIA. LIMIT	NO. OF FLUTES	THREAD LENGTH	OAL	SETS EDP NO.	SETS LIST PRICE	EDP NO. TAPER	EDP NO. PLUG	EDP NO. BOTTOM	LIST PRICE
M1.6 × 0.35	D3	2	5/16	1 5/8	38200	$52.87	38141	38016	38116	$17.67
M1.8 × 0.35	D3	2	3/8	1 11/16	38201	52.87	38142	38017	38117	17.67
M2 × 0.4	D3	3	7/16	1 3/4	38203	52.98	38143	38018	38118	17.64
M2.2 × 0.45	D3	3	7/16	1 3/4	38204	52.98	38144	38019	38119	17.64
M2.5 × 0.45	D3	3	1/2	1 13/16	38205	31.88	38145	38001	38101	10.63
M3 × 0.5	D3	3	5/8	1 15/16	38206	26.54	38146	38002	38102	8.84
M3.5 × 0.6	D3	3	11/16	2	38207	21.95	38147	38003	38103	7.32
M4 × 0.7	D4	4	3/4	2 1/8	38208	21.95	38148	38004	38104	7.32
M4.5 × 0.75	D4	4	7/8	2 3/8	38209	21.95	38149	38005	38105	7.32
M5 × 0.8	D4	4	7/8	2 3/8	38210	21.95	38150	38006	38106	7.32
M6 × 1	D5	4	1	2 1/2	38211	23.16	38151	38007	38107	7.72
M7 × 1	D5	4	1 1/8	2 23/32	38212	25.19	38152	38008	38108	8.40
M8 × 1	D5	4	1 1/8	2 23/32	38213	25.19	38153	38020	38120	8.40
*M8 × 1.25	D5	4	1 1/8	2 23/32	38214	25.19	38154	38009	38109	8.40
M10 × 1.25	D5	4	1 1/4	2 15/16	38215	47.37	38155	38021	38121	15.80
*M10 × 1.5	D6	4	1 1/4	2 15/16	38216	47.37	38156	38010	38110	15.80
M12 × 1.25	D5	4	1 21/32	3 3/8	38217	55.83	38157	38022	38122	18.62
*M12 × 1.75	D6	4	1 21/32	3 3/8	38218	55.83	38158	38011	38111	18.62
M14 × 1.5	D6	4	1 21/32	3 19/32	38219	83.04	38159	38023	38123	27.68
*M14 × 2	D7	4	1 21/32	3 19/32	38220	83.04	38160	38012	38112	27.68
M16 × 1.5	D6	4	1 13/16	3 13/16	38221	99.79	38161	38024	38124	33.28
*M16 × 2	D7	4	1 13/16	3 13/16	38222	99.79	38162	38013	38113	33.28
M18 × 1.5	D6	4	1 13/16	4 1/32	38223	136.84	38163	38025	38125	45.62
*M18 × 2.5	D7	4	1 13/16	4 1/32	38224	136.84	38164	38014	38114	45.62
M20 × 1.5	D6	4	2	4 15/32	38225	186.14	38165	38026	38126	62.07
*M20 × 2.5	D7	4	2	4 15/32	38226	186.14	38166	38015	38115	62.07
M22 × 1.5	D6	4	2 7/32	4 11/16	38227	200.20	38167	38027	38127	66.76
*M22 × 2.5	D7	4	2 7/32	4 11/16	38228	200.20	38168	38028	38128	66.76
M24 × 2	D7	4	2 7/32	4 29/32	38229	266.07	38169	38029	38129	88.72
*M24 × 3	D8	4	2 7/32	4 29/32	38230	266.07	38170	38030	38130	88.72
M27 × 2	D7	4	2 1/2	5 1/8	38231	486.20	38171	38031	38131	147.69
*M27 × 3	D8	4	2 1/2	5 1/8	38232	486.20	38172	38032	38132	147.69
M30 × 2	D7	4	2 9/16	5 7/16	38233	581.88	38173	38033	38133	194.03
*M30 × 3.5	D9	4	2 9/16	5 7/16	38234	581.88	38174	38034	38134	194.03
M33 × 2	D7	6	2 9/16	5 3/4	38238	654.50	38178	38038	38138	198.42
*M33 × 3.5	D9	4	2 9/16	5 3/4	38235	595.02	38175	38035	38135	198.42
M36 × 3	D8	4	3	6 1/16	38236	816.20	38176	38036	38136	247.58
*M36 × 4	D9	4	3	6 1/16	38237	742.44	38177	38037	38137	247.58
M39 × 3	D8	6	3 3/16	6 11/16	38239**	1063.75	38179**	38039**	38139**	354.72
*M39 × 4	D9	6	3 3/16	6 11/16	38240**	1063.75	38180**	38040**	38140**	354.72

Pitch diameters are those recommended for 6H class of thread.

***Designates course pitch**
****Available while supplies last**

Spiral Point Plug Taps

Ground Thread — High Speed Steel

Spiral Point taps are designed for machine tapping in through holes in a wide variety of materials. The point ejects the chips ahead of the tap, eliminating chip disposal problems and thread damage. Shallower flutes also result in greater tap core strength allowing for higher cutting speeds.

Steam Oxide Surface Treatment increases wear resistance, reduces friction, acts as a lubricant, reduces galling and chip welding. Improves chip flow and increases tap lubricant retention. **NOT RECOMMENDED FOR NON-FERROUS MATERIALS.**

List No. 2070 Machine Screw
Bright Finish

List No. 2070X Machine Screw
Steam Oxide Treated

STANDARD PACKAGE All sizes — 12 each

Bold type indicates standard H limit.

SIZE	THREADS PER INCH NC-UNC	NF-UNF	PITCH DIA. LIMIT	THREAD LENGTH	OAL	NO. OF FLUTES	2070 EDP NO.	2070X EDP NO.	LIST PRICE
0	—	80	H1	5/16	1 5/8	2	**34001**	—	$16.00
	—	80	**H2**	5/16	1 5/8	2	**34002**	**34122**	16.00
1	64	—	H1	3/8	1 11/16	2	**34003**	—	14.31
	64	—	**H2**	3/8	1 11/16	2	**34004**	—	14.31
	—	72	H1	3/8	1 11/16	2	**34005**	—	14.31
	—	72	**H2**	3/8	1 11/16	2	**34006**	**34126**	14.31
2	56	—	**H2**	7/16	1 3/4	2	**34008**	**34127**	13.72
	—	64	**H2**	7/16	1 3/4	2	**34010**	—	13.72
3	48	—	**H2**	1/2	1 13/16	2	**34012**	**34129**	9.60
	—	56	H1	1/2	1 13/16	2	**34013**	—	11.93
	—	56	**H2**	1/2	1 13/16	2	**34014**	**34131**	10.85
4	40	—	H1	9/16	1 7/8	2	**34015**	**34132**	9.07
	40	—	**H2**	9/16	1 7/8	2	**34016**	**34133**	7.75
	—	48	H1	9/16	1 7/8	2	**34017**	—	9.19
	—	48	**H2**	9/16	1 7/8	2	**34018**	—	9.07
	—	*36	**H2**	9/16	1 7/8	2	**34019**	**34134**	9.07
5	40	—	H1	5/8	1 15/16	2	**34020**	—	9.07
	40	—	**H2**	5/8	1 15/16	2	**34021**	**34136**	7.75
	—	44	**H2**	5/8	1 15/16	2	**34022**	—	9.07
6	32	—	H1	11/16	2	2	**34023**	—	7.46
	32	—	H2	11/16	2	2	**34024**	**34137**	6.65
	32	—	**H3**	11/16	2	2	**34025**	**34138**	6.65
	—	40	**H2**	11/16	2	2	**34026**	**34139**	7.52
8	32	—	H1	3/4	2 1/8	2	**34027**	—	7.52
	32	—	H2	3/4	2 1/8	2	**34028**	**34140**	7.16
	32	—	**H3**	3/4	2 1/8	2	**34029**	**34141**	6.67
	—	36	**H2**	3/4	2 1/8	2	**34030**	**34142**	7.52
10	24	—	H1	7/8	2 3/8	2	**34031**	—	8.16
	24	—	H2	7/8	2 3/8	2	**34032**	**34143**	7.16
	24	—	**H3**	7/8	2 3/8	2	**34033**	**34144**	6.67
	—	32	H1	7/8	2 3/8	2	**34034**	—	7.16
	—	32	H2	7/8	2 3/8	2	**34035**	**34145**	6.67
	—	32	**H3**	7/8	2 3/8	2	**34036**	**34146**	6.67
12	24	—	**H3**	15/16	2 3/8	2	**34038**	**34147**	7.46
	—	28	**H3**	15/16	2 3/8	2	**34039**	**34148**	7.46

*NS

Titanium Nitride (TiN) Coated Spiral Point Plug Taps

Spiral Point taps are designed for machine tapping in through holes in a wide variety of materials. The point ejects the chips ahead of the tap, eliminating chip disposal problems and thread damage. Shallower flutes also result in greater tap core strength allowing for higher cutting speeds.

Titanium Nitride (TiN) Coating results in an extremely hard surface with high lubricity for increased tool life, improved thread quality, reduced torque and increased tapping speeds for greater productivity.

List No. 2070G Machine Screw

Ground Thread – High Speed Steel

STANDARD PACKAGE. All sizes — 12 each

SIZE	PITCH DIA. LIMIT	THREAD LENGTH	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
0-80	H2	5/16	1 5/8	2	92520	$17.95
1-64	H2	3/8	1 11/16	2	92521	16.27
2-56	H2	7/16	1 3/4	2	92522	15.67
2-64	H2	7/16	1 3/4	2	92523	15.67
3-48	H2	1/2	1 13/16	2	92524	11.55
3-56	H2	1/2	1 13/16	2	92525	12.80
4-40	H2	9/16	1 7/8	2	92526	9.70
4-48	H2	9/16	1 7/8	2	92527	11.02
5-40	H2	5/8	1 15/16	2	92528	9.70
5-44	H2	5/8	1 15/16	2	92529	11.02
6-32	H3	11/16	2	2	92530	10.30
6-40	H2	11/16	2	2	92531	10.32
8-32	H3	3/4	2 1/8	2	92532	10.32
8-36	H2	3/4	2 1/8	2	92533	11.17
10-24	H3	7/8	2 3/8	2	92534	11.17
10-32	H3	7/8	2 3/8	2	92535	11.17
12-24	H3	15/16	2 3/8	2	92536	11.11
12-28	H3	15/16	2 3/8	2	92537	11.11

Decimal Equivalent Pocket Chart

List No. 1005

NEW LOOK! LARGER SIZE! Decimal Equivalents. Tap Drill Sizes for inch, metric and pipe threads. Size: 3⅜″ × 7″, Printed on plastic

Pack of 50
EDP No. 20412
List Price $51.50

Pack of 100
EDP No. 20413
List Price $96.45

Front

Back

Spiral Point Plug Taps

Ground Thread — High Speed Steel

Spiral Point taps are designed for machine tapping in through holes in a wide variety of materials. The point ejects the chips ahead of the tap, eliminating chip disposal problems and thread damage. Shallower flutes also result in greater tap core strength allowing for higher cutting speeds.

Steam Oxide Surface Treatment increases wear resistance reduces friction, acts as a lubricant, reduces galling and chip welding, improves chip flow and increases tap lubricant retention. **NOT RECOMMENDED FOR NON-FERROUS MATERIALS.**

List No. 2047 Fractional
Bright Finish

List No. 2047X Fractional
Steam Oxide Treated

STANDARD PACKAGE 1/4" thru 1/2" — 12 each
9/16" thru 3/4" — 3 each

Bold type indicates standard H limit.

SIZE	THREADS PER INCH NC-UNC	THREADS PER INCH NF-UNF	NO. OF FLUTES STD.	NO. OF FLUTES OPTL.	PITCH DIA. LIMIT	THREAD LENGTH	OAL	2047 EDP NO.	2047X EDP NO.	LIST PRICE
1/4	20	—	2	—	H1	1	2 1/2	**33001**	—	$7.47
	20	—	2	—	H2	1	2 1/2	**33002**	**33055**	7.47
	20	—	2	—	**H3**	1	2 1/2	**33003**	**33056**	6.56
	20	—	2	—	H5	1	2 1/2	**33004**	**33057**	7.47
	20	—	—	3	**H3**	1	2 1/2	**33005**	—	8.05
	20	—	—	3	H5	1	2 1/2	**33006**	—	8.05
1/4	—	28	2	—	H1	1	2 1/2	**33007**	—	8.05
	—	28	2	—	H2	1	2 1/2	**33008**	**33058**	8.05
	—	28	2	—	**H3**	1	2 1/2	**33009**	**33059**	6.80
	—	28	2	—	H4	1	2 1/2	**33010**	**33060**	8.05
	—	28	—	3	H2	1	2 1/2	**33011**	—	8.05
	—	28	—	3	H4	1	2 1/2	**33012**	—	8.05
5/16	18	—	2	—	H1	1 1/8	2 23/32	**33013**	—	9.31
	18	—	2	—	H2	1 1/8	2 23/32	**33014**	—	8.17
	18	—	2	—	**H3**	1 1/8	2 23/32	**33015**	**33061**	7.10
	18	—	2	—	H5	1 1/8	2 23/32	**33016**	**33062**	8.17
	18	—	—	3	**H3**	1 1/8	2 23/32	**33017**	**33063**	9.31
	18	—	—	3	H5	1 1/8	2 23/32	**33018**	**33064**	9.31
5/16	—	24	2	—	H1	1 1/8	2 23/32	**33019**	—	9.31
	—	24	2	—	H2	1 1/8	2 23/32	**33020**	**33065**	9.31
	—	24	2	—	**H3**	1 1/8	2 23/32	**33021**	**33066**	8.17
	—	24	2	—	H4	1 1/8	2 23/32	**33022**	—	9.31
	—	24	—	3	H2	1 1/8	2 23/32	**33023**	—	9.31
	—	24	—	3	H4	1 1/8	2 23/32	**33024**	**33067**	9.31
3/8	16	—	3	—	H1	1 1/4	2 15/16	**33025**	—	10.62
	16	—	3	—	H2	1 1/4	2 15/16	**33026**	—	9.65
	16	—	3	—	**H3**	1 1/4	2 15/16	**33027**	**33068**	8.41
	16	—	3	—	H5	1 1/4	2 15/16	**33028**	**33069**	10.62
3/8	—	24	3	—	H1	1 1/4	2 15/16	**33029**	—	10.62
	—	24	3	—	H2	1 1/4	2 15/16	**33030**	—	10.62
	—	24	3	—	**H3**	1 1/4	2 15/16	**33031**	**33070**	8.95
	—	24	3	—	H4	1 1/4	2 15/16	**33032**	—	10.62
7/16	14	—	3	—	H2	1 7/16	3 5/32	**33033**	—	15.62
	14	—	3	—	**H3**	1 7/16	3 5/32	**33034**	**33071**	14.26
	14	—	3	—	H5	1 7/16	3 5/32	**33035**	**33072**	15.62
7/16	—	20	3	—	**H3**	1 7/16	3 5/32	**33036**	**33073**	14.26
	—	20	3	—	H5	1 7/16	3 5/32	**33037**	**33074**	15.62
1/2	13	—	3	—	H2	1 21/32	3 3/8	**33039**	—	18.97
	13	—	3	—	**H3**	1 21/32	3 3/8	**33040**	**33075**	14.55
	13	—	3	—	H5	1 21/32	3 3/8	**33041**	**33076**	17.28
1/2	—	20	3	—	H1	1 21/32	3 3/8	**33042**	—	18.97
	—	20	3	—	H2	1 21/32	3 3/8	**33043**	—	18.97
	—	20	3	—	**H3**	1 21/32	3 3/8	**33044**	**33077**	17.28
	—	20	3	—	H5	1 21/32	3 3/8	**33045**	**33078**	18.97
5/8	11	—	3	—	**H3**	1 13/16	3 13/16	**33046**	**33079**	32.45
	11	—	3	—	H5	1 13/16	3 13/16	**33047**	**33080**	32.45
	—	18	3	—	**H3**	1 13/16	3 13/16	**33050**	**33081**	32.45
3/4	10	—	3	—	**H3**	2	4 1/4	**33048**	**33082**	47.35
	10	—	3	—	H5	2	4 1/4	**33049**	**33083**	47.35
	—	16	3	—	**H3**	2	4 1/4	**33052**	**33084**	47.35

Titanium Nitride (TiN) Coated Spiral Point Plug Taps

Spiral Point taps are designed for machine tapping in through holes in a wide variety of materials. The point ejects the chips ahead of the tap, eliminating chip disposal problems and thread damage. Shallower flutes also result in greater tap core strength allowing for higher cutting speeds.

Titanium Nitride (TiN) Coating results in an extremely hard surface with high lubricity for increased tool life, improved thread quality, reduced torque and increased tapping speeds for greater productivity.

List No. 2047G Fractional

Ground Thread – High Speed Steel

STANDARD PACKAGE 1/4 - 1/2 — 12 each
5/8 - 3/4 — 3 each

SIZE	PITCH DIA. LIMIT	THREAD LENGTH	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
1/4-20	H3	1	2 1/2	2	92500	$10.21
1/4-28	H3	1	2 1/2	2	92501	10.45
5/16-18	H3	1 1/8	2 23/32	2	92502	12.67
5/16-24	H3	1 1/8	2 23/32	2	92503	13.74
3/8-16	H3	1 1/4	2 15/16	3	92504	13.98
3/8-24	H3	1 1/4	2 15/16	3	92505	14.52
7/16-14	H3	1 7/16	3 5/32	3	92506	19.82
7/16-20	H3	1 7/16	3 5/32	3	92507	19.82
1/2-13	H3	1 21/32	3 3/8	3	92508	20.11
1/2-20	H3	1 21/32	3 3/8	3	92509	22.85
5/8-11	H3	1 13/16	3 13/16	3	92510	42.46
5/8-18	H3	1 13/16	3 13/16	3	92511	42.46
3/4-10	H3	2	4 1/4	3	92512	57.37
3/4-16	H3	2	4 1/4	3	92513	57.37

Spiral Point Bottoming Taps

Spiral Point Bottoming taps are designed for machine tapping in blind holes with adequate chip space at the bottom of the hole. The point ejects the chips ahead of the tap, eliminating chip disposal problems and thread damage. Shallower flutes also result in greater tap core strength allowing for higher cutting speeds. Recommended for a wide range of materials.

List No. 2047 Fractional

List No. 2070 Machine Screw

STANDARD PACKAGE All sizes — 12 each

Ground Thread — High Speed Steel

List No. 2047 Fractional

SIZE	THREADS PER INCH NC-UNC	THREADS PER INCH NF-UNF	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	EDP NO. BOTTOMING	LIST PRICE
1/4	20	—	2	H3	1	2 1/2	33101	$8.32
	—	28	2	H3	1	2 1/2	33102	9.60
5/16	18	—	2	H3	1 1/8	2 23/32	33103	10.14
	—	24	2	H3	1 1/8	2 23/32	33104	10.14

List No. 2070 Machine Screw

SIZE	THREADS PER INCH NC-UNC	THREADS PER INCH NF-UNF	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	EDP NO.	LIST PRICE
0	—	80	2	H2	5/16	1 5/8	34101	$19.20
2	56	—	2	H2	7/16	1 3/4	34102	15.20
3	48	—	2	H2	1/2	1 13/16	34103	13.72
4	40	—	2	H2	9/16	1 7/8	34104	10.14
	—	48	2	H2	9/16	1 7/8	34105	10.21
5	40	—	2	H2	5/8	1 15/16	34106	10.38
6	32	—	2	H2	11/16	2	34107	8.24
	32	—	2	H3	11/16	2	34108	8.24
	—	40	2	H2	11/16	2	34109	9.55
8	32	—	2	H2	3/4	2 1/8	34110	8.89

(continued)

Spiral Point Bottoming Taps (continued)

List No. 2070 Machine Screw

SIZE	THREADS PER INCH NC-UNC	NF-UNF	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	EDP NO.	LIST PRICE
8	32	—	2	H3	3/4	2 1/8	34111	$8.32
10	24	—	2	H2	7/8	2 3/8	34112	9.55
	24	—	2	H3	7/8	2 3/8	34113	8.00
	—	32	2	H2	7/8	2 3/8	34114	9.55
	—	32	2	H3	7/8	2 3/8	34115	8.00
12	24	—	2	H3	15/16	2 3/8	34116	9.55

+.005″ Oversize Spiral Point Plug Taps

Spiral Point taps are designed for machine tapping in through holes in a wide variety of materials. The point ejects the chips ahead of the tap, eliminating chip disposal problems and thread damage. Shallower flutes also result in greater tap core strength allowing for higher cutting speeds.

+.005″ Oversize (H11) taps are mainly used for parts that will be plated or heat treated after tapping. Also used in materials that tend to shrink after tapping

List No. 2015 Machine Screw & Fractional

Ground Thread — High Speed Steel

STANDARD PACKAGE

Machine screw sizes: All sizes — 12 each
Fractional sizes:
1/4″ thru 1/2″ — 12 each
5/8″ — 3 each

List No. 2015 Machine Screw

SIZE	THREADS PER INCH NC UNC	NF UNF	PITCH DIA. LIMIT	THREAD LENGTH	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
6	32	—	GH11	11/16	2	2	34241	$6.50
8	32	—	GH11	3/4	2 1/8	2	34243	6.50
10	24	—	GH11	7/8	2 3/8	2	34244	6.85
10	—	32	GH11	7/8	2 3/8	2	34245	6.85

List No. 2015 Fractional

SIZE	THREADS PER INCH NC UNC	NF UNF	PITCH DIA. LIMIT	THREAD LENGTH	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
1/4	20	—	GH11	1	2 1/2	2	34251	$7.81
5/16	18	—	GH11	1 1/8	2 23/32	2	34253	9.81
3/8	16	—	GH11	1 1/4	2 15/16	3	34255	11.22
1/2	13	—	GH11	1 21/32	3 3/8	3	34259	19.29
5/8	11	—	GH11	1 13/16	3 13/16	3	34263	36.18

CUTTING FLUIDS SELECTION

Coolants and lubricants offer many benefits including reduced friction and heat, enhanced chip removal, improved accuracy and surface finish, higher speeds and feeds, corrosion protection and increased tool life.

Proper selection and application of cutting fluids is critical to optimizing machining applications. **Please consult your cutting fluids supplier for advice on your specific machining application.**

Metric Spiral Point Plug Taps

Ground Thread — High Speed Steel

Spiral Point taps are designed for machine tapping in through holes in a wide variety of materials. The point ejects the chips ahead of the tap, eliminating chip disposal problems and thread damage. Shallower flutes also result in greater tap core strength allowing for higher cutting speeds.

STANDARD PACKAGE M1.6 thru M12 — 12 each
M14 thru M16 — 3 each
M18 thru M20 — 1 each

List No. 7501 Bright Finish

List No. 7501G TiN Coated

Titanium Nitride (TiN) Coating results in an extremely hard surface with high lubricity for increased tool life, improved thread quality, reduced torque and increased tapping speeds for greater productivity.

SIZE	PITCH DIA. LIMIT	THREAD LENGTH	OAL	NUMBER OF FLUTES	7501 EDP NO.	7501 LIST PRICE	7501G EDP NO.	7501G LIST PRICE
M1.6 × 0.35	D3	5/16	1 5/8	2	38516	$19.73	98516	$22.00
M1.8 × 0.35	D3	3/8	1 11/16	2	38517	18.60	98517	20.90
M2 × 0.4	D3	7/16	1 3/4	2	38518	18.60	98518	20.90
M2.2 × 0.45	D3	7/16	1 3/4	2	38519	14.57	98519	16.85
M2.5 × 0.45	D3	1/2	1 13/16	2	38501	12.30	98501	14.60
M3 × 0.5	D3	5/8	1 15/16	2	38502	9.79	98502	12.10
M3.5 × 0.6	D4	11/16	2	2	38503	8.44	98503	11.20
M4 × 0.7	D4	3/4	2 1/8	2	38504	8.44	98504	12.80
M4.5 × 0.75	D4	7/8	2 3/8	2	38505	8.44	98505	12.80
M5 × 0.8	D4	7/8	2 3/8	2	38506	8.44	98506	12.80
M6 × 1	D5	1	2 1/2	2	38507	8.44	98507	12.80
M7 × 1	D5	1 1/8	2 23/32	2	38508	9.79	98508	16.70
M8 × 1	D5	1 1/8	2 23/32	2	38520	9.79	98520	16.70
M8 × 1.25*	D5	1 1/8	2 23/32	2	38509	9.79	98509	16.70
M10 × 1.25	D5	1 1/4	2 15/16	3	38521	16.14	98521	24.15
M10 × 1.5*	D6	1 1/4	2 15/16	3	38510	16.14	98510	24.15
M12 × 1.25	D5	1 21/32	3 3/8	3	38522	19.71	98522	24.80
M12 × 1.75*	D6	1 21/32	3 3/8	3	38511	19.71	98511	24.80
M14 × 1.5	D6	1 21/32	3 19/32	3	38523	29.43	98523	40.30
M14 × 2*	D7	1 21/32	3 19/32	3	38512	29.43	98512	40.30
M16 × 1.5	D6	1 13/16	3 13/16	3	38524	34.54	98524	44.95
M16 × 2*	D7	1 13/16	3 13/16	3	38513	34.54	98513	44.95
M18 × 2.5	D7	1 13/16	4 1/32	3	38514	50.08	98514	65.10
M20 × 2.5	D7	2	4 15/32	3	38515	65.98	98515	75.70

Pitch diameters are those recommended for 6H class of thread

* Designates Course Pitch

Machinist's Guide for Taps

This booklet contains all the needed information for correct tapping work. Included are thread forms and dimensions, fits and limits, hole preparation and size, type of taps, speeds and lubricants, tap sharpening, and troubleshooting hints.

List No. 1002

EDP No. 20403
Box of 50
List Price $336.00

EDP No. 20404
Individual Copies
List Price $7.20

Slow Spiral Spiral Flute Taps

Ground Thread — High Speed Steel
30° Helix Angle

Spiral Flute taps lift the chips out of the hole in blind hole tapping, eliminating chip disposal problems, damaged threads and broken taps. They will also bridge interruptions in the tapped hole. Recommended for mild steel, aluminum, brass and other ductile materials.

List No. 2063 Machine Screw
List No. 2039 Fractional

STANDARD PACKAGE All sizes — 12 each

List No. 2063 Machine Screw

SIZE	THREADS PER INCH NC-UNC	THREADS PER INCH NF-UNF	NO. OF FLUTES STD.	NO. OF FLUTES OPTL.	PITCH DIA. LIMIT	THREAD LENGTH	OAL	PLUG EDP NO.	BOTTOM EDP NO.	LIST PRICE
4	40	—	2	—	H2	9/16	1 7/8	33401	33426	$15.40
5	40	—	2	—	H2	5/8	1 15/16	33402	33427	15.40
6	32	—	2	—	H3	11/16	2	33403	33428	11.98
8	32	—	2	—	H3	3/4	2 1/8	33404	33429	11.98
10	24	—	2	—	H3	7/8	2 3/8	33405	33430	11.98
10	—	32	2	—	H3	7/8	2 3/8	33406	33431	11.98

List No. 2039 Fractional

SIZE	THREADS PER INCH NC-UNC	THREADS PER INCH NF-UNF	NO. OF FLUTES STD.	NO. OF FLUTES OPTL.	PITCH DIA. LIMIT	THREAD LENGTH	OAL	PLUG EDP NO.	BOTTOM EDP NO.	LIST PRICE
1/4	20	—	2	—	H3	1	2 1/2	32121	—	$14.94
	—	28	2	—	H3	1	2 1/2	32123	32152	14.94
	—	28	—	3	H3	1	2 1/2	32124*	32153*	11.75
5/16	18	—	3	—	H3	1 1/8	2 23/32	32125	32154	18.62
	—	24	3	—	H3	1 1/8	2 23/32	32126	32155	20.48
3/8	16	—	3	—	H3	1 1/4	2 15/16	32127	32156	21.32
	—	24	3	—	H3	1 1/4	2 15/16	32128	32157	23.45
1/2	13	—	3	—	H3	1 21/32	3 3/8	32130	32159	38.64
	—	20	3	—	H3	1 21/32	3 3/8	32131	—	38.64

*Available While Supplies Last

Fast Spiral Spiral Flute Taps

Ground Thread — High Speed Steel
52° Helix Angle

Spiral Flute taps lift the chips out of the hole in blind hole tapping, eliminating chip disposal problems, damaged threads and broken taps. They will also bridge interruptions in the tapped hole. Recommended for mild steel, aluminum, brass and other ductile materials. **Fast Spiral** enhances chip lifting action especially in deeper holes and bridges wider interruptions.

List No. 2059 Machine Screw & Fractional

STANDARD PACKAGE All sizes — 12 each

List No. 2059 Machine Screw

SIZE	THREADS PER INCH NC-UNC	THREADS PER INCH NF-UNF	PITCH DIA. LIMIT	THREAD LENGTH	OAL	NO. OF FLUTES	PLUG EDP NO.	BOTTOM EDP NO.	LIST PRICE
3	48	—	H2	1/2	1 13/16	2	33201*	33251*	$19.67
4	40	—	H2	9/16	1 7/8	2	33203	33253	16.31
5	40	—	H2	5/8	1 15/16	2	33205	33255	16.31
6	32	—	H3	11/16	2	2	33208	33258	13.24
8	32	—	H2	3/4	2 1/8	3	33210	—	14.40
8	32	—	H3	3/4	2 1/8	3	33211	33261	13.24
10	24	—	H3	7/8	2 3/8	3	33214	33264	13.24
10	—	32	H3	7/8	2 3/8	3	33216	33266	13.24
12	24	—	H3	15/16	2 3/8	3	33217	33267	14.35

*Available While Supplies Last

(continued)

Fast Spiral Spiral Flute Taps (continued)

List No. 2059 Fractional

SIZE	THREADS PER INCH NC-UNC	NF-UNF	PITCH DIA. LIMIT	THREAD LENGTH	OAL	NO. OF FLUTES	PLUG EDP NO.	BOTTOM EDP NO.	LIST PRICE
¼	20	—	H3	1	2½	3	33302	33352	$14.35
	—	28	H3	1	2½	3	33305	33355	14.35
5/16	18	—	H3	1⅛	2 23/32	3	33307	33357	17.79
	—	24	H3	1⅛	2 23/32	3	33309	33359	17.79
⅜	16	—	H3	1¼	2 15/16	3	33311	33361	20.49
	—	24	H3	1¼	2 15/16	3	33313	33363	20.49
7/16	14	—	H3	1 7/16	3 5/32	3	33314	33364	30.56
	—	20	H3	1 7/16	3 5/32	3	33315	33365	30.56
½	13	—	H3	1 21/32	3⅜	3	33316	33366	36.82
	—	20	H3	1 21/32	3⅜	3	33317	33367	36.82

Left Hand Straight Flute Hand Taps

Ground Thread — High Speed Steel

Left Hand taps are left hand cutting for producing left hand threads in a wide variety of materials.

List No. 2020

STANDARD PACKAGE #6 thru 1/2″ — 12 each
5/8″ thru 3/4″ — 3 each
7/8″ thru 1″ — 1 each

Available in plug (3-5 thread chamfer), or bottoming (1-2 thread chamfer)

SIZE	THREADS PER INCH NC-UNC	NF-UNF	NO. OF FLUTES	PITCH DIA. LIMIT	THREAD LENGTH	OAL	PLUG EDP NO.	LIST PRICE	BOTTOM EDP NO.	LIST PRICE
10	24	—	4	H3	⅞	2⅜	33440	$7.14	33470	$7.14
	—	32	4	H3	⅞	2⅜	33441	7.14	33471	7.14
¼	20	—	4	H3	1	2½	33442	8.29	33472	8.29
	—	28	4	H3	1	2½	33443	8.29	33473	8.29
5/16	18	—	4	H3	1⅛	2 23/32	33444	9.26	33474	9.26
	—	24	4	H3	1⅛	2 23/32	33445	9.26	33475	9.26
⅜	16	—	4	H3	1¼	2 15/16	33446	11.94	33476	11.94
	—	24	4	H3	1¼	2 15/16	33447	11.94	33477	11.94
7/16	14	—	4	H3	1 7/16	3 5/32	33448	17.40	33478	17.40
	—	20	4	H3	1 7/16	3 5/32	33449	17.40	33479	17.40
½	13	—	4	H3	1 21/32	3⅜	33450	20.45	33480	20.45
	—	20	4	H3	1 21/32	3⅜	33451	20.45	33481	20.45
⅝	11	—	4	H3	1 13/16	3 13/16	33452	38.41	33482	38.41
	—	18	4	H3	1 13/16	3 13/16	33453	38.41	33483	38.41
¾	10	—	4	H3	2	4¼	33454	50.46	33484	50.46
	—	16	4	H3	2	4¼	33455	50.46	33485	50.46
⅞	9	—	4	H4	2 7/32	4 11/16	33456	68.15	33486	68.15
	—	14	4	H4	2 7/32	4 11/16	33457	68.15	33487	68.15
1	8	—	4	H4	2½	5⅛	33458	89.45	33488	89.45
	—	12	4	H4	2½	5⅛	33459	89.45	33489	89.45
	—	14**	4	H4	2½	5⅛	33460	89.45	33490	89.45

** NS/UNS – Special Pitch

Thread Forming Taps

Ground Thread — High Speed Steel

Thread Forming taps cold form rather than cut the threads. Advantages include no chips to dispose of, stronger higher quality threads, increased tapping speeds, longer tap life and reduced tap breakage. Recommended for a wide variety of ductile materials.

Lube Grooves provide a path for lubrication and act as vents to relieve pressure in blind hole tapping.

Plug Style (4 threads tapered) for through holes and blind holes with adequate depth. The longer taper lead is easier starting, requires less torque, produces less burr above the mouth of the tapped hole and increases tool life.

Bottoming Style (2 threads tapered) for blind holes.

Titanium Nitride (TiN) Coating results in an extremely hard surface with high lubricity for increased tool life, improved thread quality, reduced torque and increased tapping speeds for greater productivity.

List No. 2105 Bright Finish
List No. 2105G TiN Coated

NOTE: Thread forming taps require a larger **tap drill size** than cutting taps because the material flows during the thread forming process. It may be necessary to experiment to determine the required hole size to produce a specific percent of thread. **Countersinking** before tapping is recommended because the forming process usually displaces material above the mouth of the tapped hole.

STANDARD PACKAGE
No. 0 thru ½″ — 12 each
⁹⁄₁₆″ thru ¾″ — 3 each
M3 thru M12 — 12 each
M14 thru M16 — 3 each
M18 thru M24 — 1 each

TAP DRILL SIZES: Page 184
CLASS OF FIT RECOMMEDATIONS: Page 186

Machine Screw

SIZE	THREADS PER INCH NC UNC	NF UNF	PITCH DIA. LIMIT	THREAD LENGTH	OAL	NO. OF LUBE GROOVES	PLUG BRIGHT EDP NO.	PLUG BRIGHT LIST PRICE	PLUG TiN COATED EDP NO.	PLUG TiN COATED LIST PRICE	BOTTOM BRIGHT EDP NO.	BOTTOM BRIGHT LIST PRICE	BOTTOM TiN COATED EDP NO.	BOTTOM TiN COATED LIST PRICE
0	80	—	H2	5⁄16	1 5⁄8	1	—	—	—	—	36370	$18.73	96370	$21.39
1	64	—	H2	3⁄8	1 11⁄16	1	—	—	—	—	36371	18.73	96371	21.39
	—	72	H2	3⁄8	1 11⁄16	1	—	—	—	—	36372	18.73	96372	21.39
2	56	—	H2	7⁄16	1 3⁄4	1	—	—	—	—	36373	18.57	96373	21.22
	56	—	H3	7⁄16	1 3⁄4	1	—	—	—	—	36374	18.57	96374	21.22
	—	64	H2	7⁄16	1 3⁄4	1	—	—	—	—	36375	18.57	96375	21.22
	—	64	H3	7⁄16	1 3⁄4	1	—	—	—	—	36376	18.57	96376	21.22
3	48	—	H2	1⁄2	1 13⁄16	1	—	—	—	—	36377	18.57	96377	21.22
	48	—	H3	1⁄2	1 13⁄16	1	—	—	—	—	36378	18.57	96378	21.22
	—	56	H2	1⁄2	1 13⁄16	1	—	—	—	—	36379	18.57	96379	21.22
	—	56	H3	1⁄2	1 13⁄16	1	—	—	—	—	36380	18.57	96380	21.22
4	40	—	H3	9⁄16	1 7⁄8	3	36281	$16.98	96281	$19.63	36381	16.98	96381	19.63
	40	—	H5	9⁄16	1 7⁄8	3	36282	16.98	96282	19.63	36382	16.98	96382	19.63
	—	48	H3	9⁄16	1 7⁄8	3	36283	16.98	96283	19.63	36383	16.98	96383	19.63
	—	48	H5	9⁄16	1 7⁄8	3	36284	16.98	96284	19.63	36384	16.98	96384	19.63
5	40	—	H3	5⁄8	1 15⁄16	3	36285	16.98	96285	19.63	36385	16.98	96385	19.63
	40	—	H5	5⁄8	1 15⁄16	3	36286	16.98	96286	19.63	36386	16.98	96386	19.63
	—	44	H3	5⁄8	1 15⁄16	3	36287	16.98	96287	19.63	36387	16.98	96387	19.63
	—	44	H5	5⁄8	1 15⁄16	3	36288	16.98	96288	19.63	36388	16.98	96388	19.63
6	32	—	H3	11⁄16	2	3	36289	13.88	96289	17.06	36389	13.88	96389	17.06
	32	—	H5	11⁄16	2	3	36290	13.88	96290	17.06	36390	13.88	96390	17.06
	—	40	H3	11⁄16	2	3	36291	13.88	96291	17.06	36391	13.88	96391	17.06
	—	40	H5	11⁄16	2	3	36292	13.88	96292	17.06	36392	13.88	96392	17.06
8	32	—	H3	3⁄4	2 1⁄8	3	36293	13.88	96293	18.97	36393	13.88	96393	18.97
	32	—	H5	3⁄4	2 1⁄8	3	36294	13.88	96294	18.97	36394	13.88	96394	18.97
	—	36	H3	3⁄4	2 1⁄8	3	36295	13.88	96295	18.97	36395	13.88	96395	18.97
	—	36	H5	3⁄4	2 1⁄8	3	36296	13.88	96296	18.97	36396	13.88	96396	18.97
10	24	—	H4	7⁄8	2 3⁄8	4	36297	13.88	96297	18.97	36397	13.88	96397	18.97
	24	—	H6	7⁄8	2 3⁄8	4	36298	13.88	96298	18.97	36398	13.88	96398	18.97
	—	32	H4	7⁄8	2 3⁄8	4	36299	13.88	96299	18.97	36399	13.88	96399	18.97
	—	32	H6	7⁄8	2 3⁄8	4	36300	13.88	96300	18.97	36400	13.88	96400	18.97
12	24	—	H4	15⁄16	2 3⁄8	4	36301	14.57	96301	19.63	36401	14.57	96401	19.63
	24	—	H6	15⁄16	2 3⁄8	4	36302	14.57	96302	19.63	36402	14.57	96402	19.63
	—	28	H4	15⁄16	2 3⁄8	4	36303	14.57	96303	19.63	36403	14.57	96403	19.63
	—	28	H6	15⁄16	2 3⁄8	4	36304	14.57	96304	19.63	36404	14.57	96404	19.63

(continued)

Thread Forming Taps (continued)

Fractional

SIZE	THREADS PER INCH NC UNC	NF UNF	PITCH DIA. LIMIT	THREAD LENGTH	OAL	NO. OF LUBE GROOVES	PLUG BRIGHT EDP NO.	PLUG BRIGHT LIST PRICE	PLUG TiN COATED EDP NO.	PLUG TiN COATED LIST PRICE	BOTTOM BRIGHT EDP NO.	BOTTOM BRIGHT LIST PRICE	BOTTOM TiN COATED EDP NO.	BOTTOM TiN COATED LIST PRICE
1/4	20	—	H4	1	2 1/2	4	36310	$14.16	96310	$19.22	36410	$14.16	96410	$19.22
	20	—	H6	1	2 1/2	4	36311	14.16	96311	19.22	36411	14.16	96411	19.22
	—	28	H4	1	2 1/2	4	36312	14.16	96312	19.22	36412	14.16	96412	19.22
	—	28	H6	1	2 1/2	4	36313	14.16	96313	19.22	36413	14.16	96413	19.22
5/16	18	—	H5	1 1/8	2 23/32	4	36314	16.65	96314	24.65	36414	16.65	96414	24.65
	18	—	H7	1 1/8	2 23/32	4	36315	16.65	96315	24.65	36415	16.65	96415	24.65
	—	24	H5	1 1/8	2 23/32	4	36316	16.65	96316	24.65	36416	16.65	96416	24.65
	—	24	H7	1 1/8	2 23/32	4	36317	16.65	96317	24.65	36417	16.65	96417	24.65
3/8	16	—	H5	1 1/4	2 15/16	4	36318	18.90	96318	26.90	36418	18.90	96418	26.90
	16	—	H7	1 1/4	2 15/16	4	36319	18.90	96319	26.90	36419	18.90	96419	26.90
	—	24	H5	1 1/4	2 15/16	4	36320	18.90	96320	26.90	36420	18.90	96420	26.90
	—	24	H7	1 1/4	2 15/16	4	36321	18.90	96321	26.90	36421	18.90	96421	26.90
7/16	14	—	H5	1 7/16	3 5/32	4	36322	27.84	96322	35.89	36422	27.84	96422	35.89
	14	—	H8	1 7/16	3 5/32	4	36323	27.84	96323	35.89	36423	27.84	96423	35.89
	—	20	H5	1 7/16	3 5/32	4	36324	27.84	96324	35.89	36424	27.84	96424	35.89
	—	20	H8	1 7/16	3 5/32	4	36325	27.84	96325	35.89	36425	27.84	96425	35.89
1/2	13	—	H5	1 21/32	3 3/8	4	36326	32.41	96326	40.41	36426	32.41	96426	40.41
	13	—	H8	1 21/32	3 3/8	4	36327	32.41	96327	40.41	36427	32.41	96427	40.41
	—	20	H5	1 21/32	3 3/8	4	36328	32.41	96328	40.41	36428	32.41	96428	40.41
	—	20	H8	1 21/32	3 3/8	4	36329	32.41	96329	40.41	36429	32.41	96429	40.41
9/16	12	—	H7	1 21/32	3 19/32	6	36330	37.18	96330	52.20	36430	37.18	96430	52.20
	12	—	H10	1 21/32	3 19/32	6	36331	37.18	96331	52.20	36431	37.18	96431	52.20
	—	18	H7	1 21/32	3 19/32	6	36332	37.18	96332	52.20	36432	37.18	96432	52.20
	—	18	H10	1 21/32	3 19/32	6	36333	37.18	96333	52.20	36433	37.18	96433	52.20
5/8	11	—	H7	1 13/16	3 13/16	6	36334	44.90	96334	59.92	36434	44.90	96434	59.92
	11	—	H10	1 13/16	3 13/16	6	36335	44.90	96335	59.92	36435	44.90	96435	59.92
	—	18	H7	1 13/16	3 13/16	6	36336	44.90	96336	59.92	36436	44.90	96436	59.92
	—	18	H10	1 13/16	3 13/16	6	36337	44.90	96337	59.92	36437	44.90	96437	59.92
3/4	10	—	H7	2	4 1/4	6	36338	62.08	96338	79.22	36438	62.08	96438	79.22
	10	—	H10	2	4 1/4	6	36339	62.08	96339	79.22	36439	62.08	96439	79.22
	—	16	H7	2	4 1/4	6	36340	62.08	96340	79.22	36440	62.08	96440	79.22
	—	16	H10	2	4 1/4	6	36341	62.08	96341	79.22	36441	62.08	96441	79.22

Metric

SIZE	PITCH	PITCH DIA. LIMIT	THREAD LENGTH	OAL	NO. OF LUBE GROOVES	PLUG BRIGHT EDP NO.	PLUG BRIGHT LIST PRICE	PLUG TiN COATED EDP NO.	PLUG TiN COATED LIST PRICE	BOTTOM BRIGHT EDP NO.	BOTTOM BRIGHT LIST PRICE	BOTTOM TiN COATED EDP NO.	BOTTOM TiN COATED LIST PRICE
M3	0.5	D5	5/8	1 15/16	3	36350	$16.45	96350	$19.10	36450	$16.45	96450	$19.10
M4	0.7	D6	3/4	2 1/8	3	36351	13.39	96351	18.45	36451	13.39	96451	18.45
M5	0.8	D7	7/8	2 3/8	4	36352	13.39	96352	18.45	36452	13.39	96452	18.45
M6	1	D8	1	2 1/2	4	36353	13.76	96353	18.82	36453	13.76	96453	18.82
M8	1.25	D9	1 1/8	2 23/32	4	36354	15.84	96354	23.84	36454	15.84	96454	23.84
M10	1.5	D10	1 1/4	2 15/16	4	36355	17.96	96355	25.96	36455	17.96	96455	25.96
M12	1.75	D11	1 21/32	3 3/8	4	36356	30.94	96356	38.94	36456	30.94	96456	38.94
M14	2	D11	1 21/32	3 19/32	6	36357	37.18	96357	52.20	36457	37.18	96457	52.20
M16	2	D12	1 13/16	3 13/16	6	36358	44.90	96358	59.92	36458	44.90	96458	59.92
M20	2.5	D12	2	4 15/32	6	36359	83.76	96359	103.80	36459	83.76	96459	103.80

STI (Screw Thread Insert) Straight Flute Hand Taps

Straight Flute hand taps are used for hand tapping and machine tapping in through holes or blind holes in a wide variety of materials.

STI (Screw Thread Insert) taps are oversize taps that produce a thread that will accept a helical coil wire screw thread insert of the same size and pitch.

List No. 2072 Machine Screw & Fractional

Ground Thread — High Speed Steel

STANDARD PACKAGE All sizes — 12 each

List No. 2072 — Machine Screw

SIZE	THREADS PER INCH NC UNC	NF UNF	PITCH DIA. LIMIT	THREAD LENGTH	OAL	NO. OF FLUTES	PLUG EDP NO.	BOTTOM EDP NO.	LIST PRICE
4	40	–	H1	9/16	1 7/8	3	34151	34051*	$13.06
	40	–	H2	9/16	1 7/8	3	34152	—	13.06
5	40	–	H1	5/8	1 15/16	3	34153	34053*	13.06
	40	–	H2	5/8	1 15/16	3	34154	34054*	13.06
6	32	–	H2	11/16	2	3	34155	34055*	13.06
	32	–	H3	11/16	2	3	34156	34056*	13.06
	–	40	H1	11/16	2	3	34157	34057*	13.06
	–	40	H2	11/16	2	3	34158	34058*	13.06
8	32	–	H2	3/4	2 1/8	3	34159	34059*	14.11
	32	–	H3	3/4	2 1/8	3	34160	34060*	14.11
10	24	–	H2	7/8	2 3/8	3	34161	34061*	14.56
	24	–	H3	7/8	2 3/8	3	34162	34062*	14.56
	–	32	H2	7/8	2 3/8	3	34163	34063*	14.56
	–	32	H3	7/8	2 3/8	3	34164	—	14.56
12	24	–	H2	15/16	2 3/8	3	34165	34065*	15.03
	24	–	H3	15/16	2 3/8	3	34166	34066*	15.03

* Available While Supplies Last

List No. 2072 — Fractional

SIZE	THREADS PER INCH NC UNC	NF UNF	PITCH DIA. LIMIT	THREAD LENGTH	OAL	NO. OF FLUTES	PLUG EDP NO.	BOTTOM EDP NO.	LIST PRICE
1/4	20	–	H2	1	2 1/2	3	34167	34067*	$15.03
	20	–	H3	1	2 1/2	3	34168	—	15.03
	–	28	H2	1	2 1/2	3	34169	34069*	15.03
	–	28	H3	1	2 1/2	3	34170	34070*	15.03
5/16	18	–	H3	1 1/8	2 23/32	4	34171	34071*	16.82
	18	–	H4	1 1/8	2 23/32	4	34172	34072*	16.82
	–	24	H2	1 1/8	2 23/32	4	34173	34073*	16.82
	–	24	H3	1 1/8	2 23/32	4	34174	34074*	16.82
3/8	16	–	H3	1 1/4	2 15/16	4	34175	34075*	21.58
	16	–	H4	1 1/4	2 15/16	4	34176	34076*	21.58
	–	24	H2	1 1/4	2 15/16	4	34177	34077*	21.58
	–	24	H3	1 1/4	2 15/16	4	34178	34078*	21.58
7/16	14	–	H3	1 7/16	3 5/32	4	34179	34079*	23.79
	14	–	H4	1 7/16	3 5/32	4	34180	34080*	23.79
	–	20	H3	1 7/16	3 5/32	4	34181	34081*	23.79
	–	20	H4	1 7/16	3 5/32	4	34182	34082*	23.79
1/2	13	–	H3	1 21/32	3 3/8	4	34183	34083*	28.16
	13	–	H4	1 21/32	3 3/8	4	34184	34084*	28.16
	–	20	H3	1 21/32	3 3/8	4	34185	34085*	28.16
	–	20	H4	1 21/32	3 3/8	4	34186	34086*	28.16

* Available While Supplies Last

STI (Screw Thread Insert) Spiral Point Plug Taps

Spiral Point taps are designed for machine tapping in through holes in a wide variety of materials. The point ejects the chips ahead of the tap, eliminating chip disposal problems and thread damage. Shallower flutes also result in greater tap core strength allowing for higher cutting speeds.

STI (Screw Thread Insert) taps are oversize taps that produce a thread that will accept a helical coil wire screw thread insert of the same size and pitch.

List No. 2073 — Machine Screw & Fractional

Ground Thread — High Speed Steel

STANDARD PACKAGE All sizes — 12 each

List No. 2073 — Machine Screw

SIZE	THREADS PER INCH NC UNC	NF UNF	PITCH DIA. LIMIT	THREAD LENGTH	OAL	NO. OF FLUTES	PLUG EDP NO.	LIST PRICE
4	40	–	H1	9/16	1 7/8	2	33860	$13.91
	40	–	H2	9/16	1 7/8	2	33861	13.91
5	40	–	H1	5/8	1 15/16	2	33862	13.91
	40	–	H2	5/8	1 15/16	2	33863	13.91
6	32	–	H2	11/16	2	2	33864	13.91
	32	–	H3	11/16	2	2	33865	13.91
	–	40	H1	11/16	2	2	33866	14.93
	–	40	H2	11/16	2	2	33867	14.93
8	32	–	H2	3/4	2 1/8	2	33868	14.93
	32	–	H3	3/4	2 1/8	2	33869	14.93
10	24	–	H2	7/8	2 3/8	2	33870	15.47
	24	–	H3	7/8	2 3/8	2	33871	15.47
	–	32	H2	7/8	2 3/8	2	33872	15.47
	–	32	H3	7/8	2 3/8	2	33873	15.47
12	24	–	H2	15/16	2 3/8	2	33874	16.02
	24	–	H3	15/16	2 3/8	2	33875	16.02

List No. 2073 — Fractional

SIZE	THREADS PER INCH NC UNC	NF UNF	PITCH DIA. LIMIT	THREAD LENGTH	OAL	NO. OF FLUTES	PLUG EDP NO.	LIST PRICE
1/4	20	–	H2	1	2 1/2	2	33876	$16.02
	20	–	H3	1	2 1/2	2	33877	16.02
	–	28	H2	1	2 1/2	2	33878	16.02
	–	28	H3	1	2 1/2	2	33879	16.02
5/16	18	–	H3	1 1/8	2 23/32	3	33880	17.87
	18	–	H4	1 1/8	2 23/32	3	33881	17.87
	–	24	H2	1 1/8	2 23/32	3	33882	17.87
	–	24	H3	1 1/8	2 23/32	3	33883	17.87
3/8	16	–	H3	1 1/4	2 15/16	3	33884	23.19
	16	–	H4	1 1/4	2 15/16	3	33885	23.19
	–	24	H2	1 1/4	2 15/16	3	33886	23.19
	–	24	H3	1 1/4	2 15/16	3	33887	23.19

CUTTING FLUIDS SELECTION

Coolants and lubricants offer many benefits including reduced friction and heat, enhanced chip removal, improved accuracy and surface finish, higher speeds and feeds, corrosion protection and increased tool life.

Proper selection and application of cutting fluids is critical to optimizing machining applications. **Please consult your cutting fluids supplier for advice on your specific machining application.**

Taper Pipe Reamers

High Speed Steel – Left Hand Helical Flute Right Hand Cut

3/4″ Taper per foot. For reaming holes to be tapped with American Standard taper pipe taps.

List No. 2116

STANDARD PACKAGE All sizes — 1 each

SIZE	DIAMETER LARGE END	DIAMETER SMALL END	FLUTE LENGTH	OAL	EDP NO.	LIST PRICE
1/8	.362	.316	3/8	2 1/8	36081	$47.43
1/4	.472	.406	1 1/16	2 7/16	36082	54.29
3/8	.606	.540	1 1/16	2 9/16	36083	61.48
1/2	.751	.665	1 3/8	3 1/8	36084	77.66
3/4	.962	.876	1 3/8	3 1/4	36085	107.69
1	1.212	1.103	1 3/4	3 3/4	36086	158.41
1 1/4	1.553	1.444	1 3/4	4	36087	266.88
1 1/2	1.793	1.684	1 3/4	4 1/4	36088	337.47
2	2.268	2.159	1 3/4	4 1/2	36089	450.15

Taper Pipe Taps

Ground Thread — High Speed Steel NPT/ANPT—NPTF

Chamfer – 2-3½ threads

Regular Thread NPT taper pipe taps are commonly used for tapping pipe fittings and couplings in a wide variety of materials. Assembly requires the use of a thread sealant to ensure a tight seal.

NPTF Dryseal taper pipe taps produce threads where a tight seal is achieved during assembly by metal-to-metal contact. Used for applications requiring a tight seal without the use of thread sealants.

Interrupted Thread taper pipe taps reduce friction, increase chip capacity and enhance coolant flow to the cutting teeth for reduced chance of torn threads and improved thread quality. Recommended for a wide variety of materials, especially soft ductile materials and materials producing long continuous chips.

List No. 2113 Interrupted Thread

List No. 2119 Regular Thread

STANDARD PACKAGE 1/16″ thru 1/4″ — 6 each
3/8″ thru 2″ — 1 each

SIZE	THREAD LENGTH	OAL	NO. OF FLUTES. LIST NO. 2113	NO. OF FLUTES. LIST NO 2119	NTERRUPTED THREAD LIST NO. 2113 EDP NO. NPT/ANPT	NTERRUPTED THREAD LIST NO. 2113 EDP NO. NPTF	2113 LIST PRICE	REGULAR THREAD LIST NO. 2119 EDP NO. NPT/ANPT	REGULAR THREAD LIST NO. 2119 EDP NO. NPTF	2119 LIST PRICE
1/16-27	1 1/16	2 1/8	5	4	—	—	—	36121	36141	$24.95
1/8–27* (Sm. Sk.)	3/4	2 1/8	5	4	36001	36021	$36.91	36122	36142	24.95
1/8–27* (Lg. Sk.)	3/4	2 1/8	5	4	36002	36022	36.91	36123	36143	24.95
1/4–18	1 1/16	2 7/16	5	4	36003	36023	40.99	36124	36144	27.51
3/8–18	1 1/16	2 9/16	5	4	36004	36024	51.69	36125	36145	36.09
1/2–14	1 3/8	3 1/8	5	4	36005	36025	82.38	36126	36146	57.58
3/4–14	1 3/8	3 1/4	5	5	36006	36026	117.07	36127	36147	80.63
1–11½	1 3/4	3 3/4	5	5	36007	36027	179.74	36128	36148	122.39
1 1/4–11½	1 3/4	4	5	5	36008	—	251.76	36129	36149	172.85
1 1/2–11½	1 3/4	4 1/4	7	7	36009	—	339.12	36130	36150	234.21
2–11½	1 3/4	4 1/2	7	7	36010	—	458.67	36131	36151	318.16

*Large shank furnished unless otherwise specified.

Straight Pipe Taps

Ground Thread — High Speed Steel
NPS/NPSF

NPS straight pipe taps produce straight pipe threads for low pressure applications in a wide variety of materials. Can be assembled with taper pipe threads, straight pipe threads or fittings. Assembly requires the use of a thread sealant to ensure a tight seal.

NPSF Dryseal straight pipe taps produce threads where a tight seal is achieved during assembly by metal-to-metal contact when assembled with dryseal taper pipe threads. Used for applications requiring a tight seal without the use of thread sealants.

List No. 2123

STANDARD PACKAGE 1/8″ thru 1/4″ — 6 each
3/8″ thru 1″ — 1 each

Furnished in Plug style chamfer only. NPS also suitable for NPSC or NPSM work.

SIZE AND PITCH	NUMBER OF FLUTES	THREAD LENGTH	OAL	EDP NO. NPS	EDP NO. NPSF	LIST PRICE
1/8-27* (Sm. Sk.)	4	3/4	2 1/8	36161	36181	$28.06
1/8-27* (Lg. Sk.)	4	3/4	2 1/8	36162	36182	28.06
1/4-18	4	1 1/16	2 7/16	36163	36183	31.23
3/8-18	4	1 1/16	2 9/16	36164	36184	41.02
1/2-14	4	1 3/8	3 1/8	36165	36185	65.05
3/4-14	5	1 3/8	3 1/4	36166	36186	91.20
1-11 1/2	5	1 3/4	3 3/4	36167	—	138.46

*Large shank furnished unless otherwise specified.

Taper Pipe Taps For Cast Iron

Ground Thread — High Speed Steel
NPT

Taper pipe taps **for Cast Iron** feature specific geometry and a wear resistant surface finish for tapping materials that produce small or powdery chips. Recommended for cast iron, cast brass and other brass materials and non-metals that produce small or powdery chips. Assembly requires the use of a thread sealant to ensure a tight seal.

Furnished with 2-3 1/2 thread chamfer in NPT thread form 1°-3° Rake.

List No. 2133 Surface Treated

STANDARD PACKAGE 1/8″ thru 1/4″ — 6 each
3/8″ thru 2″ — 1 each

SIZE	THREAD LENGTH	OAL	NO. OF FLUTES	NPT EDP NO.	LIST PRICE
1/8-27 (Lg. Sk.)	3/4	2 1/8	4	36202	$24.82
1/4-18	1 1/16	2 7/16	4	36203	27.51
3/8-18	1 1/16	2 9/16	4	36204	36.09
1/2-14	1 3/8	3 1/8	4	36205	57.58
3/4-14	1 3/8	3 1/4	5	36206	80.63

SIZE	THREAD LENGTH	OAL	NO. OF FLUTES	NPT EDP NO.	LIST PRICE
1-11 1/2	1 3/4	3 3/4	5	36207	$122.39
1 1/4-11 1/2	1 3/4	4	5	36208	191.40
1 1/2-11 1/2	1 3/4	4 1/4	7	36209	234.98
2-11 1/2	1 3/4	4 1/2	7	36210	318.18

High Hook Taper Pipe Taps

Ground Thread — High Speed Steel
NPT/NPTF

High Hook taper pipe taps feature specific geometry for tapping ductile materials and soft gummy materials including aluminum, mild steels, free machining stainless steels, leaded steels and other materials. **NPT** threads require the use of a thread sealant to ensure a tight seal. **NPTF** threads are used for applications requiring a tight seal without the use of thread sealants.

List No. 2120

Taper — 3/4″ per foot
Chamfer — 2 - 3-1/2 threads

STANDARD PACKAGE 1/8″ thru 1/4″ — 6 each
3/8″ thru 1″ — 1 each

SIZE	THREAD LENGTH	OAL	NO. OF FLUTES	EDP NO. NPT	EDP NO. NPTF	LIST PRICE
1/8-27 (Lg. Sk.)	3/4	2 1/8	4	36188	36194	$25.12
1/4-18	1 1/16	2 7/16	4	36189	36195	27.69
3/8-18	1 1/16	2 9/16	4	36190	36196	36.34
1/2-14	1 3/8	3 1/8	4	36191	36197	57.98
3/4-14	1 3/8	3 1/4	5	36192	36198	81.19
1-11 1/2	1 3/4	3 3/4	5	36193	36199	123.24

Spiral Flute Taper Pipe Taps

Ground Thread — High Speed Steel
NPT/NPTF — 30° Spiral Flute

Spiral Flute taper pipe taps are recommended for tapping stringy and ductile materials that produce long stringy chips. The **spiral flute** lifts the chips out of the hole to eliminate chip packing in the flutes. **NPT** threads require the use of a thread sealant to ensure a tight seal. **NPTF** threads are used for applications requiring a tight seal without the use of thread sealants.

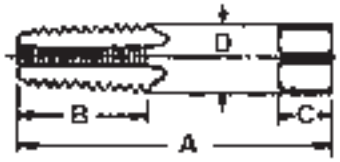
List No. 2121

Chamfer — 2 - 3-1/2 threads

STANDARD PACKAGE 1/8″ thru 1/4″ — 6 each
3/8″ thru 3/4″ — 1 each

SIZE	THREAD LENGTH	OAL	NO. OF FLUTES	EDP NO. NPT	EDP NO. NPTF	LIST PRICE
1/8-27 (Lg. Sk.)	3/4	2 1/8	4	36168	36173	$45.06
1/4-18	1 1/16	2 7/16	4	36169	36174	59.25
3/8-18	1 1/16	2 9/16	4	36170	36175	81.57
1/2-14	1 3/8	3 1/8	4	36171	36176	92.91
3/4-14	1 3/8	3 1/4	5	36172	36177	141.00

Standard Pipe Tap Dimensions



Size	Dimensions OAL	Length of Thread	Length of Square	Diameter of Shank	Size of Square
	A	B	C	D	E
1/16	2 1/8	11/16	3/8	.3125	.234
1/8	2 1/8	3/4	3/8	.3125	.234
1/8	2 1/8	3/4	3/8	.4375	.328
1/4	2 7/16	1 1/16	7/16	.5625	.421
3/8	2 9/16	1 1/16	1/2	.7000	.531
1/2	3 1/8	1 3/8	5/8	.6875	.515
3/4	3 1/4	1 3/8	11/16	.9063	.679
1	3 1/4	1 3/4	13/16	1.1250	.843
1 1/4	4	1 3/4	15/16	1.3125	.984
1 1/2	4 1/4	1 3/4	1	1.5000	1.125
2	4 1/2	1 3/4	1 1/8	1.8750	1.406

Cut Thread Taper Pipe Taps

High Speed Steel — NPT

Cut Thread taps are general purpose taps that are ideal for maintenance, repair and rethreading applications. Because they are not precision ground, they are used in applications that do not require high accuracy, close tolerance threads.

List No. 2115

STANDARD PACKAGE 1/8″ thru 1/4″ — 6 each
3/8″ thru 2″ — 1 each

SIZE	THREAD LENGTH	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
1/8-27* (Sm.Sk.)	3/4	2 1/8	4	36061	$18.45
1/8-27* (Lg.Sk.)	3/4	2 1/8	4	36062	18.45
1/4-18	1 1/16	2 7/16	4	36063	20.55
3/8-18	1 1/16	2 9/16	4	36064	26.53
1/2-14	1 3/8	3 1/8	4	36065	44.68
3/4-14	1 3/8	3 1/4	5	36066	$61.67
1-11 1/2	1 3/4	3 3/4	5	36067	92.93
1 1/4-11 1/2	1 3/4	4	5	36068	132.12
1 1/2-11 1/2	1 3/4	4 1/4	7	36069	178.79
2-11 1/2	1 3/4	4 1/2	7	36070	242.00

*Large shank furnished unless otherwise specified.

Morse® Plastic Wall Chart

NEW LOOK! LARGER SIZE! Redesigned for enhanced readability. Decimal Equivalents. Tap Drill Sizes for inch, metric and pipe threads. 24″ × 36″ printed on heavy duty .023″ gage plastic with three punched holes across top for wall mounting. Also available Custom Imprinted with your company logo and information.

List No. 1007 EDP No. 01650 List Price $7.00

SPECIAL TAPS FAST QUOTE SERVICE

Call Morse Cutting Tools for all of your special tap needs.
To expedite your quote please provide the following information:

TAP SIZE _____ CLASS of FIT or H LIMIT _____ # of FLUTES _____

TYPE of TAP _____ SURFACE TREATMENT _____

MATERIAL to be THREADED _____ HARDNESS _____

BLIND or THROUGH HOLE _____ LENGTH of THREAD _____

# of HOLES to TAP _____ TAPPING EQUIPMENT USED _____

CURRENT TAP USED _____ TAPPING PROBLEM _____

Pulley Taps

Ground Thread — High Speed Steel

Pulley taps, commonly used wherever extra reach is required, were originally designed for tapping holes in pulleys with hubs. The shank diameter is the same diameter as the major diameter of the thread and the threaded section has the same dimensions as a standard hand tap.

List No. 2082

Plug Style – H3 Pitch Dia. Limit

STANDARD PACKAGE All sizes — 1 each

SIZE	THREADS PER INCH NC-UNC	THREAD LENGTH	NO. OF FLUTES	6″ LENGTH EDP NO.	6″ LIST PRICE	8″ LENGTH EDP NO.	8″ LIST PRICE	10″ LENGTH EDP NO.	10″ LIST PRICE	12″ LENGTH EDP NO.	12″ LIST PRICE
¼	20	1	4	34201	$41.08	34207	$49.86	—	—	—	—
5/16	18	1⅛	4	34202	42.76	34208	51.12	—	—	—	—
⅜	16	1¼	4	34203	48.18	34209	57.27	34213	$71.30	—	—
7/16	14	1 7/16	4	34204	51.12	34210	65.44	—	—	—	—
½	13	1 21/32	4	34205	51.68	34211	67.31	34214	82.77	34217	$101.90
⅝	11	1 13/16	4	34206	69.19	34212	88.31	34215	111.55	—	—
¾	10	2	4	—	—	—	—	34216	131.08	—	—

Nut Taps

Ground Thread – High Speed Steel
Long Chamfer – H3 Pitch Dia. Limit

Nut taps feature a long thread length, a long chamfer and a long reduced shank smaller than the minor diameter of the thread. They were originally designed for threading hex nuts with the finished nuts collecting on the shank until unloaded. The long chamfer spreads the cutting load over a larger area and helps to center the threads. The reduced shank also enhances chip removal and workpiece clearance.

List No. 2052 **STANDARD PACKAGE** All sizes — 1 each

SIZE	THREADS PER INCH NC-UNC	NO. OF FLUTES	THREAD LENGTH	OAL	EDP NO.	LIST PRICE
¼	20	4	1⅝	5	33176	$62.30
5/16	18	4	1 13/16	5½	33177	70.50
⅜	16	4	2	6	33178	83.28
½	13	4	2½	7	33179	107.75

Combined Tap and Drill

High Speed Steel

Combined Tap and Drills drill and tap in a single pass for increased productivity. Recommended for through hole applications up to 2X the nominal diameter of the tap. The self-centering point eliminates the need for center drilling or center punching. NOTE: Drill point must penetrate the workpiece prior to start of tapping.

List No. 2080 — Machine Screw, Fractional & Metric

STANDARD PACKAGE 4-40 — 3/8-24 — 12 ea.
7/16 — 3 ea.
1/2 — 1 ea.

List No. 2080 — Machine Screw

TAP SIZE	THREADS PER INCH NC-UNC	THREADS PER INCH NF-UNF	THREAD LENGTH	DRILL SIZE	DRILL LENGTH	OAL	EDP NO. PLUG	LIST PRICE
4	40	–	⅜	.0910	¼	1⅞	38600*	$24.91
	–	48	⅜	.0945	¼	1⅞	38601*	26.90
5	40	–	13/32	.1040	9/32	1 15/16	38602*	24.91
	–	44	13/32	.1060	9/32	1 15/16	38603*	26.90
6	32	–	7/16	.1115	5/16	2	38604	24.91
	–	40	7/16	.1170	5/16	2	38605*	29.59
8	32	–	½	.1375	⅜	2⅛	38606	24.91
	–	36	½	.1405	⅜	2⅛	38607*	26.90
10	24	–	⅝	.1545	13/32	2⅜	38608	24.91
	–	32	⅝	.1635	13/32	2⅜	38609	24.91
12	24	–	21/32	.1805	15/32	2⅜	38610	24.91
	–	28	21/32	.1860	15/32	2⅜	38611*	24.91

* Available While Supplies Last

(continued)

Combined Tap and Drill (continued)

List No. 2080 — Fractional

TAP SIZE	THREADS PER INCH NC-UNC	THREADS PER INCH NF-UNF	THREAD LENGTH	DRILL SIZE	DRILL LENGTH	OAL	EDP NO.	LIST PRICE
1/4	20	–	25/32	.2080	17/32	2 1/2	38612	$24.91
	–	28	25/32	.2220	17/32	2 1/2	38613	24.91
5/16	18		15/16	.2660	11/16	2 27/32	38614	34.36
	–	24	15/16	.2770	11/16	2 27/32	38615	37.79
3/8	16	–	1 1/16	.3225	13/16	3 3/8	38616	41.61
	–	24	1 1/16	.3395	13/16	3 3/8	38617	45.77
7/16	14	–	1 1/4	.3770	1	3 3/4	38618	53.30
	–	20	1 1/4	.3955	1	3 3/4	38619	58.63
1/2	13	–	1 3/8	.4350	1 1/8	4 1/16	38620	60.20
	–	20	1 3/8	.4580	1 1/8	4 1/16	38621	66.22

List No. 2080 — Metric

TAP SIZE	THREAD LENGTH	DRILL SIZE	DRILL LENGTH	OAL	EDP NO.	LIST PRICE
M4 × 0.7	1/2	.1340	3/8	2 1/8	38622	$24.95
M5 × 0.8	5/8	.1700	13/32	2 3/8	38623	24.95
M6 × 1	25/32	.2030	17/32	2 1/2	38624	24.95
M8 × 1.25	15/16	.2730	11/16	2 27/32	38625	36.75
M10 × 1.5	1 1/16	.3440	13/16	3 3/8	38626	44.56
M12 × 1.75	1 3/8	.4140	1 1/8	4 1/16	38627	60.30

Adjustable Round Split Dies NPT - Taper Pipe Sizes

Carbon Steel

Adjustable Round Split dies use a set screw for adjustment of the thread size for precision threading applications.

THICKNESS
1 Inch O.D., 3/8 Inch Thick
1 1/2 Inch O.D., 1/2 Inch Thick
2 Inch O.D., 5/8 Inch Thick

List No. 1198

STANDARD PACKAGE All sizes — 1 each

NPT SIZE	1″ O.D. EDP NO.	1″ O.D. LIST PRICE	1 1/2″ O.D. EDP NO.	1 1/2″ O.D. LIST PRICE	2″ O.D. EDP NO.	2″ O.D. LIST PRICE
1/8-27	31251	$24.52	31252	$37.90	—	—
1/4-18	—	—	31253	37.90	31255	$58.72
3/8-18	—	—	31254	37.90	31256	58.72
1/2-14	—	—	—	—	31257	58.72

Adjustable Round Split Dies Machine Screw Sizes

Carbon Steel

Adjustable Round Split dies use a set screw for adjustment of the thread size for precision threading applications.

SIZE	THREADS PER INCH NC UNC	THREADS PER INCH NF UNF	13/16″ O.D. EDP NO.	13/16″ O.D. LIST PRICE
0	—	80	31101	$30.10
1	64	—	31102	30.10
		72	31103	30.10
2	56	—	31104	25.98
	—	64	31105	25.98
3	48	—	31106	25.98
	—	56	31107	25.98
4	—	36*	31108	22.29
	40	—	31109	22.29
	—	48	31110	22.29
5	40	—	31111	19.70
	—	44	31112	19.70

*36 — Pitch properly designated NS

List No. 1190

STANDARD PACKAGE All sizes — 1 each

THICKNESS
13/16″ O.D., 1/4″ Thick
1″ O.D., 3/8″ Thick

SIZE	THREADS/IN. NC UNC	THREADS/IN. NF UNF	13/16″ O.D. EDP NO.	13/16″ O.D. LIST PRICE	1″ O.D. EDP NO.	1″ O.D. LIST PRICE
6	32	—	31113	$19.70	31121	$22.29
	—	40	31114	19.70	—	—
8	32	—	31115	19.70	31122	22.29
	—	36	31116	19.70	—	—
10	24	—	31117	19.70	31123	22.29
	—	32	31118	19.70	31124	22.29
12	24	—	31119	19.70	31125	22.29
	—	28	31120	19.70	—	—

Adjustable Round Split Dies
Fractional Sizes

Carbon Steel

Adjustable Round Split dies use a set screw for adjustment of the thread size for precision threading applications.

THICKNESS

13/16″ O.D., 1/4″ Thick
1″ O.D., 3/8″ Thick
1½″ O.D., 1/2″ Thick
2″ O.D., 5/8″ Thick
2½″ O.D., 3/4″ Thick
3″ O.D., 1″ Thick

List No. 1195

STANDARD PACKAGE All sizes — 1 each

SIZE	THREADS PER INCH NC UNC	NF UNF	NS	13/16″ O.D. EDP NO.	13/16″ O.D. LIST PRICE	1″ O.D. EDP NO.	1″ O.D LIST PRICE	1½″ O.D. EDP NO.	1½″ O.D LIST PRICE	2″ O.D. EDP NO.	2″ O.D. LIST PRICE
1/4	20	—	—	31158	$19.70	31164	$22.29	31177	$34.45	31191	$58.72
	—	28	—	31159	19.70	31165	22.29	31178	34.45	31192	58.72
5/16	18	—	—	31160	19.70	31168	22.29	31179	34.45	31193	58.72
	—	24	—	—	—	31169	22.29	31180	34.45	31194	58.72
3/8	16	—	—	—	—	31171	22.29	31181	34.45	31195	58.72
	—	24	—	—	—	31172	22.29	31182	34.45	31196	58.72
7/16	14	—	—	—	—	31173	22.29	31183	34.45	31197	58.72
	—	20	—	—	—	31174	22.29	31184	34.45	31198	58.72
1/2	13	—	—	—	—	31175	22.29	31185	34.45	31199	58.72
	—	20	—	—	—	31176	22.29	31186	34.45	31200	58.72
9/16	12	—	—	—	—	—	—	31187	34.45	31201	58.72
	—	18	—	—	—	—	—	31188	34.45	31202	58.72

SIZE	THREADS PER INCH NC UNC	NF UNF	NS	1½″ O.D. EDP NO.	1½″ O.D. LIST PRICE	2″ O.D. EDP NO.	2″ O.D LIST PRICE	2½″ O.D. EDP NO.	2½″ O.D LIST PRICE	3″ O.D. EDP NO.	3″ O.D. LIST PRICE
5/8	11	—	—	31189	$34.45	31203	$58.72	31213	$99.31	—	—
	—	18	—	31190	34.45	31204	58.72	—	—	—	—
11/16	—	—	11	—	—	31205	58.72	—	—	—	—
	—	—	16	—	—	31206	58.72	—	—	—	—
3/4	10	—	—	—	—	31207	58.72	31214	99.31	—	—
	—	16	—	—	—	31208	58.72	31215	99.31	—	—
7/8	9	—	—	—	—	31209	58.72	31216	99.31	—	—
	—	14	—	—	—	31210	58.72	31217	99.31	—	—
1	8	—	—	—	—	31211	58.72	31218	99.31	31221	$163.83
	—	12	—	—	—	31212	58.72	31219	99.31	31222	163.83
1 1/8	7	—	—	—	—	—	—	—	—	31224	163.83
	—	12	—	—	—	—	—	—	—	31225	163.83
1 1/4	7	—	—	—	—	—	—	—	—	31226	163.83
	—	12	—	—	—	—	—	—	—	31227	163.83
1 3/8	6	—	—	—	—	—	—	—	—	31228	163.83
	—	12	—	—	—	—	—	—	—	31229	163.83
1 1/2	6	—	—	—	—	—	—	—	—	31230	163.83
	—	12	—	—	—	—	—	—	—	31231	163.83

Adjustable Round Split Dies
High Speed Steel

Adjustable Round Split dies use a set screw for adjustment of the thread size for precision threading applications. **High Speed Steel** dies recommended for longer tool life.

THICKNESS

13/16″ O.D., 1/4″ Thick
1″ O.D., 3/8″ Thick
1½″ O.D., 1/2″ Thick
2″ O.D., 5/8″ Thick

List No. 2190 Machine Screw
List No. 2195 Fractional
List No. 2195M Metric

STANDARD PACKAGE All sizes — 1 each

List No. 2190 Machine Screw

SIZE	THREADS PER INCH NC UNC	NF UNF	13/16″ O.D. EDP NO.	13/16″ O.D. LIST PRICE	1″ O.D. EDP NO.	1″ O.D. LIST PRICE
5	40	—	31501	$33.20	—	—
	—	44	31502	33.20	—	—
6	32	—	31503	33.20	31511	$41.46
	—	40	31504	33.20	—	—
8	32	—	31505	33.20	31512	41.46

SIZE	THREADS PER INCH NC UNC	NF UNF	13/16″ O.D. EDP NO.	13/16″ O.D. LIST PRICE	1″ O.D. EDP NO.	1″ O.D. LIST PRICE
8	—	36	31506	$33.20	—	—
10	24	—	31507	33.20	31513	$41.46
	—	32	31508	33.20	31514	41.46
12	24	—	31509	33.20	31515	41.46
	—	28	31510	33.20	—	—

List No. 2195 Fractional

SIZE	THREADS PER INCH NC UNC	NF UNF	13/16″ O.D. EDP NO.	13/16″ O.D. LIST PRICE	1″ O.D. EDP NO.	1″ O.D. LIST PRICE	1½″ O.D. EDP NO.	1½″ O.D. LIST PRICE	2″ O.D. EDP NO.	2″ O.D. LIST PRICE
¼	20	—	31526	$33.20	31530	$41.46	31538	$66.21	—	—
	—	28	31527	33.20	31531	41.46	31539	66.21	—	—
5/16	18	—	31528	33.20	31532	41.46	31540	66.21	—	—
	—	24	31529	33.20	31533	41.46	31541	66.21	—	—
3/8	16	—	—	—	31534	41.46	31542	66.21	—	—
	—	24	—	—	31535	41.46	31543	66.21	—	—
7/16	14	—	—	—	31536	41.46	31544	66.21	—	—
	—	20	—	—	31537	41.46	31545	66.21	—	—
½	13	—	—	—	—	—	31546	66.21	—	—
	—	20	—	—	—	—	31547	66.21	—	—
9/16	12	—	—	—	—	—	31548	66.21	—	—
	—	18	—	—	—	—	31549	66.21	—	—
5/8	11	—	—	—	—	—	31550	66.21	31552	$115.04
	—	18	—	—	—	—	31551	66.21	31553	115.04
3/4	10	—	—	—	—	—	—	—	31554	115.04
	—	16	—	—	—	—	—	—	31555	115.04
7/8	9	—	—	—	—	—	—	—	31556	115.04
	—	14	—	—	—	—	—	—	31557	115.04

List No. 2195M Metric

SIZE	13/16″ O.D. EDP NO.	13/16″ O.D. LIST PRICE	1″ O.D. EDP NO.	1″ O.D. LIST PRICE
M2.5 × 0.45	31560	$49.19	—	—
M3 × 0.5	31561	49.19	—	—
M3.5 × 0.6	31562	49.19	—	—
M4 × 0.7	31563	49.19	—	—
M4.5 × 0.75	31564	49.19	—	—
M5 × 0.8	31565	49.19	—	—
M6 × 1	31566	49.19	31567	$61.40
M7 × 1	—	—	31568	61.40

SIZE	1″ O.D. EDP NO.	1″ O.D. LIST PRICE	1½″ O.D. EDP NO.	1½″ O.D. LIST PRICE
M8 × 1.25	31569	$61.40	—	—
M10 × 1.5	31570	61.40	—	—
M12 × 1.75	31571	61.40	—	—
M14 × 2	—	—	31572	$97.34
M16 × 2	—	—	31573	97.34
M18 × 2.5	—	—	31574	97.34
M20 × 2.5	—	—	31575	97.34

Hexagon Rethreading Dies

Carbon Steel

Hexagon Rethreading dies are used in repair and maintenance applications to repair existing bruised or rusty threads. They are not recommended for cutting new threads.

STANDARD PACKAGE All sizes — 1 each

List No. 1266 Fractional
List No. 1266M Metric
List No. 1267 Taper Pipe — NPT

List No. 1266 Fractional

SIZE	THREADS PER INCH NC UNC	NF UNF	NS	DIMENSIONS ACROSS FLATS	THICK-NESS	EDP NO.	LIST PRICE
1/4	20	—	—	19/32	1/4	31301	$17.85
	—	28	—	19/32	1/4	31302	17.85
5/16	18	—	—	11/16	5/16	31303	19.93
	—	24	—	11/16	5/16	31304	19.93
3/8	16	—	—	25/32	3/8	31305	20.80
	—	24	—	25/32	3/8	31306	20.80
7/16	14	—	—	7/8	7/16	31307	23.39
	—	20	—	7/8	7/16	31308	23.39
1/2	13	—	—	1 1/16	1/2	31309	25.11
	—	20	—	1 1/16	1/2	31310	25.11
9/16	12	—	—	1 1/16	1/2	31311	26.72
	—	18	—	1 1/16	1/2	31312	26.72
5/8	11	—	—	1 1/4	5/8	31313	30.67
	—	18	—	1 1/4	5/8	31314	30.67
11/16	—	—	11	1 7/16	3/4	31315	34.46
	—	—	16	1 7/16	3/4	31316	34.46
3/4	10	—	—	1 7/16	3/4	31317	$40.84
	—	16	—	1 7/16	3/4	31318	40.84
7/8	9	—	—	1 5/8	7/8	31319	45.91
	—	14	—	1 5/8	7/8	31320	45.91
1	8	—	—	1 13/16	1	31321	52.31
	—	12	—	1 13/16	1	31322	52.31
	—	—	14	1 13/16	1	31323	52.31
1 1/8	7	—	—	2	1	31324	61.38
	—	12	—	2	1	31325	61.38
1 1/4	7	—	—	2 3/16	1	31326	69.25
	—	12	—	2 3/16	1	31327	69.25
1 3/8	6	—	—	2 3/8	1	31328	84.52
	—	12	—	2 3/8	1	31329	84.52
1 1/2	6	—	—	2 9/16	1	31330	94.95
	—	12	—	2 9/16	1	31331	94.95

List No. 1266M Metric

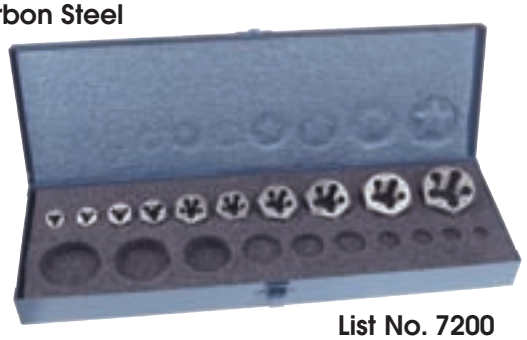
SIZE	DIMENSIONS ACROSS FLATS	THICKNESS	EDP NO.	LIST PRICE
M5 × 0.8	19/32	1/4	31340	$25.44
M6 × 1	19/32	1/4	31341	26.53
M8 × 1.25	11/16	5/16	31342	29.88
M10 × 1.5	7/8	7/16	31343	35.04
M12 × 1.75	1 1/16	1/2	31344	37.96
M14 × 2	1 1/16	1/2	31345	40.14
M16 × 2	1 1/4	5/8	31346	55.70
M20 × 2.5	1 5/8	7/8	31347	68.76

List No. 1267 Taper Pipe — NPT

SIZE	THREADS PER INCH	DIMENSIONS ACROSS FLATS	THICKNESS	EDP NO.	LIST PRICE
1/8	27	1 1/16	3/8	31332	$39.81
1/4	18	1 1/4	5/8	31333	53.23
3/8	18	1 7/16	5/8	31334	77.97
1/2	14	1 5/8	3/4	31335	102.70
3/4	14	2	13/16	31336	132.34
1	11 1/2	2 3/8	1	31337	174.37

Hexagon Rethreading Die Sets

Carbon Steel



List No. 7200

EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
37021	$583.11	37022	$583.11	37023	$760.00
SET NO. 194		SET NO. 195		SET NO. 200	
NC-UNC		NF-UNF		NC-UNC	NF-UNF
1/4 - 20		1/4 - 28		1/4 - 20	1/4 - 28
5/16 - 18		5/16 - 24		5/16 - 18	5/16 - 24
3/8 - 16		3/8 - 24		3/8 - 16	3/8 - 24
7/16 - 14		7/16 - 20		7/16 - 14	7/16 - 20
1/2 - 13		1/2 - 20		1/2 - 13	1/2 - 20
9/16 - 12		9/16 - 18		9/16 - 12	9/16 - 18
5/8 - 11		5/8 - 18		5/8 - 11	5/8 - 18
3/4 - 10		3/4 - 16		3/4 - 10	3/4 - 16
7/8 - 9		7/8 - 14		7/8 - 9	7/8 - 14
1 - 8		1- 12		1 - 8	1 - 12

Tap and Drill Kits

3 Series Available • NC, NF, Metric

ALL KITS INCLUDE

- 10 popular sized high speed steel hand taps.
- 10 popular sized high speed steel screw machine length drills.
- 128 Page Machinist's Guide for Taps.
- Packaged in a durable plastic pouch.

List No. 8001

EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
37103	$112.00	37104	$120.73	37105	$137.55
SET NO. 103 NC TAPS		SET NO. 104 NF TAPS		SET NO. 105 METRIC TAPS	
NC TAPS	DRILLS	NF TAPS	DRILLS	METRIC TAPS	DRILLS
#4-40	#44	#4-48	#43	M3 x 0.5	2.50mm (#40-.0980)
#5-40	#39	#5-44	#38	M3.5 x 0.6	2.87mm (#33-.1130)
#6-32	#36	#6-40	#34	M4 x 0.7	3.28mm (#30-.1285)
#8-32	#30	#8-36	#29	M4.5 x 0.75	3.73mm (#26-.1470)
#10-24	#25	#10-32	#21	M5 x 0.8	4.22mm (#19-.1660)
¼-20	#7	¼-28	#3	M6 x 0.1	4.98mm (#9-.1960)
5/16-18	F	5/16-24	I	M7 x 0.1	5.95mm (15/64-.2344)
3/8-16	5/16	3/8-24	Q	M8 x 1.25	6.75mm (17/64-.2656)
7/16-14	U	7/16-20	W	M10 x 1.5	8.43mm (Q-.3320)
½-13	27/64	½-20	29/64	M12 x 1.75	10.28mm (Y-.4040)

"T" Handle Tap Wrenches

Holds tap sizes indicated and also can be used for driving screw extractors. Split jaw construction gives a positive holding grip enhancing its use for hand operations encompassing light drilling and reaming as well.

Sliding handle with spring tension stop. May be extended for more leverage. Has positive grip knurled nut.

STANDARD PACKAGE All sizes — 1 each

List No. 1149

WRENCH NO.	TAPS CAPACITY INCH	TAPS CAPACITY METRIC	EDP NO.	LIST PRICE
2	0-¼	M1.5-M6.3	30522	$23.70
4	¼ - ½	M6.3-M12.5	30524	34.68

TOOL COATING SERVICE

Morse Cutting tools now offers a variety of tool coatings for enhanced cutting performance and increased tool life. Please inquire.

TiN — Titanium Carbide

TiCN — Titanium Carbonitride

TiALN — Titanium Aluminum Nitride

CrN — Chromium Nitride

Tap Wrenches

STANDARD PACKAGE All sizes — 1 each

List No. 1148

WRENCH NO.	CAPACITY CUTTING SIZE FRACTIONAL TAPS	PIPE TAPS	REAMERS	EDP NO.	LIST PRICE
11	1/16 - 1/4		1/8 - 17/64	30501	$62.52
12	1/16 - 3/8		1/8 - 25/64	30502	99.67
13	5/32 - 1/2	1/8	11/64 - 7/16	30503	120.89
14	5/32 - 3/4	1/8 - 1/4	11/64 - 41/64	30504	131.68
15	1/4 - 1 1/8	1/8 - 3/4	9/32 - 29/32	30505	169.35

Die Stocks

STANDARD PACKAGE All sizes — 1 each

List No. 1179

DIE STOCK NO.	CAPACITY DIE O.D.	DIE THICKNESS	EDP NO.	LIST PRICE
2	13/16	1/4	30512	$43.35
3	1	3/8	30513	49.04
5	1 1/2	1/2	30514	76.76
6	2	5/8	30515	100.48
7	2 1/2	3/4	30516	139.73
8	3	1	30517	239.36

Tap and Die Sets Fractional Sizes

Taps — Plug No. 2046 — HSS
Dies — Round Adjustable No. 1195 — Carbon Steel

List No. 7120

SET NO.	FRACTIONAL SIZES NC-UNC	NF-UNF	TOOL NUMBER TAP WRENCH	DIE STOCK	DIE O.D.	EDP NO.	LIST PRICE
100	1/4 - 20 5/16 - 18 3/8 - 16 7/16 - 14 1/2 - 13	1/4 - 28 5/16 - 24 3/8 - 24 7/16 - 20 1/2 - 20	13	3	1″	37001	$623.81
101	9/16 - 12 5/8 - 11 3/4 - 10 7/8 - 9 1 - 8	9/16 - 18 5/8 - 18 3/4 - 16 7/8 - 14 1 - 12	15	6	2″	37002	1365.60

Tap and Die Set Machine Screw Sizes

Taps — Plug No. 2068 — HSS
Dies — Round Adjustable No. 1190 — Carbon Steel

List No. 7130

SET NO.	MACHINE SCREW SIZES	TOOL NUMBER DIE O.D.	TAP WRENCH	DIE STOCK	EDP NO.	LIST PRICE
31	2-56, 3-48, 4-40, 5-40, 6-32, 8-32 10-24, 10-32, 12-24	13/16″	11	2	37011	$4672.89

Feeds and Speeds for High Speed Steel Drills, Reamers and Taps

MATERIAL	BRINELL HARDNESS (BHN)	DRILLS			REAMERS		TAPS —SPEED (SFM) THREADS PER INCH			
		SPEED (SFM)	POINT	FEED	SPEED (SFM)	FEED	3-7½	8-15	16-24	25-UP
Aluminum	99-101	200-250	118°	M	150-160	M	50	100	150	200
Aluminum bronze	170-187	60	118°	M	40-45	M	12	25	45	60
Bakelite	—	80	60°-90°	M	50-60	M	50	100	150	200
Brass	192-202	200-250	118°	H	150-160	H	50	100	150	200
Bronze, common	166-183	200-250	118°	H	150-160	H	40	80	100	150
Bronze, phosphor, 1/2 hard	187-202	175-180	118°	M	130-140	M	25	40	50	80
Bronze, phosphor, soft	149-163	200-250	118°	H	150-160	H	40	80	100	150
Cast iron, soft	126	140-150	90°	H	100-110	H	30	60	90	140
Cast iron, medium soft	196	80-110	118°	M	50-65	M	25	40	50	80
Cast iron, hard	293-302	45-50	118°	L	67-75	L	10	20	30	40
Cast iron, chilled*	402	15	150°	L	8-10	L	5	5	10	10
Cast steel	286-302	40-50*	118°	L	70-75	L	20	30	40	50
Celluloid	—	100	90°	M	75-80	M	50	100	150	200
Copper	80-85	70	100°	L	45-55	L	40	80	100	150
Drop forgings (steel)	170-196	60	118°	M	40-45	M	12	25	45	60
Duralumin	90-104	200	118°	M	150-160	M	50	100	150	200
Everdur	179-207	60	118°	L	40-45	L	20	30	40	50
Machinery steel	170-196	110	118°	H	67-75	H	35	50	60	85
Magnet steel, soft	241-302	35-40	118°	M	20-25	M	20	40	50	75
Magnet steel, hard*	321-512	15	150°	L	10	L	5	10	15	25
Manganese steel, 7-13*	187-217	15	150°	L	10	L	15	20	25	30
Manganese copper, 30 Mn.*	134	15	150°	L	10-12	L	—	—	—	—
Malleable iron	112-126	85-90	118°	H	—	H	20	30	40	50
Mild steel, .20-.30C	170-202	110-120	118°	H	75-85	H	40	55	70	90
Molybdenum steel	196-235	55	125°	M	35-45	M	20	30	35	45
Monel metal	149-170	50	118°	M	35-38	M	8	10	15	20
Nickel, pure*	187-202	75	118°	L	40	L	25	40	50	80
Nickel steel, 3½%	196-241	60	118°	L	40-45	L	8	10	15	20
Rubber, hard	—	100	60°-90°	L	70-80	L	50	100	150	200
Screw stock, C.R.	170-196	110	118°	H	75	H	20	30	40	50
Spring steel	402	20	150°	L	12-15	L	10	10	15	15
Stainless steel	146-149	50	118°	M	30	M	8	10	15	20
Stainless steel, C.R.*	460-477	20	118°	L	15	L	8	10	15	20
Steel, .40 to .50 C	170-196	80	118°	M	8-10	M	20	30	40	50
Tool, S.A.E., and Forging steel	149	75	118°	H	35-40	H	25	35	45	55
Tool, S.A.E., and Forging steel	241	50	125°	M	12	M	15	15	25	25
Tool, S.A.E., and Forging steel*	402	15	150°	L	10	L	8	10	15	20
Zinc alloy	112-126	200-250	118°	M	150-175	M	50	100	150	200

* Use specially constructed heavy duty drills.

Drill Feed per Revolution (IPR)						Reamer Feed
REFERENCE SYMBOL	DIAMETER OF DRILL					ALL DIAMETERS
	UNDER ⅛	⅛ to ¼	¼ to ½	½ to 1	OVER 1″	Use a feed equal to two or three times that recommended for Drills.
L – Light	.001	.002	.003	.005	.006	
M – Medium	.0015	.003	.006	.010	.012	
H – Heavy	.0025	.005	.010	.020	.025	

SPEEDS and FEEDS shown are suggested starting points only and may be increased or decreased depending on actual material and machining conditions. Start conservatively and increase until the machining cycle is optimized.

TAP SPEEDS may be **increased** for coated taps, spiral point taps, fine pitch taps and when the percentage of thread is decreased.

TAP SPEEDS may need to be **reduced** for spiral flute taps, coarse pitch taps, bottoming taps, difficult materials, longer thread lengths and when the percentage of thread is increased.

THREAD FORMING TAPS generally form threads more efficiently at higher speeds. Suggested speeds are 50% to 100% higher then the suggested speeds for cutting taps in similar applications.

PIPE TAPS speeds should be between one-half and three-quarters of the speeds of taps of comparable diameter and pitch.

Tap Drill Sizes – Standard Taps

While minor diameter limits result in a satisfactory threaded hole, there are cases where a larger hole will save time and tool cost. Tests show that in general the bolt, or external thread, breaks at about 55% thread engagement, and there is very little increase in the strength of the nut when the thread height is increased.

It is, therefore, an advantage for tap users to keep the minor diameter as large as possible. If tapping difficulties continue, the Fine Thread Series should be considered, as the volume of chips are much smaller, and the strength of the internal thread is practically the same.

It must be remembered that usually the part to be tapped is the most valuable and that the balance of strength should be in the tapped hole.

The following table shows both the theoretical percentage of thread represented by the drill size and the percentage that would normally be obtained in drilling based on test data.

Tap Drill Sizes — Probable percentage of full thread produced in tapped hole using stock sizes of drill.

Tap	Tap Drill	Decimal Equiv. of Tap Drill	Theoretical % of Thread	Probable Oversize (Mean)	Probable Hole Size	% of Thread
0-80	56	.0465	83	.0015	.0480	74
	3/64	.0469	81	.0015	.0484	71
1-64	54	.0550	89	.0015	.0565	81
	53	.0595	67	.0015	.0610	59
1-72	53	.0595	75	.0015	.0610	67
	1/16	.0625	58	.0015	.0640	50
2-56	51	.0670	82	.0017	.0687	74
	50	.0700	69	.0017	.0717	62
	49	.0730	56	.0017	.0747	49
2-64	50	.0700	79	.0017	.0717	70
	49	.0730	64	.0017	.0747	56
3-46	48	.0760	85	.0019	.0779	78
	5/64	.0781	77	.0019	.0800	70
	47	.0785	76	.0019	.0804	69
	46	.0810	67	.0019	.0829	60
	45	.0820	63	.0019	.0839	56
3-56	46	.0810	78	.0019	.0829	69
	45	.0820	73	.0019	.0839	65
	44	.0860	56	.0020	.0800	47
4-40	44	.0860	80	.0020	.0880	74
	43	.0890	71	.0020	.0910	65
	42	.0935	57	.0020	.0955	51
	3/32	.0938	56	.0020	.0958	50
4-48	42	.0935	68	.0020	.0955	61
	3/32	.0938	68	.0020	.0958	60
	41	.0960	59	.0020	.0980	52
5-40	40	.0980	83	.0023	.1003	76
	39	.0995	79	.0023	.1018	71
	38	.1015	72	.0023	.1038	65
	37	.1040	65	.0023	.1063	58
5-44	38	.1015	79	.0023	.1038	72
	37	.1040	71	.0023	.1063	63
	36	.1065	63	.0023	.1088	55
6-32	37	.1040	84	.0023	.1063	78
	36	.1065	78	.0023	.1088	72
	7/64	.1094	70	.0026	.1130	64
	35	.1100	69	.0026	.1126	63
	34	.1110	67	.0026	.1136	60
	33	.1130	62	.0026	.1156	55

Tap	Tap Drill	Decimal Equiv. of Tap Drill	Theoretical % of Thread	Probable Oversize (Mean)	Probable Hole Size	% of Thread
6-40	34	.1110	83	.0026	.1136	75
	33	.1130	77	.0026	.1156	69
	32	.1160	68	.0026	.1186	60
8-32	29	.1360	69	.0029	.1389	62
	28	.1405	58	.0029	.1434	51
8-36	29	.1360	78	.0029	.1389	70
	28	.1405	68	.0029	.1434	57
	9/64	.1406	68	.0029	.1435	57
10-24	27	.1440	85	.0032	.1472	79
	26	.1470	79	.0032	.1502	74
	25	.1495	75	.0032	.1527	69
	24	.1520	70	.0032	.1552	64
	23	.1540	67	.0032	1572	61
	5/32	.1563	62	.0032	.1595	56
	2	.1570	61	.0032	.1602	55
10-32	5/32	.1563	83	.0032	.1595	75
	22	.1570	81	.0032	.1602	73
	21	.1590	76	.0032	.1622	68
	20	.1610	71	.0032	.1642	64
	19	.1660	59	.0032	.1692	51
12-24	11/64	.1719	82	.0035	.1754	75
	17	.1730	79	.0035	.1765	73
	16	.1770	72	.0035	.1805	66
	15	.1800	67	.0035	.1835	60
	14	.1820	63	.0035	.1855	56
12-28	16	.1770	84	.0035	.1805	77
	15	.1800	78	.0035	.1835	70
	14	.1820	73	.0035	.1855	66
	13	.1850	67	.0035	.1885	59
	3/16	.1875	61	.0035	.1910	54
1/4-20	9	.1960	83	.0038	.1998	77
	8	.1990	79	.0038	.2028	73
	7	.2010	75	.0038	.2048	70
	13/64	.2031	72	.0038	.2069	66
	6	.2040	71	.0038	.2078	65
	5	.2055	69	.0038	.2093	63
	4	.2090	63	.0038	.2128	57
1/4-28	3	.2130	80	.0038	.2168	72
	7/32	.2188	67	.0038	.2226	59
	2	.2210	63	.0038	.2248	55

(continued)

Tap Drill Sizes – Standard Taps (continued)

Tap Drill Sizes — Probable percentage of full thread produced in tapped hole using stock sizes of drill.

Tap	Tap Drill	Decimal Equiv. of Tap Drill	Theoretical % of Thread	Probable Oversize (Mean)	Probable Hole Size	% of Thread
5/16-18	F	.2570	77	.0038	.2608	72
	G	.2610	71	.0041	.2651	66
	17/64	.2656	65	.0041	.2697	59
	H	.2660	64	.0041	.2701	59
5/16-24	H	.2660	86	.0041	.2701	78
	I	.2720	75	.0041	.2761	67
	J	.2770	66	.0041	.2811	58
3/8-16	5/16	.3125	77	.0044	.3169	72
	O	.3160	73	.0044	.3204	68
	P	.3230	64	.0044	.3274	59
3/8-24	21/64	.3281	87	.0044	.3325	79
	Q	,3320	79	.0044	.3364	71
	R	.3390	67	.0044	.3434	58
7/16-14	T	.3580	86	.0046	.3626	81
	23/64	.3594	84	.0046	.3640	79
	U	.3680	75	.0046	.3726	70
	3/8	.3750	67	.0046	.3796	62
	V	.3770	65	.0046	.3816	60
7/16-20	W	.3860	79	.0046	.3906	72
	25/64	.3906	72	.0046	.3952	65
	X	.3970	62	.0046	.4016	55
1/2-13	27/64	.4219	78	.0047	.4266	73
	7/16	.4375	63	.0047	.4422	58
1/2-20	29/64	.4531	72	.0047	.4578	65
9/16-12	15/32	.4688	87	.0048	.4736	82
	31/64	.4844	72	.0048	.4892	68
9/16-18	1/2	.500	87	.0048	.5048	80
	33/64	.5156	65	.0048	.5204	58
5/8-11	17/32	.5313	79	.0049	.5362	75
	35/64	.5469	66	.0049	.5518	62
5/8-18	9/16	.5625	87	.0049	.5674	80
	37/64	.5781	65	.0049	.5831	58
3/4-10	41/64	.6406	84	.0050	.6456	80
	21/64	.6563	72	.0050	.6613	68
3/4-16	11/16	.6875	77	.0050	.6925	71
7/8-9	49/64	.7656	76	.0052	.7708	72
	25/32	.7812	65	.0052	7864	61

Tap	Tap Drill	Decimal Equiv. of Tap Drill	Theoretical % of Thread	Probable Oversize (Mean)	Probable Hole Size	% of Thread
7/8-14	51/64	.7969	84	.0052	.8021	79
	13/16	.8125	67	.0052	.8177	62
1-8	55/64	.8594	87	.0059	.8653	83
	7/8	.8750	77	.0059	.8809	73
	57/64	.8906	67	.0059	.8965	64
	29/32	.9063	58	.0059	.9122	54
1-12	29/32	.9063	87	.0059	.9122	81
	59/64	.9219	72	.0060	9279	67
	15/16	.9375	58	.0060	.9435	52
1-14	59/64	.9219	84	.0060	.9279	78
	15/16	.9375	67	.0060	.9435	61
1 1/8-7	31/32	.9688	84	.0062	.9750	81
	63/64	.9844	76	.0067	.9911	72
	1	1.0000	67	.0070	1.0070	64
	1 1/64	1.0156	59	.0070	1.0226	55
1 1/8-12	1 1/32	1.0313	87	.0071	1.0384	80
	1 3/64	1.0469	72	.0072	1.0541	66
1 1/4-7	1 3/32	1.0938	84	Reaming Recommended		
	1 7/64	1.1094	76			
	1 1/8	1.1250	67			
1 1/4-12	1 5/32	1.1563	87			
	1 11/64	1.1719	72			
1 3/8-6	1 3/16	1.1875	87			
	1 13/64	1.2031	79			
	1 7/32	1.2188	72			
	1 15/64	1.2344	65			
1 3/8-12	1 9/32	1.2813	87			
	1 19/64	1.2969	72			
1 1/2-6	1 5/16	1.3125	87			
	1 21/64	1.3281	79			
	1 11/32	1.3438	72			
	1 23/64	1.3594	65			
1 1/2 12	1 13/32	1.4063	87			
	1 27/64	1.4219	72			

Formula for Obtaining Tap Drill Sizes for Cutting Taps:

$$\text{Major Dia. of Thread} - \frac{.01299 \times \text{Amt. of percentage of full thread}}{\text{No. of threads per inch}} = \text{Drilled Hole* Size}$$

Note: Select nearest commercial stock drill.

Percentage of Full Thread for Other Drill Sizes

$$\text{No. of Threads per Inch} \times \frac{\text{Major Dia. Selected of Thread} - \text{Drill Dia.}}{.01299} = \text{Percentage of Full Thread}$$

Formula For Obtaining Tap Drill Sizes For Thread Forming Taps:

$$\text{*Drill Hole Size (inches)} = \text{Basic Major Dia. of thread (inches)} - .0068 \times \frac{\text{Percentage of Full Thread}}{\text{No. of Threads per Inch}}$$

$$\text{*Drilled Hole Size (mm)} = \text{Basic Major Dia. of thread (mm)} - \frac{\text{Percentage of Full Thread} \times \text{mm Pitch}}{147.06}$$

*Note: Drill size should be smaller than hole size by the probable amount the drill will cut oversize.

Tap Drill Sizes – Fluteless Thead Forming Taps

These taps are used in the same manner as conventional taps but require a larger hole size since the material is actually cold formed to produce the thread.

It is recommended that 65% of thread be used since this usually results in maximum efficiency and tool life.

The chart shown has been derived from formulas and research statistics and can be generally used. Slight deviations may occasionally be necessary when using oversized taps or in tapping metals at the extreme ranges of ductility.

Machine Screw & Fractional

Tap Size		75% Thread		70% Thread		65% Thread		60% Thread		55% Thread		50% Thread	
		Theoretical Hole Size	Nearest Drill Size	Theoretical Hole Size	Nearest Drill Size	Theoretical Hole Size	Nearest Drill Size	Theoretical Hole Size	Nearest Drill Size	Theoretical Hole Size	Nearest Drill Size	Theoretical Hole Size	Nearest Drill Size
0	80	.0536	1.35mm	.0540	1.35mm	.0545	—	.0549	54	.0554	54	.0558	1.4mm
1	64	.0650	1.65mm	.0655	1.65mm	.0661	—	.0666	—	.0672	51	.0677	51
	72	.0659	1.65mm	.0663	—	.0669	1.7mm	.0673	51	.0679	51	.0683	—
2	56	.0769	1.95mm	.0774	1.95mm	.0781	5/64	.0787	47	.0794	2mm	.0799	—
	64	.0780	5/64	.0785	47	.0791	2mm	.0796	2mm	.0802	—	.0807	2.05mm
3	48	.0884	2.25mm	.0890	43	.0898	43	.0905	2.3mm	.0913	2.3mm	.0919	—
	56	.0899	43	.0904	—	.0911	2.3mm	.0917	2.3mm	.0924	2.35mm	.0929	2.35mm
4	40	.0993	2.5mm	.1000	39	.1010	39	.1018	38	.1028	2.6mm	.1035	2.6mm
	48	.1014	38	.1020	38	.1028	2.6mm	.1035	2.6mm	.1043	37	.1049	37
5	40	.1123	34	.1130	33	.1140	33	.1148	2.9mm	.1158	32	.1165	32
	44	.1134	33	.1141	2.9mm	.1150	2.9mm	.1157	—	.1166	32	.1173	32
6	32	.1221	3.1mm	.1230	3.1mm	.1243	—	.1252	1/8	.1264	3.2mm	.1274	—
	40	.1253	1/8	.1260	3.2mm	.1270	3.2mm	.1278	3.25mm	.1288	30	.1295	30
8	32	.1481	3.75mm	.1490	—	.1503	25	.1512	3.8mm	.1524	24	.1534	3.9mm
	36	.1498	25	.1507	3.8mm	.1518	24	.1526	24	.1537	3.9mm	.1546	23
10	24	.1688	—	.1700	18	.1717	11/64	.1729	11/64	.1746	17	.1758	—
	32	.1741	17	.1750	—	.1763	—	.1772	16	.1784	4.5mm	.1794	—
12	24	.1948	10	.1960	9	.1977	5mm	.1989	8	.2006	5.1mm	.2018	7
	28	.1978	5mm	.1989	8	.2006	8	.2014	7	.2028	—	.2039	13/64
1/4	20	.2245	5.7mm	.2260	—	.2280	1	.2295	1	.2315	—	.2330	5.9mm
	28	.2318	—	.2329	5.9mm	.2343	A	.2354	15/64	.2368	6mm	.2379	B
5/16	18	.2842	7.2mm	.2861	7.25mm	.2879	7.3mm	.2898	L	.2917	7.4mm	.2936	—
	24	.2912	7.4mm	.2927	—	.2941	M	.2955	7.5mm	.2969	19/64	.2983	7.6mm
3/8	16	.3431	11/32	.3452	8.75mm	.3474	S	.3495	8.9mm	.3516	—	.3537	9mm
	24	.3537	9mm	.3552	9mm	.3566	—	.3580	T	.3594	23/64	.3608	—
7/16	14	.4011	—	.4035	Y	.4059	13/32	.4084	—	.4108	—	.4132	Z
	20	.4120	Z	.4137	10.5mm	.4154	—	.4171	—	.4188	—	.4205	—
1/2	13	.4608	—	.4634	—	.4660	—	.4686	—	.4712	12mm	.4738	12mm
	20	.4745	—	.4762	—	.4779	—	.4796	15/32	.4813	—	.4830	31/64
9/16	12	.5200	—	.5229	—	.5257	—	.5285	—	.5313	17/32	.5342	17/32
	18	.5342	13.5mm	.5361	—	.5380	—	.5398	—	.5417	—	.5436	35/64
5/8	11	.5787	37/64	.5817	37/64	.5848	—	.5879	—	.5910	15mm	.5941	—
	18	.5967	19/32	.5986	—	.6004	—	.6023	—	.6042	—	.6061	19/32
3/4	10	.6990	—	.7024	—	.7058	45/64	.7092	18mm	.7126	—	.7160	—
	16	.7181	23/32	.7202	23/32	.7224	—	.7245	—	.7266	—	.7287	18.5mm

Metric

Tap Size	75% Thread		65% Thread		55% Thread	
	Theoretical Hole Size	Nearest Drill Size	Theoretical Hole Size	Nearest Drill Size	Theoretical Hole Size	Nearest Drill Size
M1.6 × 0.35	.057	1.45mm	.058	1.45mm	.059	#53
M1.8 × 0.35	.064	#52	.065	#52	.066	#51
M2 × 0.4	.072	1.85mm	.073	#49	.074	#49
M2.2 × 0.45	.078	5/64	.079	2mm	.080	#46
M2.5 × 0.45	.089	#43	.091	#43	.092	#42
M3 × 0.5	.110	#35	.111	#34	.112	#33
M3.5 × 0.6	.128	#30	.129	3.3mm	.130	3.3mm
M4 × 0.7	.145	3.7mm	.146	3.7mm	.148	#26
M5 × 0.8	.183	#14	.184	#13	.185	#13
M6 × 1	.218	7/32″	.220	#2	.222	#1
M8 × 1.25	.291	7.4mm	.294	M	.296	19/64″
M10 × 1.5	.365	9.3mm	.368	U	.371	U
M12 × 1.75	.439	7/16″	.442	7/16″	.446	29/64″
M14 × 2	.512	13mm	.516	33/64″	.520	33/64″
M16 × 2	.591	15mm	.595	19/32″	.599	19/32″
M18 × 2.5	.659	16.75mm	.665	17mm	.672	43/64″
M20 × 2.5	.737	18.75mm	.742	18.75mm	.747	3/4″
M24 × 3	.885	22.5mm	.893	57/64″	.901	23mm

Tap Drill Sizes – STI (Screw Thread Insert) Taps

STI TAP SIZE	ALUMINUM				STEEL, PLASTIC, MAGNESIUM			
	TAP DRILL SIZE	DECIMAL EQUIV. OF TAP DRILL (INCHES)	MINOR DIA. LIMITS (AFTER TAPPING)		TAP DRILL SIZE	DECIMAL EQUIV. OF TAP DRILL (INCHES)	MINOR DIA. LIMITS (AFTER TAPPING)	
			MIN.	MAX.			MIN.	MAX.
4 - 40	#31	.1200	.116	.121	#31	.1200	.119	.124
5 - 40	#30	.1285	.128	.133	#29	.1360	.131	.136
6 - 32	#25	.1495	.144	.150	#25	.1495	.148	.154
6 - 40	#26	.1470	.144	.149	#25	.1495	.148	.153
8 - 32	#17	.1730	.170	.176	#16	.1770	.174	.180
10- 24	13/64	.2031	.199	.205	#5	.2055	.203	.209
10 - 32	#7	.2010	.196	.202	13/64	.2031	.200	.206
12 - 24	#2	.2210	.221	.227	#1	.2280	.225	.231
1/4 - 20	17/64	.2656	.261	.267	17/64	.2656	.265	.271
1/4 - 28	G	.2610	.257	.264	17/64	.2656	.261	.268
5/16 - 18	Q	.3320	.328	.334	Q	.3320	.331	.337
5/16 - 24	21/64	.3281	.323	.330	Q	.3320	.327	.334
3/8 - 16	X	.3970	.390	.398	X	.3970	.396	.402
3/8 - 24	25/64	.3906	.385	.392	25/64	.3906	.389	.396
7/16 - 14	29/64	.4531	.453	.463	15/32	.4687	.461	.471
7/16 - 20	29/64	.4531	.450	.458	29/64	.4531	.453	.461
1/2 - 13	33/64	.5156	.515	.525	17/32	.5312	.523	.533
1/2 - 20	33/64	.5156	.513	.522	33/64	.5156	.515	.524

NOTE: Tap Drills listed above should produce holes within the required limits. However, variations in material and equipment may require the use of drills which are larger or smaller than those recommended.

NOTE: Minor Diameter Limits for steel, plastic, and magnesium are such as to allow for material contraction and provide maximum tap life.

SPECIAL TAPS FAST QUOTE SERVICE

Call Morse Cutting Tools for all of your special tap needs.
To expedite your quote please provide the following information:

TAP SIZE _____ CLASS of FIT or H LIMIT _____ # of FLUTES _____

TYPE of TAP _____ SURFACE TREATMENT _____

MATERIAL to be THREADED _____ HARDNESS _____

BLIND or THROUGH HOLE _____ LENGTH of THREAD _____

# of HOLES to TAP _____ TAPPING EQUIPMENT USED _____

CURRENT TAP USED _____ TAPPING PROBLEM _____

Fluteless Thread Forming Taps
Class of Fit Recommendations

These tap recommendations will produce the specified class of fit in most applications. Threads produced should be checked with thread plug gages to ensure that the threads meet required specifications. Threads that gage loose or tight may require experimentation with taps of lower or higher pitch diameter limit ("H" or "D" number).

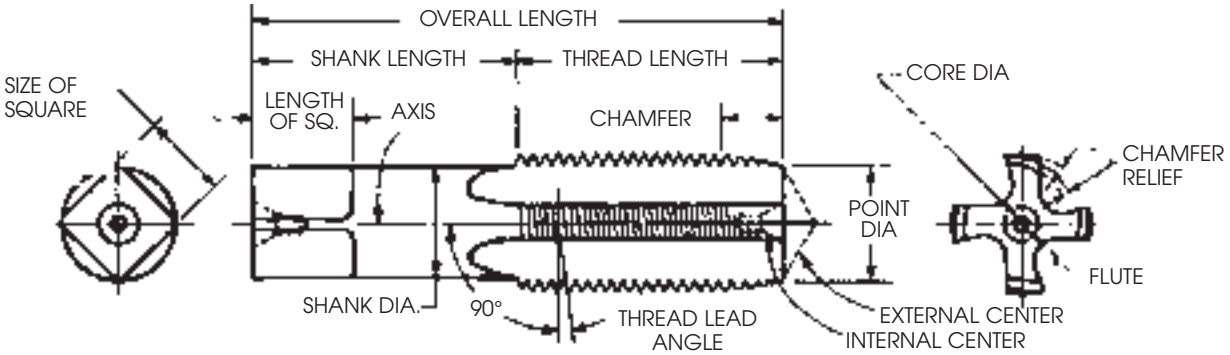
Machine Screw & Fractional

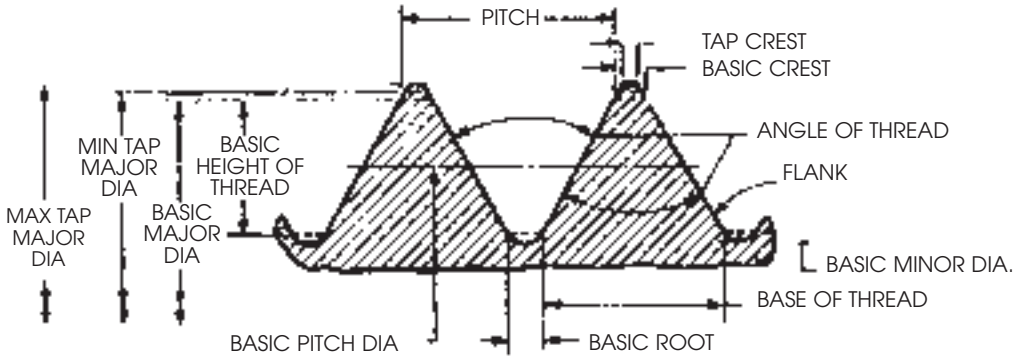
SIZE	THREADS PER INCH		"H" LIMIT for CLASS of FIT		
	NC UNC	NF UNF	2	2B	3B
0	80	—	H2	H3	H2
1	64	—	H2	H3	H2
	—	72	H2	H3	H2
2	56	—	H2	H3	H2
	—	64	H2	H3	H2
3	48	—	H2	H3	H2
	—	56	H2	H3	H2
4	40	—	H3	H5	H3
	—	48	H3	H5	H3
5	40	—	H3	H5	H3
	—	44	H3	H5	H3
6	32	—	H3	H5	H3
	—	40	H3	H5	H3
8	32	—	H3	H5	H3
	—	36	H3	H5	H3
10	24	—	H4	H6	H4
	—	32	H4	H6	H4
12	24	—	H4	H6	H4
	—	28	H4	H6	H4
1/4	20	—	H4	H6	H4
	—	28	H4	H6	H4
5/16	18	—	H5	H7	H5
	—	24	H5	H7	H5
3/8	16	—	H5	H7	H5
	—	24	H5	H7	H5
7/16	14	—	H5	H8	H5
	—	20	H5	H8	H5
1/2	13	—	H5	H8	H5
	—	20	H5	H8	H5
9/16	12	—	H7	H10	H7
	—	18	H7	H10	H7
5/8	11	—	H7	H10	H7
	—	18	H7	H10	H7
3/4	10	—	H7	H10	H7
	—	16	H7	H10	H7

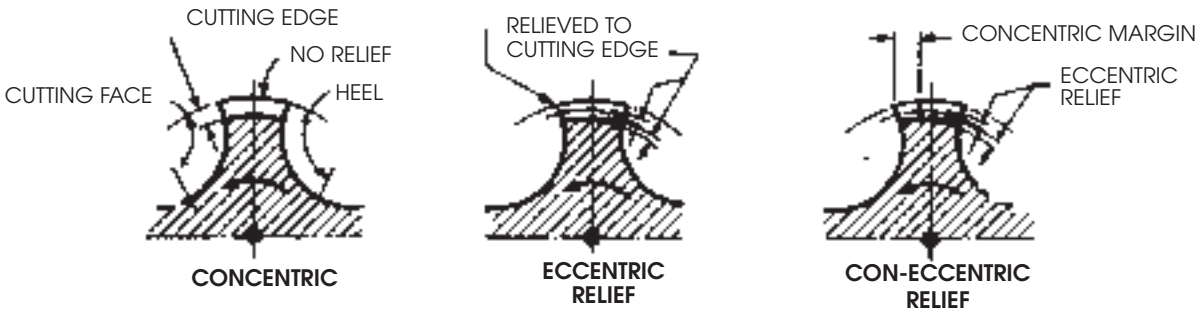
Metric

SIZE	PITCH	"D" LIMIT for CLASS of FIT	
		4H	6H
M3	0.5	D3	D5
M4	0.7	D4	D6
M5	0.8	D4	D7
M6	1	D5	D8
M8	1.25	D5	D9
M10	1.5	D6	D10
M12	1.75	D6	D11
M14	2	D7	D11
M16	2	D7	D12
M20	2.5	D7	D12

Tap Terminology







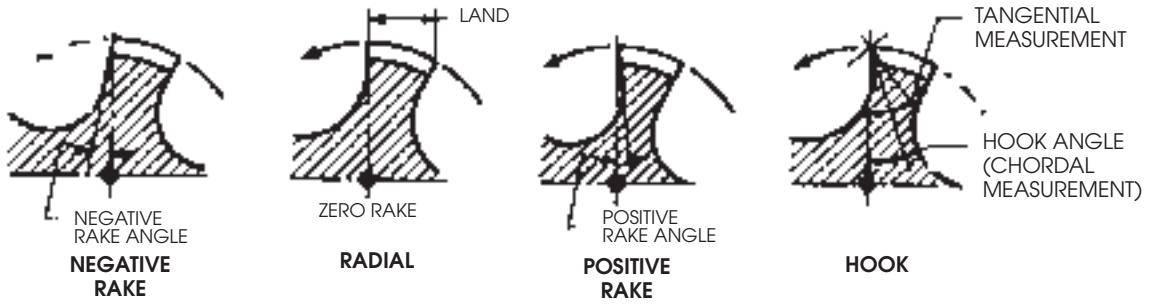
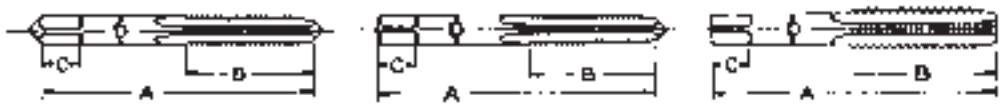


Table 302 — Hand Taps



General Dimensions

NOMINAL DIA. RANGE-INCHES		MACHINE SCREW SIZE NO.	NOMINAL FRACTIONAL DIAMETER (INCHES)	NOMINAL METRIC DIAMETER (MM)	STYLE	TAP DIMENSIONS —INCHES				
OVER	TO (Incl.)					LENGTH OVERALL A	THREAD LENGTH B	SQUARE LENGTH C	SHANK DIAMETER D	SIZE OF SQUARE E
.052	.065	0	1/16	M1.6	1	1 5/8	5/16	3/16	.141	.110
.065	.078	1	—	M1.8	1	1 11/16	3/8	3/16	.141	.110
.078	.091	2	—	M2, M2.2	1	1 3/4	7/16	3/16	.141	.110
.091	.104	3	3/32	M2.5	1	1 13/16	1/2	3/16	.141	.110
.104	.117	4	—	—	1	1 7/8	9/16	3/16	.141	.110
.117	.130	5	1/8	M3, M3.15	1	1 15/16	5/8	3/16	.141	.110
.130	.145	6	—	M3.5	1	2	11/16	3/16	.141	.110
.145	.171	8	5/32	M4	1	2 1/8	3/4	1/4	.168	.131
.171	.197	10	3/16	M4.5, M5	1	2 3/8	7/8	1/4	.194	.152
.197	.223	12	7/32	—	1	2 3/8	15/16	9/32	.220	.165
.223	.260	14	1/4	M6, M6.3	2	2 1/2	1	5/16	.255	.191
.260	.323		5/16	M7, M8	2	2 23/32	1 1/8	3/8	.318	.238
.323	.395		3/8	M10	2	2 15/16	1 1/4	7/16	.381	.286
.395	.448		7/16	—	3	3 5/32	1 7/16	13/32	.323	.242
.448	.510		1/2	M12, M12.5	3	3 3/8	1 21/32	7/16	.367	.275
.510	.573		9/16	M14	3	3 19/32	1 21/32	1/2	.429	.322
.573	.635		5/8	M16	3	3 13/16	1 13/16	9/16	.480	.360
.635	.709		11/16	M18	3	4 1/32	1 13/16	5/8	.542	.406
.709	.760		3/4	—	3	4 1/4	2	11/16	.590	.442
.760	.823		13/16	M20	3	4 15/32	2	11/16	.652	.489
.823	.885		7/8	M22	3	4 11/16	2 7/32	3/4	.697	.523
.885	.948		15/16	M24	3	4 29/32	2 7/32	3/4	.760	.570
.948	1.010		1	M25	3	5 1/8	2 1/2	13/16	.800	.600
1.010	1.073		1 1/16	M27	3	5 1/8	2 1/2	7/8	.896	.672
1.073	1.135		1 1/8	—	3	5 7/16	2 9/16	7/8	.896	.672
1.135	1.198		1 3/16	M30	3	5 7/16	2 9/16	1	1.021	.766
1.198	1.260		1 1/4	—	3	5 3/4	2 9/16	1	1.021	.766
1.260	1.323		1 5/16	M33	3	5 3/4	2 9/16	1 1/16	1.108	.831
1.323	1.385		1 3/8	—	3	6 1/16	3	1 1/16	1.108	.831
1.385	1.448		1 7/16	M36	3	6 1/16	3	1 1/8	1.233	.925
1.448	1.510		1 1/2	—	3	6 3/8	3	1 1/8	1.233	.925
1.510	1.635		1 5/8	M39	3	6 11/16	3 3/16	1 1/8	1.305	.979
1.635	1.760		1 3/4	M42	3	7	3 3/16	1 1/4	1.430	1.072
1.760	1.885		1 7/8	—	3	7 5/16	3 9/16	1 1/4	1.519	1.139
1.885	2.010		2	M48	3	7 5/8	3 9/16	1 3/8	1.644	1.233
2.010	2.135		2 1/8	—	3	8	3 9/16	1 3/8	1.769	1.327
2.135	2.260		2 1/4	M56	3	8 1/4	3 9/16	1 7/16	1.894	1.420
2.260	2.385		2 3/8	—	3	8 1/2	4	1 7/16	2.019	1.514
2.385	2.510		2 1/2	—	3	8 3/4	4	1 1/2	2.100	1.575
2.510	2.635		2 5/8	M64	3	8 3/4	4	1 1/2	2.225	1.669
2.635	2.760		2 3/4	—	3	9 1/4	4	1 9/16	2.350	1.762
2.760	2.885		2 7/8	M72	3	9 1/4	4	1 9/16	2.475	1.856

(continued)

Table 302 — Hand Taps (continued)

General Dimensions

NOMINAL DIA. RANGE-INCHES		MACHINE SCREW SIZE NO.	NOMINAL FRACTIONAL DIAMETER (INCHES)	NOMINAL METRIC DIAMETER (MM)	STYLE	TAP DIMENSIONS —INCHES				
OVER	TO (Incl.)					LENGTH OVERALL A	THREAD LENGTH B	SQUARE LENGTH C	SHANK DIAMETER D	SIZE OF SQUARE E
2.885	3.010		3	—	3	9¾	4⁹⁄₁₆	1⅝	2.543	1.907
3.010	3.135		3⅛	—	3	9¾	4⁹⁄₁₆	1⅝	2.668	2.001
3.135	3.260		3¼	M80	3	10	4⁹⁄₁₆	1¾	2.793	2.095
3.260	3.385		3⅜	—	3	10	4⁹⁄₁₆	1¾	2.883	2.162
3.385	3.510		3½	—	3	10¼	4¹⁵⁄₁₆	2	3.008	2.256
3.510	3.635		3⅝	M90	3	10¼	4¹⁵⁄₁₆	2	3.133	2.350
3.635	3.760		3¾	—	3	10½	5⁵⁄₁₆	2⅛	3.217	2.413
3.760	3.885		3⅞	—	3	10½	5⁵⁄₁₆	2⅛	3.342	2.506
3.885	4.010		4	M100	3	10¾	5⁵⁄₁₆	2¼	3.467	2.600

Tolerances

ELEMENT	NOMINAL DIAMETER RANGE —INCHES		DIRECTION	TOLERANCE — INCHES
	OVER	TO (Incl.)		
Length Overall — A	.052	1.010	Plus or Minus	1⁄32
	1.010	4.010	Plus or Minus	1⁄16
Length of Thread — B	.052	.223	Plus or Minus	3⁄64
	.223	.510	Plus or Minus	1⁄16
	.510	1.510	Plus or Minus	3⁄32
	1.510	4.010	Plus or Minus	⅛
Length of Square — C	.052	1.010	Plus or Minus	1⁄32
	1.010	4.010	Plus or Minus	1⁄16
Diameter of Shank — D	.052	.223	Minus	.0015
	.223	.635	Minus	.0015
	.635	1.010	Minus	.002
	1.010	1.510	Minus	.002
	1.510	2.010	Minus	.003
	2.010	4.010	Minus	.003
Size of Square — E	.052	.510	Minus	.004
	.510	1.010	Minus	.006
	1.010	2.010	Minus	.008
	2.010	4.010	Minus	.010

Special Taps

Unless otherwise specified:
Special taps over 1.010" to 1.510" diameter inclusive, having 14 or more threads per inch or 1.75 millimeter pitch and finer, and sizes over 1.510" diameter with 10 or more threads per inch or 2.5 millimeter pitch and finer, are made to general dimensions shown in Table 303.

Special ground thread taps are made to limits shown in Table 331 for Unified Inch Screw Threads and Table 341 for Metric M-Profile Screw Threads.

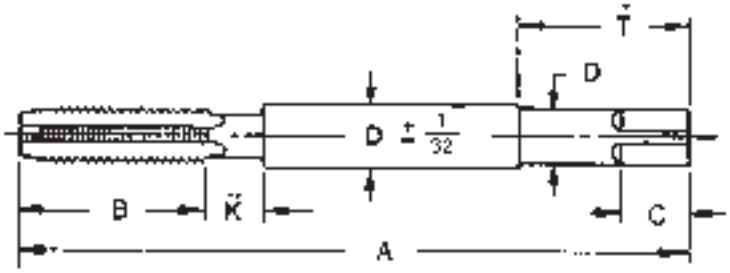
Notes

Ground thread taps, sizes .395" and smaller, have external center on thread end (may be removed on bottoming taps). Sizes .223" and smaller have external center on shank end; sizes .224" thru .395" have truncated partial cone centers on shank end (length of cone approximately 1/4 of diameter shank). Sizes over .395" have internal center in thread and shank ends.

For standard thread limits and tolerances for Unified Inch Screw Threads see Table 327 and for Metric Threads see Table 337.

For eccentricity tolerances of tap elements see Table 317.

Table 310 — Ground Thread Pulley Taps



General Dimensions

DIAMETER OF TAP INCHES	DIMENSIONS - INCHES						
	LENGTH OVERALL A	LENGTH OF THREAD B	LENGTH OF SQUARE C	DIA. OF SHANK D	LENGTH OF CLOSE TOLERANCE T*	SIZE OF SQUARE E	LENGTH OF NECK K
1/4	6, 8	1	5/16	.255	1 1/2	.191	3/8
5/16	6, 8	1 1/8	3/8	.318	1 9/16	.238	3/8
3/8	6, 8, 10	1 1/4	7/16	.381	1 5/8	.286	3/8
7/16	6, 8	1 7/16	1/2	.444	1 11/16	.333	7/16
1/2	6, 8, 10, 12	1 21/32	9/16	.507	1 11/16	.380	1/2
5/8	6, 8, 10, 12	1 13/16	11/16	.633	2	.475	5/8
3/4	10, 12	2	3/4	.759	2 1/4	.569	3/4

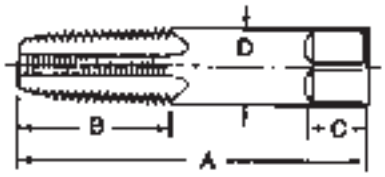
Tolerances

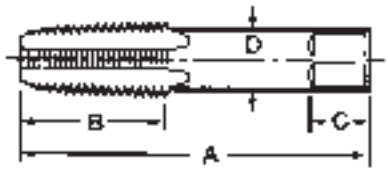
ELEMENT	RANGE	DIRECTION	TOLERANCE
Length Overall — A	1/4" to 3/4" incl.	Plus or Minus	1/16"
Length of Thread — B	1/4" to 3/4" incl.	Plus or Minus	1/16"
Length of Square — C	1/4" to 3/4" incl.	Plus or Minus	1/32"
Diameter of Shank — D	1/4" to 3/4" incl.	Minus	.005"
Size of Square — E	1/4" to 1/2" incl. 5/8" to 3/4" incl.	Minus Minus	.004" .006"

Formulae (Approximate)
Diameter of Shank "D" = Maximum Major Diameter.
Size of Square = Diameter of Shank "D" x .75 to nearest .001"

Notes
*T is minimum length of shank which is held to eccentricity tolerances.
**Optional with manufacturer.

Table 311
Ground Thread Pipe Taps





General Dimensions

NOMINAL SIZE INCHES	DIMENSIONS - INCHES				
	LENGTH OVERALL A	LENGTH OF THREAD B	LENGTH OF SQUARE C	DIA. OF SHANK D	SIZE OF SQUARE E
1/16	2 1/8	11/16	3/8	.3125	.234
1/8	2 1/8	3/4	3/8	.3125	.234
1/8	2 1/8	3/4	3/8	.4375	.328
1/4	2 7/16	1 1/16	7/16	.5625	.421
3/8	2 9/16	1 1/16	1/2	.7000	.531
1/2	3 1/8	1 3/8	5/8	.6875	.515
3/4	3 1/4	1 3/8	11/16	.9063	.679
1	3 3/4	1 3/4	13/16	1.1250	.843
1 1/4	4	1 3/4	15/16	1.3125	.984
1 1/2	4 1/4	1 3/4	1	1.5000	1.125
2	4 1/2	1 3/4	1 1/8	1.8750	1.406
2 1/2	5 1/2	2 9/16	1 1/4	2.2500	1.687
3	6	2 5/8	1 3/8	2.6250	1.968
3 1/2	6 1/2	2 11/16	1 1/2	2.8125	2.108
4	6 3/4	2 3/4	1 5/8	3.0000	2.250

Tolerances

ELEMENT	RANGE	DIRECTION	TOLERANCE
Length Overall — A	1/16" to 3/4" incl.	Plus or Minus	1/32"
	1" to 4" incl.	Plus or Minus	1/16"
Length of Thread — B	1/16" to 3/4" incl.	Plus or Minus	1/16"
	1" to 1 1/4" incl.	Plus or Minus	3/32"
	1 1/2" to 4" incl.	Plus or Minus	1/8"
Length of Square — C	1/16" to 3/4" incl.	Plus or Minus	1/32"
	1" to 4" incl.	Plus or Minus	1/16"
Diameter of Shank — D	1/16" to 1/8" incl.	Minus	.0015"
	1/4" to 1/2" incl.	Minus	.0020"
	3/4" to 1" incl.	Minus	.0020"
	1 1/4" to 4" incl.	Minus	.0030"
Size of Square — E	1/16" to 1/8" incl.	Minus	.0040"
	1/8" to 3/4" incl.	Minus	.0060"
	1" to 4" incl.	Minus	.0080"

Useful Formulas

FEEDS AND SPEEDS	
SFM	.262 x DIA. x RPM
RPM	3.82 x SFM/DIA.
IPM	IPR x #teeth x RPM
IPT	IPM / (#teeth x RPM)
IPR	IPM / RPM
CIM	IPR x SPD. X DOC
HP	CIM x UHF

END MILLS

(continued)

END MILLS (continued)

COBALT - ROUGHING (continued)

HIGH SPEED STEEL - SINGLE END

HIGH SPEED STEEL - DOUBLE END

HIGH SPEED STEEL - ROUGHING

SETS

TECHNICAL DATA

variFLUTE

Variable Flute AlTiN Coated HPE High Performance Solid Carbide Single End Mills

Patent Pending

Center Cutting
Premium Micrograin Carbide
10% Cobalt Content

HIGH PERFORMANCE MILLING: Carbon Steels, Alloy Steels, Stainless Steels, Mold & Die Steels, High Temperature Alloys, Titanium Alloys, Cast Iron and many other materials.

Variable Flute design reduces chatter, harmonics and cutting forces for increased feed rates, greater depths of cut, improved surface finish and accuracy, minimal tool deflection, reduced machine vibration and increased tool life.

TOLERANCES
Diameter +.000/ - .002
Shank Dia. -.0001/ - .0004

List No. 5985 3-Flute – Corner Radius

List No. 5985 3-Flute – Corner Radius

List No. 5986 5-Flute – Corner Radius
List No. 5987 5-Flute – Square End

List No. 5988 3-Flute – Ball Nose

3-Flute end mills with their greater chip capacity are recommended for slotting and roughing applications.

5-Flute end mills feature a greater core thickness for increased rigidity allowing increased feed rates with minimum tool deflection but have less chip capacity than 3-flute end mills. Recommended for peripheral milling, finishing applications, improved surface finish and greater dimensional accuracy.

Cutting Speeds: Page 196

AlTiN- Aluminum Titanium Nitride Coated

Corner Radius strengthens the end mill corners to minimize chipping especially in tougher milling applications. **Corner Radius** also used when the finished part requires a radius.

List No. 5985 – 3-Flute – Corner Radius

DIA.	SHANK DIA.	LENGTH OF CUT	OAL	CORNER RADIUS	EDP NO.	LIST PRICE
			STUB LENGTH			
1/4	1/4	3/8	2	.015-.020	56270	$15.00
3/8	3/8	1/2	2	.015-.020	56271	24.80
1/2	1/2	5/8	2 1/2	.025-.030	56272	40.44
5/8	5/8	3/4	3	.030-.035	56273	81.55
3/4	3/4	7/8	3	.030-.035	56274	111.73
			REGULAR LENGTH			
1/8	1/8	3/8	1 1/2	.010-.015	56275	$10.95
5/32	3/16	7/16	2	.010-.015	56276	16.16
3/16	3/16	7/16	2	.010-.015	56277	15.31
7/32	1/4	7/16	2 1/2	.015-.020	56278	20.39
1/4	1/4	5/8	2 1/2	.015-.020	56279	18.73
9/32	5/16	5/8	2 1/2	.015-.020	56280	25.71
5/16	5/16	3/4	2 1/2	.015-.020	56281	25.71
3/8	3/8	7/8	2 1/2	.015-.020	56282	30.89
7/16	7/16	1	2 3/4	.015-.020	56283	42.13
1/2	1/2	1	3	.025-.030	56284	50.56
5/8	5/8	1 1/4	3 1/2	.030-.035	56285	94.76
3/4	3/4	1 1/2	4	.030-.035	56286	139.59
1	1	1 1/2	4	.030-.035	56287	219.27

AlTiN - Aluminum Titanium Nitride coating offers excellent hardness, lubricity, wear resistance and heat resistance for dry machining, abrasive and difficult materials and applications generating higher cutting temperatures. An excellent universal high performance coating for machining titanium alloys, stainless steels, aerospace materials and a wide range of other materials. Higher speeds and feeds, increased productivity and enhanced tool life.

(continued)

variFLUTE Solid Carbide Single End Mills (continued)

AlTiN- Aluminum Titanium Nitride Coated

Corner Radius strengthens the end mill corners to minimize chipping especially in tougher milling applications. **Corner Radius** also used when the finished part requires a radius.

List No. 5986 – 5-Flute – Corner Radius

Patent Pending

DIA.	SHANK DIA.	LENGTH OF CUT	OAL	CORNER RADIUS	EDP NO.	LIST PRICE
			STUB LENGTH			
¼	¼	⅜	2	.015-.020	**56290**	$15.00
⅜	⅜	½	2	.015-.020	**56291**	24.80
½	½	⅝	2½	.025-.030	**56292**	40.44
⅝	⅝	¾	3	.030-.035	**56293**	81.55
¾	¾	⅞	3	.030-.035	**56294**	111.73
			REGULAR LENGTH			
¼	¼	⅝	2½	.015-.020	**56295**	18.73
5/16	5/16	¾	2½	.015-.020	**56296**	25.71
⅜	⅜	⅞	2½	.015-.020	**56297**	30.89
7/16	7/16	1	2¾	.015-.020	**56298**	42.13
½	½	1	3	.025-.030	**56299**	50.56
⅝	⅝	1¼	3½	.030-.035	**56300**	94.76
¾	¾	1½	4	.030-.035	**56301**	139.59
1	1	1½	4	.030-.035	**56302**	219.27
			LONG LENGTH			
¼	¼	1¼	3	.015-.020	**56330**	40.82
⅜	⅜	1¼	3	.015-.020	**56331**	55.10
½	½	2	4	.025-.030	**56332**	83.67
⅝	⅝	2¼	5	.030-.035	**56333**	142.65
¾	¾	2¼	5	.030-.035	**56334**	199.69
			EXTENDED LENGTH			
¼	¼	⅝	4	.015-.020	**56303**	20.71
⅜	⅜	⅞	4	.015-.020	**56304**	31.43
½	½	1	6	.025-.030	**56305**	60.67
⅝	⅝	1¼	6	.030-.035	**56306**	110.60
¾	¾	1½	6	.030-.035	**56307**	147.41

AlTiN- Aluminum Titanium Nitride Coated

Square End for peripheral milling and finishing applications requiring machining to a sharp corner.

List No. 5987 – 5-Flute – Square End

Patent Pending

DIA.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
			REGULAR LENGTH		
¼	¼	⅝	2½	**56310**	$17.80
5/16	5/16	¾	2½	**56311**	24.42
⅜	⅜	⅞	2½	**56312**	29.34
7/16	7/16	1	2¾	**56313**	40.02
½	½	1	3	**56314**	48.03
⅝	⅝	1¼	3½	**56315**	90.02
¾	¾	1½	4	**56316**	132.61
1	1	1½	4	**56317**	208.30

(continued)

variFLUTE Solid Carbide Single End Mills (continued)

AlTiN- Aluminum Titanium Nitride Coated

Ball Nose for milling die cavities, fillets, radius bottom slots and special contours.

List No. 5988 – 3-Flute – Ball Nose

Patent Pending

DIA.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
		REGULAR LENGTH			
1/8	1/8	3/8	1½	56320	$13.25
5/32	3/16	7/16	2	56321	19.65
3/16	3/16	7/16	2	56322	18.04
7/32	1/4	7/16	2½	56323	23.44
1/4	1/4	5/8	2½	56324	21.60
9/32	5/16	5/8	2½	56325	29.39
5/16	5/16	3/4	2½	56326	29.39
3/8	3/8	7/8	2½	56327	35.12
7/16	7/16	1	2¾	56328	45.75
1/2	1/2	1	3	56329	62.14

AlTiN - Aluminum Titanium Nitride coating offers excellent hardness, lubricity, wear resistance and heat resistance for dry machining, abrasive and difficult materials and applications generating higher cutting temperatures. An excellent universal high performance coating for machining titanium alloys, stainless steels, aerospace materials and a wide range of other materials. Higher speeds and feeds, increased productivity and enhanced tool life.

variFLUTE SPEEDS & FEEDS

MATERIAL		HARDNESS BHN	CUTTING SPEED SFM	FEED (INCH PER TOOTH) FOR PROFILE MILLING								
TYPE	EXAMPLES			1/8″	3/16″	1/4″	5/16″	3/8″	1/2″	5/8″	3/4″	1″
Plain Steels - Low & Medium Carbon	1008, 1010, 1020	175 275	500 400	.0004	.0006	.0015	.002	.0025	.003	.0035	.004	.005
Alloy Steels - Medium Carbon	4140, 4150, 4340	275 375	400 300	.0003	.0005	.001	.0015	.002	.0025	.003	.0035	.004
Mold & Die Steels	O1, A2, D2, H13, P20	275	180	.0003	.0005	.001	.0015	.002	.0025	.003	.0035	.004
Stainless Steels - 300 Series	304, 310, 316	275	300	.0003	.0005	.001	.0015	.002	.0025	.003	.0035	.004
Stainless Steels - 400 Series	409, 430, 436	175 325	400 250	.0003	.0005	.001	.0015	.002	.0025	.003	.0035	.004
Stainless Steels - Precipitation Hardened	15-5PH, 17-4PH	325	250	.0003	.0005	.001	.0015	.002	.0025	.003	.0035	.004
High Temperature Alloys	Inconel, Waspaloy Hastalloy, A286	300	75	.0002	.0004	.0008	.001	.0015	.002	.0025	.003	.0035
Titanium Alloys	6A14V	300	300	.0003	.0005	.001	.0015	.002	.0025	.003	.0035	.004
Cast Irons	Gray	200	500	.0004	.0006	.0015	.002	.0025	.003	.0035	.004	.005
Aluminum	6061-T6	—	1500	.0005	.001	.002	.0025	.003	.004	.005	.006	.007

SPEEDS and FEEDS shown are suggested starting points only and may be increased or decreased depending on actual material and machining conditions. Start conservatively and increase until the machining cycle is optimized.

RECOMMENDED MAXIMUM DEPTHS OF CUT:	PROFILING Radial Depth = .5 × D Axial Depth = 1 × D	SLOTTING Axial Depth = . 5 × D

SHEARMILL™ M42 8% Cobalt 3-Flute 60° High Helix Single End Mills

List No. 4686

TOOL COATINGS AVAILABLE
TiN TiCN TiALN

Center Cutting

High Spiral Design Cuts Cleanly & Efficiently

M42 8% Cobalt offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications.

60° High Helix angle keeps the cutting edges constantly engaged in the workpiece reducing cutting load variations. The result is a clean efficient cutting action with decreased cutting resistance, enhanced chip control, excellent surface finish and long tool life.

Recommended for tough milling jobs including stainless steel, titanium, inconel, mold and die steels and other abrasive and difficult materials. **Center Cutting** end allows for plunge cutting like a drill into solid material.

STANDARD PACKAGE All sizes — 1 each

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
1/4	.2500	3/8	5/8	2 7/16	42938	$33.58
5/16	.3125	3/8	3/4	2 1/2	42939	33.58
3/8	.3750	3/8	3/4	2 1/2	42918	33.58
3/8	.3750	3/8	1 1/2	3 1/4	42919	43.67
1/2	.5000	1/2	1 1/4	3 1/4	42920	50.75
1/2	.5000	1/2	2	4	42921	65.94
1/2	.5000	1/2	3	5	42922	78.68
5/8	.6250	5/8	1 5/8	3 3/4	42928	70.70
5/8	.6250	5/8	2 1/2	4 5/8	42929	91.87
3/4	.7500	3/4	1 5/8	3 7/8	42936	91.87
3/4	.7500	3/4	3	5 1/4	42937	133.19
7/8	.8750	3/4	1 7/8	4 1/8	42944*	$96.50
7/8	.8750	3/4	3 1/2	5 3/4	42945*	154.42
1	1.0000	1	2	4 1/2	42953	149.09
1	1.0000	1	4	6 1/2	42954	238.57
1 1/4	1.2500	1	2	4 1/2	42970*	249.36
1 1/4	1.2500	1 1/4	2	4 1/2	42971*	177.13
1 1/4	1.2500	1 1/4	4	6 1/2	42972*	454.21
1 1/2	1.5000	1 1/4	2	4 1/2	42980*	409.21
1 3/4	1.7500	1 1/4	2	4 1/2	42989*	263.54
2	2.0000	1 1/4	2	4 1/2	42995*	634.33
2	2.0000	2	2	5 3/4	43000*	482.66

***Available While Supplies Last**

Morse® Plastic Wall Chart

NEW LOOK! LARGER SIZE! Redesigned for enhanced readability. Decimal Equivalents. Tap Drill Sizes for inch, metric and pipe threads. 24″ × 36″ printed on heavy duty .023″ gage plastic with three punched holes across top for wall mounting. Also available Custom Imprinted with your company logo and information.

List No. 1007 EDP No. 01650 List Price $7.00

Decimal Equivalent Pocket Chart

List No. 1005

Front

Back

NEW LOOK! LARGER SIZE! Decimal Equivalents. Tap Drill Sizes for inch, metric and pipe threads. Size: 3⅜″ × 7″, Printed on plastic

Pack of 50
EDP No. 20412
List Price $51.50

Pack of 100
EDP No. 20413
List Price $96.45

2-Flute Single End Mills

High Speed Steel & M42 8% Cobalt
Bright Finish & TiN Coated
Center Cutting

List No. 1898 High Speed Steel
List No. 1898G High Speed Steel TiN Coated
List No. 4580 M42 8% Cobalt

STANDARD PACKAGE All sizes — 1 each

2-Flute end mills provide increased chip capacity and are recommended for milling slots, keyways and pockets. **Center Cutting** end allows for plunge cutting like a drill into solid material.

M42 8% Cobalt offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications.

Titanium Nitride (TiN) Coating is an excellent coating for machining a wide variety of materials at greatly increased speeds and feeds. TiN coating increases tool surface hardness, lubricity, and heat resistance and resists chip welding.

TOOL COATINGS AVAILABLE
TiN TiCN TiALN

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	1898 High Speed Steel EDP NO.	1898 High Speed Steel LIST PRICE	1898G High Speed Steel TIN COATED EDP NO.	1898G High Speed Steel TIN COATED LIST PRICE	4580 COBALT EDP NO.	4580 COBALT LIST PRICE
1/8	.1250	3/8	3/8	2 5/16	43651	$15.80	96150	$18.96	44376	$20.54
9/64	.1406	3/8	7/16	2 3/8	43704	19.24	—	—	—	—
5/32	.1562	3/8	7/16	2 3/8	43691	16.24	96152	19.60	44387	21.11
11/64	.1719	3/8	7/16	2 3/8	43705	19.24	—	—	—	—
3/16	.1875	3/8	7/16	2 3/8	43652	15.80	96154	18.96	44377	20.54
13/64	.2031	3/8	1/2	2 7/16	43706	19.24	—	—	—	—
7/32	.2187	3/8	1/2	2 7/16	43692	16.24	96156	19.60	44388	21.11
15/64	.2344	3/8	1/2	2 7/16	43707	19.24	—	—	—	—
1/4	.2500	3/8	1/2	2 7/16	43653	15.80	96158	18.96	44378	20.54
17/64	.2656	3/8	9/16	2 1/2	43708	19.24	—	—	—	—
9/32	.2812	3/8	9/16	2 1/2	43693	16.24	96160	19.60	44389	21.11
19/64	.2969	3/8	9/16	2 1/2	43709	19.24	—	—	—	—
5/16	.3125	3/8	9/16	2 1/2	43654	15.80	96162	18.96	44379	20.54
21/64	.3281	3/8	9/16	2 1/2	43710	19.24	—	—	—	—
11/32	.3437	3/8	9/16	2 1/2	43694	16.24	96164	20.55	44390	22.50
23/64	.3594	3/8	9/16	2 1/2	43711	19.24	—	—	—	—
3/8	.3750	3/8	9/16	2 1/2	43655	15.80	96166	18.96	44380	20.54
25/64	.3906	3/8	13/16	2 11/16	43712	27.26	—	—	—	—
13/32	.4062	3/8	13/16	2 11/16	43695	22.54	96168	27.81	44391	30.50
27/64	.4219	3/8	13/16	2 11/16	43713	27.66	—	—	—	—
7/16	.4375	3/8	13/16	2 11/16	43656	23.28	96170	26.77	44392	30.26
29/64	.4531	1/2	13/16	3 1/4	43714	29.53	—	—	—	—
15/32	.4687	1/2	13/16	3 1/4	43696	22.54	96172	27.81	44393	30.50
31/64	.4844	1/2	13/16	3 1/4	43715	29.73	—	—	—	—
1/2	.5000	3/8	13/16	2 11/16	43657	23.28	96183	26.77	—	—
1/2	.5000	1/2	1	3 1/4	43658	24.58	96174	28.26	44381	31.95
33/64	.5156	1/2	1 1/8	3 3/8	43716	29.73	—	—	—	—
17/32	.5312	1/2	1 1/8	3 3/8	43697	24.65	96184	28.34	—	—
35/64	.5469	1/2	1 1/8	3 3/8	43717	34.13	—	—	—	—
9/16	.5625	1/2	1 1/8	3 3/8	43659	25.28	96185	29.07	44394	31.60

(continued)

2-Flute Single End Mills (continued)

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	1898 High Speed Steel EDP NO.	1898 High Speed Steel LIST PRICE	1898G High Speed Steel TIN COATED EDP NO.	1898G High Speed Steel TIN COATED LIST PRICE	4580 COBALT EDP NO.	4580 COBALT LIST PRICE
37/64	.5781	1/2	1 1/8	3 3/8	43718	$36.41	—	—	—	—
19/32	.5937	1/2	1 1/8	3 3/8	43698	31.35	—	—	—	—
39/64	.6094	1/2	1 1/8	3 3/8	43719	38.04	—	—	—	—
5/8	.6250	1/2	1 1/8	3 3/8	43660	32.15	96186	$36.97	—	—
5/8	.6250	5/8	1 5/16	3 3/4	43661	32.70	96176	37.61	44382	$42.51
11/16	.6875	1/2	1 5/16	3 5/8	43662	34.84	—	—	—	—
11/16	.6875	5/8	1 5/16	3 3/4	43663	34.84	96187	40.06	—	—
3/4	.7500	1/2	1 5/16	3 5/8	43664	37.28	—	—	—	—
3/4	.7500	5/8	1 5/16	3 3/4	43665	37.28	96188	42.87	—	—
3/4	.7500	3/4	1 5/16	3 7/8	43666	37.28	96178	42.87	44383	48.46
13/16	.8125	5/8	1 1/2	4	43667	42.88	—	—	—	—
13/16	.8125	3/4	1 1/2	4 1/8	43668	42.88	96189	49.31	—	—
7/8	.8750	5/8	1 1/2	4	43669	42.88	—	—	—	—
7/8	.8750	3/4	1 1/2	4 1/8	43670	42.88	96190	49.31	44395	53.60
7/8	.8750	7/8	1 1/2	4 1/8	43671	45.88	96191	52.76	—	—
15/16	.9375	5/8	1 1/2	4	43672*	49.54	—	—	—	—
15/16	.9375	3/4	1 1/2	4 1/8	43673	52.01	—	—	—	—
15/16	.9375	7/8	1 1/2	4 1/8	43674*	49.54	—	—	—	—
1	1.0000	5/8	1 1/2	4	43675	52.01	—	—	—	—
1	1.0000	3/4	1 1/2	4 1/8	43676	52.01	96192	59.81	44396	65.01
1	1.0000	7/8	1 1/2	4 1/8	43677	52.01	—	—	—	—
1	1.0000	1	1 5/8	4 1/2	43678	55.52	96182	65.73	44384	72.18
1 1/8	1.1250	3/4	1 1/2	3 7/8	43720	79.83	—	—	—	—
1 1/8	1.1250	7/8	1 5/8	4 1/8	43679	79.83	—	—	—	—
1 1/8	1.1250	1	1 5/8	4 1/2	43680	80.86	96193	92.98	—	—
1 1/4	1.2500	3/4	1 1/2	3 7/8	43721	83.60	—	—	—	—
1 1/4	1.2500	7/8	1 5/8	4 1/8	43681	79.83	—	—	—	—
1 1/4	1.2500	1	1 5/8	4 1/2	43682	90.31	96194	103.85	—	—
1 1/4	1.2500	1 1/4	1 5/8	4 1/2	43683	90.31	—	—	44385	117.40
1 3/8	1.3750	3/4	1 1/2	3 7/8	43722	90.31	—	—	—	—
1 3/8	1.3750	1	1 5/8	4 1/2	43684	107.40	96195	123.51	—	—
1 1/2	1.5000	3/4	1 1/2	3 7/8	43723	118.73	—	—	—	—
1 1/2	1.5000	1	1 5/8	4 1/2	43685	118.73	—	—	—	—
1 1/2	1.5000	1 1/4	1 5/8	4 1/2	43686	118.73	96196	136.53	44386	148.41
1 5/8	1.6250	1 1/4	1 5/8	4 1/2	43687	123.51	—	—	—	—
1 3/4	1.7500	3/4	1 1/2	3 7/8	43724	141.78	—	—	—	—
1 3/4	1.7500	1 1/4	1 5/8	4 1/2	43688	141.78	—	—	—	—
1 7/8	1.8750	1 1/4	1 5/8	4 1/2	43689	145.84	—	—	—	—
2	2.0000	3/4	1 1/2	3 7/8	43725	168.70	—	—	—	—
2	2.0000	1 1/4	1 5/8	4 1/2	43690	167.54	—	—	44397	209.42

*** Available While Supplies Last**

Tool Coatings

TITANIUM NITRIDE (TiN) for increased production and lower overall tooling costs. An excellent coating for machining a wide variety of materials at greatly increased speeds and feeds. TiN coating increases tool surface hardness, lubricity, and heat resistance and resists chip welding.

TITANIUM CARBONITRIDE (TiCN) for very aggressive feeds and speeds in production applications. Especially recommended for difficult-to-machine, gummy and abrasive materials.

TITANIUM ALUMINUM NITRIDE (TiALN) for high thermal stress applications including dry machining, abrasive materials and hard-to-machine materials that generate higher cutting temperatures. An excellent universal high performance coating.

2-Flute Long Length Single End Mills

High Speed Steel & M42 8% Cobalt
Bright Finish & TiN Coated
Center Cutting

2-Flute end mills provide increased chip capacity and are recommended for milling slots, keyways and pockets. **Center Cutting** end allows for plunge cutting like a drill into solid material.

Long Length end mills provide a longer length of cut for deeper milling applications

M42 8% Cobalt offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications.

Titanium Nitride (TiN) Coating is an excellent coating for machining a wide variety of materials at greatly increased speeds and feeds. TiN coating increases tool surface hardness, lubricity, and heat resistance and resists chip welding.

List No. 4599 High Speed Steel
List No. 4599G High Speed Steel TiN Coated
List No. 4584 M42 8% Cobalt

STANDARD PACKAGE All sizes — 1 each

TOOL COATINGS AVAILABLE
TiN TiCN TiALN

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	4599 High Speed Steel EDP NO.	4599 High Speed Steel LIST PRICE	4599G High Speed Steel TIN COATED EDP NO.	4599G High Speed Steel TIN COATED LIST PRICE	4584 COBALT EDP NO.	4584 COBALT LIST PRICE
3/16	.1875	3/8	1 1/4	3 1/16	43001	$23.80	96200	$27.37	—	—
7/32	.2188	3/8	1 1/4	3 1/16	43002	23.80	—	—	—	—
1/4	.2500	3/8	1 1/4	3 1/16	43003	23.80	96201	27.37	—	—
9/32	.2812	3/8	1 3/8	3 1/8	43005	23.80	—	—	—	—
5/16	.3125	3/8	1 3/8	3 1/8	43006	24.99	96202	28.73	—	—
11/32	.3438	3/8	1 1/2	3 1/4	43007	24.99	—	—	—	—
3/8	.3750	3/8	1 1/2	3 1/4	44601	24.99	96203	28.73	45370	$31.24
13/32	.4062	1/2	1 3/4	3 3/4	43008	28.47	—	—	—	—
7/16	.4375	1/2	1 3/4	3 3/4	43009	27.67	96204	31.83	—	—
15/32	.4688	1/2	2	4	43010	28.47	—	—	—	—
1/2	.5000	1/2	2	4	44602	33.22	96205	38.21	45371	41.53
9/16	.5625	5/8	2	4 5/8	43011	33.22	—	—	—	—
5/8	.6250	5/8	2	4 5/8	44603	33.22	96206	38.21	45372	41.53
11/16	.6875	3/4	2 1/4	5 1/4	43012	36.20	—	—	—	—
3/4	.7500	3/4	2 1/4	5 1/4	44604	46.69	96207	53.70	45373	58.37
13/16	.8125	7/8	2 1/2	5 1/4	43013	51.90	—	—	—	—
7/8	.8750	7/8	2 1/2	5 3/4	44605	57.12	96208	65.69	—	—
15/16	.9375	1	3	6 1/2	43014	67.03	—	—	—	—
1	1.0000	1	3	6 1/2	44606	76.93	96209	88.46	45374	96.17
1 1/8	1.1250	1	3	6 1/2	44607	110.21	—	—	—	—
1 1/4	1.2500	1	3	6 1/2	44608	120.18	—	—	—	—
1 1/4	1.2500	1 1/4	3	6 1/2	44609	130.29	—	—	—	—
1 3/8	1.3750	1	3	6 1/2	44610	135.18	—	—	—	—
1 1/2	1.5000	1 1/4	3	6 1/2	44611	144.19	—	—	—	—
1 3/4	1.7500	1 1/4	3	6 1/2	44613*	180.62	—	—	—	—
1 7/8	1.8750	1 1/4	3	6 1/2	44614*	205.15	—	—	—	—
2	2.0000	1 1/4	3	6 1/2	44615*	217.68	—	—	—	—

* Available While Supplies Last

2-Flute Extended Length Single End Mills

High Speed Steel & M42 8% Cobalt
Bright Finish & TiN Coated
Center Cutting

List No. 1899 High Speed Steel
List No. 1899G High Speed Steel TiN Coated
List No. 4585 M42 8% Cobalt

STANDARD PACKAGE All sizes — 1 each

2-Flute end mills provide increased chip capacity and are recommended for milling slots, keyways and pockets. **Center Cutting** end allows for plunge cutting like a drill into solid material.

Extended Length end mills are recommended for applications that require a longer reach but not a longer length of cut. The increased rigidity of the unfluted extended shank reduces deflection.

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	LENGTH BELOW SHANK	OAL	1899 High Speed Steel EDP NO.	1899 High Speed Steel LIST PRICE	1899G High Speed Steel TIN COATED EDP NO.	1899G High Speed Steel TIN COATED LIST PRICE	4585 COBALT EDP NO.	4585 COBALT LIST PRICE
1/8	.1250	3/8	3/8	13/16	2 5/16	43749	$26.94	96215	$30.98	45380	$33.68
3/16	.1875	3/8	1/2	1 1/8	2 11/16	43750	26.94	96216	30.98	45381	33.68
1/4	.2500	3/8	5/8	1 1/2	3 1/16	43751	26.94	96217	30.98	45382	33.68
5/16	.3125	3/8	3/4	1 3/4	3 5/16	43752	23.32	96218	26.82	45383	29.15
3/8	.3750	3/8	3/4	1 3/4	3 5/16	43753	24.76	96219	28.48	45384	30.95
7/16	.4375	1/2	1	1 7/8	3 3/4	43747	25.85	96220	29.73	—	—
1/2	.5000	1/2	1	2 1/4	4	43754	26.94	96221	30.98	45385	33.68
5/8	.6250	5/8	1 3/8	2 3/4	4 5/8	43755	39.59	96222	45.52	—	—
3/4	.7500	3/4	1 5/8	3 3/8	5 1/4	43756	50.27	96223	57.81	45386	62.83
7/8	.8750	7/8	2	4	5 3/4	43748	60.33	96224	69.37	—	—
1	1.0000	1	2 1/2	5	7 1/4	43757	88.73	96225	102.04	45387	110.91
1 1/4	1.2500	1 1/4	3	5	7 1/4	43758*	122.08	—	—	—	—

* Available While Supplies Last

Metric 2-Flute Single End Mills

TOOL COATINGS AVAILABLE
TiN TiCN TiALN

High Speed Steel
Center Cutting

List No. 1898M

STANDARD PACKAGE All sizes — 1 each

2-Flute end mills provide increased chip capacity and are recommended for milling slots, keyways and pockets. **Center Cutting** end allows for plunge cutting like a drill into solid material.

DIA. MM	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
4.5	.1772	3/8	1/2	2 5/16	43332	$18.97
5.0	.1968	3/8	1/2	2 5/16	43333	18.97
5.5	.2165	3/8	1/2	2 5/16	43334	18.97
6.0	.2362	3/8	1/2	2 5/16	43335	18.97
6.5	.2559	3/8	1/2	2 5/16	43336	18.97
7.0	.2756	3/8	9/16	2 5/16	43337	18.97
7.5	.2953	3/8	9/16	2 5/16	43338	18.97
8.0	.3150	3/8	9/16	2 5/16	43307	18.97
8.5	.3346	3/8	9/16	2 5/16	43308	18.97
9.0	.3543	3/8	9/16	2 5/16	43309	18.97
9.5	.3740	3/8	13/16	2 1/2	43310	18.97
10.0	.3937	3/8	13/16	2 1/2	43311	28.25
10.5	.4134	3/8	13/16	2 1/2	43312	28.25
11.0	.4331	3/8	13/16	2 1/2	43313	28.25
11.5	.4528	3/8	13/16	2 1/2	43314	28.25
12.0	.4724	3/8	13/16	2 1/2	43315	28.25

DIA. MM	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
12.5	.4921	1/2	1 1/8	3	43316	$28.25
13.0	.5118	1/2	1 1/8	3	43317	38.24
13.5	.5315	1/2	1 1/8	3 1/8	43318	38.24
14.0	.5512	1/2	1 1/8	3 1/8	43319	38.24
14.5	.5709	1/2	1 1/8	3 1/8	43320	41.80
15.0	.5906	1/2	1 1/8	3 1/8	43321	41.80
16.0	.6299	5/8	1 5/16	3 7/16	43322	41.80
17.0	.6693	5/8	1 5/16	3 7/16	43323	48.71
18.0	.7087	3/4	1 5/16	3 7/16	43324	48.71
19.0	.7480	3/4	1 1/2	3 3/4	43325	54.26
20.0	.7874	3/4	1 1/2	3 3/4	43326	54.26
21.0	.8268	7/8	1 1/2	3 3/4	43327	62.57
22.0	.8661	7/8	1 1/2	3 3/4	43328	62.57
23.0	.9055	7/8	1 1/2	3 3/4	43329	74.98
24.0	.9449	1	2	4 1/2	43330	74.98
25.0	.9843	1	2	4 1/2	43331	74.98

DRILL-MILL™

M42 8% Cobalt

Specially designed to perform both drilling and milling operations with the same tool in vertical milling machine applications. Increased productivity with fewer tool changes.

DRILL-MILL performs: drilling, spotting countersinking, chamfering, slotting, side milling, profile milling and other drilling & milling operations

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH* OF CUT	OAL*	EDP NO.	LIST PRICE
1/8	.1250	3/8	3/8	2 5/16	44619	$27.36
3/16	.1875	3/8	7/16	2 5/16	44620	27.36
1/4	.2500	3/8	5/8	2 7/16	44621	27.36
5/16	.3125	3/8	23/32	2 15/32	44622	30.76
3/8	.3750	3/8	3/4	2 1/2	44623	30.76
7/16	.4375	3/8	1 1/32	2 23/32	44624	40.46
1/2	.5000	1/2	1 1/4	3 1/4	44625	40.46

*** Lengths include the 90° conical cutting point.**

List No. 1980

90° Point Angle
2-Flute
30° Right Hand Helix

TOOL COATINGS AVAILABLE
TiN TiCN TiALN

STANDARD PACKAGE All sizes — 1 each

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH* OF CUT	OAL*	EDP NO.	LIST PRICE
9/16	.5625	1/2	1 13/32	3 13/32	44626	$52.63
5/8	.6250	5/8	1 5/8	3 3/4	44627	60.41
11/16	.6875	5/8	1 21/32	3 25/32	44628	71.31
3/4	.7500	3/4	1 11/16	3 15/16	44629	71.31
13/16	.8125	3/4	1 29/32	4 5/32	44630	91.01
7/8	.8750	3/4	1 15/16	4 3/16	44631	91.01
15/16	.9375	3/4	1 31/32	4 7/32	44632	114.65
1	1.0000	3/4	2	4 1/4	44633	114.65

High Helix 2-Flute Single End Mills

High Speed Steel — Center Cutting 37° Helix Angle

2-Flute end mills provide increased chip capacity and are recommended for milling slots, keyways and pockets. **Center Cutting** end allows for plunge cutting like a drill into solid material.

High Helix end mills are recommended for aluminum, magnesium, zinc alloys and other soft non-ferrous materials. The higher helix angle provides a positive smoother cutting shearing action and enhanced chip evacuation.

List No. 1920 Regular Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
1/4	.2500	3/8	5/8	2 7/16	44021	$22.32
5/16	.3125	3/8	3/4	2 1/2	44022	22.32
3/8	.3750	3/8	3/4	2 1/2	44023	22.32
7/16	.4375	3/8	1	2 11/16	44024	28.53
1/2	.5000	1/2	1 1/4	3 1/4	44025	31.70
5/8	.6250	5/8	1 5/8	3 3/4	44026	40.87
3/4	.7500	3/4	1 5/8	3 7/8	44027	46.53
7/8	.8750	7/8	1 7/8	4 1/8	44028	61.52
1	1.0000	1	2	4 1/2	44029	76.20
1 1/4	1.2500	1 1/4	2	4 1/2	44030	106.74
1 1/2	1.5000	1 1/4	2	4 1/2	44031*	148.25
2	2.0000	1 1/4	2	4 1/2	44032*	229.91

*** Available While Supplies Last**

List No. 1921 Long Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
1/4	.2500	3/8	1 1/4	3 1/16	44051	$25.82
5/16	.3125	3/8	1 3/8	3 1/8	44052	25.82
3/8	.3750	3/8	1 1/2	3 1/4	44053	25.82
7/16	.4375	1/2	1 3/4	3 3/4	44054	35.53
1/2	.5000	1/2	2	4	44055	36.91
5/8	.6250	5/8	2 1/2	4 5/8	44056	50.03
3/4	.7500	3/4	3	5 1/4	44057	64.60
7/8	.8750	7/8	3 1/2	5 3/4	44058	81.37
1	1.0000	1	4	6 1/2	44059	111.66
1 1/4	1.2500	1 1/4	4	6 1/2	44060	158.17
1 1/2	1.5000	1 1/4	4	6 1/2	44061	202.42
2	2.0000	1 1/4	4	6 1/2	44062	313.49

List No. 1922 Extra Long Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
1/4	.2500	3/8	1 3/4	3 9/16	44076	$29.90
5/16	.3125	3/8	2	3 3/4	44077	30.82
3/8	.3750	3/8	2 1/2	4 1/4	44078	32.27
1/2	.5000	1/2	3	5	44079	44.77
5/8	.6250	5/8	4	6 1/8	44080	63.24
3/4	.7500	3/4	4	6 1/4	44081	78.33
1	1.0000	1	6	8 1/2	44082	140.88

2-Flute
Double End Mills

High Speed Steel & M42 8% Cobalt
Bright Finish & TiN Coated
Center Cutting

2-Flute end mills provide increased chip capacity and are recommended for milling slots, keyways and pockets. **Center Cutting** end allows for plunge cutting like a drill into solid material.

M42 8% Cobalt offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications.

List No. 1896 High Speed Steel
List No. 1896G High Speed Steel TiN Coated
List No. 4581 M42 8% Cobalt

Titanium Nitride (TiN) Coating is an excellent coating for machining a wide variety of materials at greatly increased speeds and feeds. TiN coating increases tool surface hardness, lubricity, and heat resistance and resists chip welding.

STANDARD PACKAGE All sizes — 1 each

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	1896 High Speed Steel EDP NO.	1896 High Speed Steel LIST PRICE	1896G High Speed Steel TIN COATED EDP NO.	1896G High Speed Steel TIN COATED LIST PRICE	4581 COBALT EDP NO.	4581 COBALT LIST PRICE
1/8	.1250	3/8	3/8	3 1/16	43412	$22.40	96050	$24.64	44560	$25.76
9/64	.1406	3/8	7/16	3 1/8	43431	24.91	—	—	—	—
5/32	.1562	3/8	7/16	3 1/8	43413	23.73	96052	26.10	44561	27.29
11/64	.1719	3/8	7/16	3 1/4	43432	25.71	—	—	—	—
3/16	.1875	3/8	7/16	3 1/4	43414	22.40	96054	24.64	44562	25.76
13/64	.2031	3/8	1/2	3 1/4	43433	25.71	—	—	—	—
7/32	.2188	3/8	1/2	3 1/4	43415	23.54	96056	25.90	44563	27.08
15/64	.2344	3/8	1/2	3 3/8	43434	25.71	—	—	—	—
1/4	.2500	3/8	1/2	3 3/8	43416	22.83	96058	25.12	44564	26.26
17/64	.2656	3/8	9/16	3 3/8	43435	25.71	—	—	—	—
9/32	.2812	3/8	9/16	3 3/8	43417	24.23	96060	26.66	44565	27.87
19/64	.2969	3/8	9/16	3 1/2	43436	26.07	—	—	—	—
5/16	.3125	3/8	9/16	3 1/2	43418	22.40	96062	24.64	44566	25.76
21/64	.3281	3/8	9/16	3 1/2	43437	26.07	—	—	—	—
11/32	.3438	3/8	9/16	3 1/2	43419	23.73	96064	26.11	44567	27.29
23/64	.3594	3/8	9/16	3 1/2	43438	26.07	—	—	—	—
3/8	.3750	3/8	9/16	3 1/2	43420	22.83	96066	25.11	44568	26.26
25/64	.3906	1/2	13/16	4 1/8	43439	26.07	—	—	—	—
13/32	.4062	1/2	13/16	4 1/8	43421	38.64	96068	42.51	44569	44.44
27/64	.4219	1/2	13/16	4 1/8	43440	37.07	—	—	—	—
7/16	.4375	1/2	13/16	4 1/8	43422	33.65	96070	37.01	44570	38.70
29/64	.4531	1/2	13/16	4 1/8	43441	37.07	—	—	—	—
15/32	.4688	1/2	13/16	4 1/8	43423	38.64	96072	42.51	—	—
31/64	.4844	1/2	13/16	4 1/8	43442	38.55	—	—	—	—
1/2	.5000	1/2	13/16	4 1/8	43424	34.68	96074	38.14	44571	39.88
17/32	.5312	5/8	1 1/8	5	43443*	43.09	—	—	—	—
9/16	.5625	5/8	1 1/8	5	43425	50.44	96075	55.48	44572	58.01
19/32	.5938	5/8	1 1/8	5	43444*	49.65	—	—	—	—
5/8	.6250	5/8	1 1/8	5	43426	52.43	96076	57.67	44573	60.30
21/32	.6562	3/4	1 5/16	5 5/8	43445*	54.22	—	—	—	—
11/16	.6875	3/4	1 5/16	5 5/8	43427	59.47	96077	65.42	44577	68.40
23/32	.7188	3/4	1 5/16	5 5/8	43446*	63.01	—	—	—	—
3/4	.7500	3/4	1 5/16	5 5/8	43428	62.67	96078	68.94	44574	72.07
25/32	.7812	7/8	1 9/16	6 1/8	43447*	78.27	—	—	—	—
13/16	.8125	7/8	1 9/16	6 1/8	43448	75.30	—	—	—	—
27/32	.8438	7/8	1 9/16	6 1/8	43449*	80.48	—	—	—	—
7/8	.8750	7/8	1 9/16	6 1/8	43429	74.83	—	—	44575*	86.06
29/32	.9062	1	1 5/8	6 3/8	43450*	82.52	—	—	—	—
15/16	.9375	1	1 5/8	6 3/8	43451	90.76	—	—	—	—
31/32	.9688	1	1 5/8	6 3/8	43452*	88.25	—	—	—	—
1	1.0000	1	1 5/8	6 3/8	43430	97.05	96082	106.76	44576*	111.61

* Available While Supplies Last

2-Flute Miniature Stub Length Double End Mills

3/16″ Dia. Shank — Center Cutting
High Speed Steel & M42 8% Cobalt

Miniature 3/16" Shank end mills are designed for small diameter milling of slots, keyways and pockets. **Center Cutting** end allows for plunge cutting like a drill into solid material. For maximum rigidity, select the shortest possible length of cut for your application.

M42 8% Cobalt offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications.

STANDARD PACKAGE All sizes — 1 each

List No. 4571 High Speed Steel
List No. 4571C M42 8% Cobalt

DIA.	DEC. EQUIV.	LENGTH OF CUT	OAL	4571 High Speed Steel EDP NO.	4571 High Speed Steel LIST PRICE	4571C COBALT EDP NO.	4571C COBALT LIST PRICE
1/32	.0312	3/64	2	44326	$17.66	44360	$20.17
3/64	.0469	1/16	2	44327	17.66	44361	20.17
1/16	.0625	3/32	2	44328	15.59	44362	17.80
5/64	.0781	1/8	2	44329	15.59	44363	17.80
3/32	.0938	9/64	2	44330	15.59	44364	17.80
7/64	.1094	5/32	2	44331	15.59	44365	17.80
1/8	.1250	3/16	2	44332	15.59	44366	17.80
9/64	.1406	7/32	2	44333	15.59	44367	17.80
5/32	.1562	15/64	2	44334	15.59	44368	17.80
11/64	.1719	1/4	2	44335	15.59	44369	17.80
3/16	.1875	9/32	2	44336	15.59	44370	17.80

2-Flute Miniature Regular Length Double End Mills

3/16″ Dia. Shank — Center Cutting
High Speed Steel & M42 8% Cobalt

Miniature 3/16" Shank end mills are designed for small diameter milling of slots, keyways and pockets. **Center Cutting** end allows for plunge cutting like a drill into solid material. For maximum rigidity, select the shortest possible length of cut for your application.

M42 8% Cobalt offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications.

STANDARD PACKAGE All sizes — 1 each

List No. 1896 High Speed Steel
List No. 1896C M42 8% Cobalt

TOOL COATINGS AVAILABLE
TiN TiCN TiALN

DIA.	DEC. EQUIV.	LENGTH OF CUT	OAL	1896 High Speed Steel EDP NO.	1896 High Speed Steel LIST PRICE	1896C COBALT EDP NO.	1896C COBALT LIST PRICE
1/32	.0312	3/32	2 1/4	43401	$20.88	44348	$23.80
3/64	.0469	9/64	2 1/4	43402	20.88	44349	23.80
1/16	.0625	3/16	2 1/4	43403	18.21	44350	20.57
5/64	.0781	15/64	2 1/4	43404	18.76	44351	21.21
3/32	.0938	9/32	2 1/4	43405	18.76	44352	21.21
7/64	.1094	21/64	2 1/4	43406	18.31	44353	20.70
1/8	.1250	3/8	2 1/4	43407	17.44	44354	19.73
9/64	.1406	13/32	2 1/4	43408	18.31	44355	20.70
5/32	.1562	7/16	2 1/4	43409	18.11	44356	20.46
11/64	.1719	1/2	2 1/4	43410	19.00	44357	21.66
3/16	.1875	1/2	2 1/4	43411	17.44	44358	19.73

CUTTING FLUIDS SELECTION

Coolants and lubricants offer many benefits including reduced friction and heat, enhanced chip removal, improved accuracy and surface finish, higher speeds and feeds, corrosion protection and increased tool life.

Proper selection and application of cutting fluids is critical to optimizing machining applications. **Please consult your cutting fluids supplier for advice on your specific machining application.**

2-Flute Miniature Long Length Double End Mills

3/16" Dia. Shank — Center Cutting
High Speed Steel & M42 8% Cobalt

Miniature 3/16" Shank end mills are designed for small diameter milling of slots, keyways and pockets. **Center Cutting** end allows for plunge cutting like a drill into solid material. For maximum rigidity, select the shortest possible length of cut for your application.

M42 8% Cobalt offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications.

STANDARD PACKAGE All sizes — 1 each

List No. 1894 High Speed Steel
List No. 1894C M42 8% Cobalt

DIA.	DEC. EQUIV.	LENGTH OF CUT	OAL	1894 High Speed Steel EDP NO.	1894 High Speed Steel LIST PRICE	1894C COBALT EDP NO.	1894C COBALT LIST PRICE
1/16	.0625	7/32	2 1/2	43251	$25.99	43256	$29.63
3/32	.0938	9/32	2 5/8	43252	24.36	43257	27.81
1/8	.1250	3/4	3 1/8	43253	24.36	43258	27.81
5/32	.1562	7/8	3 1/4	43254	24.36	43259	27.81
3/16	.1875	1	3 3/8	43255	24.36	43260	27.81

2-Flute Stub Length Double End Mills

High Speed Steel — Center Cutting

2-Flute end mills provide increased chip capacity and are recommended for milling slots, keyways and pockets. **Center Cutting** end allows for plunge cutting like a drill into solid material.

Stub Length provides increased rigidity when milling shallow slots, keyways and pockets.

STANDARD PACKAGE All sizes — 1 each

List No. 4563 High Speed Steel

TOOL COATINGS AVAILABLE
TiN TiCN TiALN

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
1/8	.1250	3/8	3/16	2 3/4	44313	$20.25
5/32	.1562	3/8	15/64	2 3/4	44314	21.23
3/16	.1875	3/8	9/32	2 3/4	44315	20.25
7/32	.2188	3/8	21/64	2 7/8	44316	20.25
1/4	.2500	3/8	3/8	2 7/8	44317	20.25

Tool Coatings

TITANIUM NITRIDE (TiN) for increased production and lower overall tooling costs. An excellent coating for machining a wide variety of materials at greatly increased speeds and feeds. TiN coating increases tool surface hardness, lubricity, and heat resistance and resists chip welding.

TITANIUM CARBONITRIDE (TiCN) for very aggressive feeds and speeds in production applications. Especially recommended for difficult-to-machine, gummy and abrasive materials.

TITANIUM ALUMINUM NITRIDE (TiALN) for high thermal stress applications including dry machining, abrasive materials and hard-to-machine materials that generate higher cutting temperatures. An excellent universal high performance coating.

3-Flute Single End Mills

High Speed Steel Center Cutting

3-Flute end mills provide a compromise between the chip capacity of 2-flute end mills and the improved surface finish, greater core strength and higher feed rate of multi-flute end mills. They are recommended for general milling and for milling slots, keyways and pockets. **Center Cutting** end allows for plunge cutting like a drill into solid material.

List No. 1880 – Regular Length

List No. 1881 – Long Length

STANDARD PACKAGE All sizes — 1 each

List No. 1880 Regular Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
1/8	.1250	3/8	3/8	2 5/16	42050	$18.99
3/16	.1875	3/8	1/2	2 3/8	42051	18.99
1/4	.2500	3/8	5/8	2 7/16	42052	18.99
5/16	.3125	3/8	3/4	2 1/2	42053	18.99
3/8	.3750	3/8	3/4	2 1/2	42054	21.68
7/16	.4375	3/8	1	2 11/16	42055	26.76
1/2	.5000	3/8	1	2 11/16	42056	27.75
1/2	.5000	1/2	1 1/4	3 1/4	42057	30.91
9/16	.5625	1/2	1 3/8	3 3/8	42058	37.12
5/8	.6250	1/2	1 3/8	3 3/8	42059	37.73
5/8	.6250	5/8	1 5/8	3 3/4	42060	38.31
3/4	.7500	3/4	1 5/8	3 7/8	42061	$41.40
7/8	.8750	3/4	1 7/8	4 1/8	42062	52.38
7/8	.8750	7/8	1 7/8	4 1/8	42063	53.32
1	1.0000	3/4	1 7/8	4 1/8	42064	63.13
1	1.0000	1	2	4 1/2	42065	65.42
1 1/8	1.1250	1	2	4 1/2	42066	87.46
1 1/4	1.2500	1	2	4 1/2	42067*	96.17
1 1/4	1.2500	1 1/4	2	4 1/2	42068*	97.13
1 1/2	1.5000	1 1/4	2	4 1/2	42069	116.62
1 3/4	1.7500	1 1/4	2	4 1/2	42070*	141.01
2	2.0000	2	3	6 3/4	42071	240.00

* Available While Supplies Last

List No. 1881 Long Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
1/4	.2500	3/8	1 1/4	3 1/16	42080	$23.85
5/16	.3125	3/8	1 3/8	3 1/8	42081	23.85
3/8	.3750	3/8	1 1/2	3 1/4	42082	23.85
7/16	.4375	1/2	1 3/4	3 3/4	42083	33.37
1/2	.5000	1/2	2	4	42084	33.37
5/8	.6250	5/8	2 1/2	4 5/8	42085	42.05
3/4	.7500	3/4	3	5 1/4	42086	$52.41
7/8	.8750	7/8	3 1/2	5 3/4	42087*	64.28
1	1.0000	1	4	6 1/2	42088	85.27
1 1/4	1.2500	1 1/4	4	6 1/2	42089	125.29
1 1/2	1.5000	1 1/4	4	6 1/2	42091*	158.94
2	2.0000	1 1/4	4	6 1/2	42092*	251.70

* Available While Supplies Last

3-Flute Double End Mills

High Speed Steel Center Cutting

3-Flute end mills provide a compromise between the chip capacity of 2-flute end mills and the improved surface finish, greater core strength and higher feed rate of multi-flute end mills. They are recommended for general milling and for milling slots, keyways and pockets. **Center Cutting** end allows for plunge cutting like a drill into solid material.

List No. 1882

TOOL COATINGS AVAILABLE
TiN TiCN TiALN

STANDARD PACKAGE All sizes — 1 each

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
1/8	.1250	3/8	3/8	3 1/16	42100	$26.37
3/16	.1875	3/8	1/2	3 1/4	42101	26.37
1/4	.2500	3/8	5/8	3 3/8	42102	27.46
5/16	.3125	3/8	3/4	3 1/2	42103	27.46
3/8	.3750	3/8	3/4	3 1/2	42104	31.01
7/16	.4375	1/2	1	4 1/8	42105	42.56
1/2	.5000	1/2	1	4 1/8	42106	$44.83
9/16	.5625	5/8	1 3/8	5	42107	56.58
5/8	.6250	5/8	1 3/8	5	42108	58.82
3/4	.7500	3/4	1 5/8	5 5/8	42109	71.24
7/8	.8750	7/8	1 7/8	6 1/8	42110	91.10
1	1.0000	1	1 7/8	6 3/8	42111	110.94

3-Flute High Helix Coarse Pitch Roughing End Mills

High Speed Steel – Center Cutting

Designed for higher speeds and feeds when milling **Aluminum**, aluminum alloys, magnesium, zinc alloys and other soft non-ferrous materials. **Deep Flutes** and **38° High Helix** angle provide positive shearing action and fast chip evacuation. **Center Cutting** end allows for plunge cutting like a drill into solid material.

List No. 4605 — Regular Length
List No. 4606 — Medium & Long Length

STANDARD PACKAGE All sizes — 1 each

TOOL COATINGS AVAILABLE
TiN TiCN TiALN

List No. 4605 - Uncoated / 4605G - TiN / 4605C - TiCN - Regular Length

					UNCOATED		TiN COATED		TiCN COATED	
DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
3/8	.3750	3/8	3/4	2 1/2	44748	$34.19	44762	$38.14	44776	$39.83
1/2	.5000	1/2	1 1/4	3 1/4	44749	33.72	44763	41.66	44777	45.07
5/8	.6250	5/8	1 5/8	3 3/4	44750	46.15	44764	56.74	44778	60.61
3/4	.7500	3/4	1 5/8	3 7/8	44751	49.04	44765	60.37	44779	65.24
7/8	.8750	3/4	1 7/8	4 1/8	44752	64.77	44766	84.73	44780	92.01
1	1.0000	1	2	4 1/2	44753	79.48	44767	103.25	44781	113.45
1 1/4	1.2500	1 1/4	2	4 1/2	44754	117.40	44768	147.84	44782	158.95
1 1/2	1.5000	1 1/4	2	4 1/2	44755	140.82	44769	178.69	44783	192.50
2	2.0000	2	2	5 3/4	44757*	240.73	44771*	311.80	44785*	337.69
2	2.0000	2	3	6 3/4	44758*	257.67	44772*	338.88	44786*	368.47
2	2.0000	2	4	7 3/4	44759*	263.66	44773*	355.03	44787*	388.31
2	2.0000	2	6	9 3/4	44760*	338.15	44774*	449.82	44788*	490.51
2	2.0000	2	8	11 3/4	44761*	535.20	44775*	669.00	44789*	715.25

*** Available while supplies last**

List No. 4606 - Uncoated / 4606G - TiN / 4606C - TiCN - Medium & Long Length

					UNCOATED		TiN COATED		TiCN COATED	
DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1/2	.5000	1/2	2	4	44790	$50.01	44799	$58.47	44808	$61.58
5/8	.6250	5/8	2 1/2	4 5/8	44791	60.20	44800	72.94	44809	77.57
3/4	.7500	3/4	3	5 1/4	44792	67.21	44801	83.38	44810	90.33
1	1.0000	1	3	5 1/2	44793	98.64	44802	128.23	44811	139.04
1	1.0000	1	4	6 1/2	44794	108.38	44803	142.18	44812	154.51
1 1/4	1.2500	1 1/4	3	5 1/2	44795	135.63	44804	171.16	44813	184.10
1 1/4	1.2500	1 1/4	4	6 1/2	44796	153.85	44805	194.46	44814	209.24
1 1/2	1.5000	1 1/4	3	5 1/2	44797	157.92	44806	202.35	44815	218.54
1 1/2	1.5000	1 1/4	4	6 1/2	44798	176.57	44807	227.32	44816	245.82

End Mills with 2" dia. shanks are provided with a dual drive shank

Tool Coatings

TITANIUM NITRIDE (TiN) for increased production and lower overall tooling costs. An excellent coating for machining a wide variety of materials at greatly increased speeds and feeds. TiN coating increases tool surface hardness, lubricity, and heat resistance and resists chip welding.

TITANIUM CARBONITRIDE (TiCN) for very aggressive feeds and speeds in production applications. Especially recommended for difficult-to-machine, gummy and abrasive materials.

TITANIUM ALUMINUM NITRIDE (TiALN) for high thermal stress applications including dry machining, abrasive materials and hard-to-machine materials that generate higher cutting temperatures. An excellent universal high performance coating.

Multi-Flute Single End Mills

High Speed Steel & M42 8% Cobalt Bright Finish & TiN Coated

Multi-Flute end mills offer higher feed rates, improved surface finish and greater core strength for reduced tool deflection.

Center Cutting end allows for plunge cutting like a drill into solid material.

M42 8% Cobalt offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications.

Titanium Nitride (TiN) Coating is an excellent coating for machining a wide variety of materials at greatly increased speeds and feeds. TiN coating increases tool surface hardness, lubricity, and heat resistance and resists chip welding.

List No. 1897 High Speed Steel
List No. 4550 High Speed Steel Center Cutting
List No. 4550G High Speed Steel Center Cutting TiN Coated
List No. 4586 M42 8% Cobalt Center Cutting

STANDARD PACKAGE All sizes — 1 each

TOOL COATINGS AVAILABLE
TiN TiCN TiALN

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	1897 High Speed Steel NON-CENTER CUTTING EDP NO.	1897 LIST PRICE	4550 High Speed Steel CENTER CUTTING EDP NO.	4550 LIST PRICE	4550G High Speed Steel CENTER CUTTING TIN COATED EDP NO.	4550G LIST PRICE	4586 COBALT CENTER CUTTING EDP NO.	4586 LIST PRICE
1/8	.1250	3/8	3/8	2 5/16	4	43501	$16.16	44135	$18.59	96100	$21.38	44426	$22.30
9/64	.1406	3/8	1/2	2 3/8	4	—	—	43020	20.02	—	—	—	—
5/32	.1562	3/8	1/2	2 3/8	4	43541	17.41	43021	20.02	96102	23.02	44415	24.02
11/64	.1719	3/8	1/2	2 3/8	4	43562	20.24	43022	23.27	—	—	—	—
3/16	.1875	3/8	1/2	2 3/8	4	43502	16.16	44136	18.58	96104	21.37	44427	22.30
13/64	.2031	3/8	5/8	2 7/16	4	43563	20.24	43023	23.28	—	—	—	—
7/32	.2188	3/8	5/8	2 7/16	4	43542	17.41	44149	20.02	96106	23.02	44416	24.02
15/64	.2344	3/8	5/8	2 7/16	4	43564	20.24	43024	23.28	—	—	—	—
1/4	.2500	3/8	5/8	2 7/16	4	43503	16.16	44137	18.58	96108	21.37	44428	22.30
17/64	.2656	3/8	3/4	2 1/2	4	43565	20.24	43025	23.28	—	—	—	—
9/32	.2812	3/8	3/4	2 1/2	4	43543	17.41	44150	20.02	96110	23.02	44417	24.02
19/64	.2969	3/8	3/4	2 1/2	4	43566	20.24	43026	23.28	—	—	—	—
5/16	.3125	3/8	3/4	2 1/2	4	43504	16.16	44138	18.58	96112	21.37	44429	22.30
21/64	.3281	3/8	3/4	2 1/2	4	43567	20.24	43027	23.28	—	—	—	—
11/32	.3438	3/8	3/4	2 1/2	4	43544	17.41	44151	20.02	96114	23.02	44418	24.02
23/64	.3594	3/8	3/4	2 1/2	4	43568	20.24	43028	23.28	—	—	—	—
3/8	.3750	3/8	3/4	2 1/2	4	43505	16.16	44139	18.58	96116	21.37	44430	22.30
25/64	.3906	3/8	1	2 11/16	4	43569	27.75	43029	31.91	—	—	—	—
13/32	.4062	3/8	1	2 11/16	4	43545	23.37	44152	26.88	96118	30.92	44419	32.26
27/64	.4219	3/8	1	2 11/16	4	43570	27.75	43030	31.92	—	—	—	—
7/16	.4375	3/8	1	2 11/16	4	43506	21.83	44153	25.10	96120	28.87	44420	30.12
29/64	.4531	1/2	1 1/4	3 1/4	4	43571	27.75	43031	31.92	—	—	—	—
15/32	.4688	1/2	1 1/4	3 1/4	4	43546	23.37	44154	28.02	96122	34.10	44421	35.80
31/64	.4844	1/2	1 1/4	3 1/4	4	43572	27.75	43032	31.92	—	—	—	—
1/2	.5000	3/8	1	2 11/16	4	43507	21.83	43033	25.10	—	—	—	—
1/2	.5000	1/2	1 1/4	3 1/4	4	43508	22.27	44140	25.61	96124	29.45	44431	30.73
17/32	.5312	1/2	1 3/8	3 3/8	4	43547	27.20	44155	32.30	96096	37.85	—	—
9/16	.5625	1/2	1 3/8	3 3/8	4	43509	28.04	44156	35.16	96125	40.53	44422	44.66
19/32	.5938	1/2	1 3/8	3 3/8	4	43548	30.66	—	—	—	—	—	—
5/8	.6250	1/2	1 3/8	3 3/8	4	43510	30.66	43034	35.26	96098	40.55	—	—
5/8	.6250	5/8	1 5/8	3 3/4	4	43511	33.29	44141	38.28	96126	44.03	44432	45.94
5/8	.6250	5/8	1 5/8	3 3/4	6	—	—	—	—	—	—	44433	45.94
21/32	.6562	5/8	1 5/8	3 3/4	4	43549	35.76	—	—	—	—	—	—
11/16	.6875	1/2	1 5/8	3 5/8	4	43512	33.13	—	—	—	—	—	—
11/16	.6875	5/8	1 5/8	3 3/4	4	43513	35.39	44142	40.70	96127	46.81	—	—

(continued)

Multi-Flute Single End Mills (continued)

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	1897 High Speed Steel NON-CENTER CUTTING EDP NO.	1897 LIST PRICE	4550 High Speed Steel CENTER CUTTING EDP NO.	4550 LIST PRICE	4550G High Speed Steel CENTER CUTTING TIN COATED EDP NO.	4550G LIST PRICE	4586 COBALT CENTER CUTTING EDP NO.	4586 LIST PRICE
23/32	.7188	3/4	1 5/8	3 7/8	4	43550	$37.69	—	—	—	—	—	—
3/4	.7500	1/2	1 5/8	3 5/8	4	43514	36.69	—	—	—	—	—	—
3/4	.7500	5/8	1 5/8	3 3/4	4	43515	36.69	43035	$42.19	96133	$48.52	—	—
3/4	.7500	3/4	1 5/8	3 7/8	4	43516	38.04	44143	43.75	96128	50.31	44434	$53.75
3/4	.7500	3/4	1 5/8	3 7/8	6	—	—	—	—	—	—	44435	53.75
25/32	.7812	3/4	1 7/8	4 1/8	4	43551	47.47	—	—	—	—	—	—
13/16	.8125	5/8	1 7/8	4	4	—	—	44161	57.68	—	—	—	—
13/16	.8125	5/8	1 7/8	4	6	43517	46.74	—	—	—	—	—	—
13/16	.8125	3/4	1 7/8	4	4	43518	47.48	44157	57.68	96129	66.34	—	—
27/32	.8438	7/8	1 7/8	4 1/8	4	43552	48.84	—	—	—	—	—	—
7/8	.8750	5/8	1 7/8	4	6	43519	47.99	—	—	—	—	—	—
7/8	.8750	3/4	1 7/8	4 1/8	4	43520	49.71	43036	57.17	96130	65.75	—	—
7/8	.8750	7/8	1 7/8	4 1/8	4	43521	47.48	44144	54.60	—	—	44423	65.52
29/32	.9062	7/8	1 7/8	4 1/8	4	43553	55.88	—	—	—	—	—	—
15/16	.9375	5/8	1 7/8	4 1/8	4	43522*	50.95	—	—	—	—	—	—
15/16	.9375	3/4	1 7/8	4 1/8	4	43523	56.61	43037	65.10	96131	74.87	—	—
15/16	.9375	7/8	1 7/8	4 1/8	4	43524	56.61	44158	65.10	—	—	—	—
31/32	.9688	1	2	4 1/2	4	43554*	56.56	—	—	—	—	—	—
1	1.0000	5/8	2	4	6	43525	55.10	—	—	—	—	—	—
1	1.0000	3/4	2	4 1/8	4	43526	54.10	43038	62.22	96134	71.55	—	—
1	1.0000	7/8	2	4 1/8	4	43527	54.10	—	—	—	—	—	—
1	1.0000	1	2	4 1/2	4	43528	57.18	44145	65.76	96132	75.62	44436	83.03
1	1.0000	1	2	4 1/2	6	—	—	—	—	—	—	44437	83.03
1 1/8	1.1250	3/4	1 1/2	3 7/8	6	43555	87.15	43039	100.22	—	—	—	—
1 1/8	1.1250	7/8	2	4 1/4	6	43529*	75.71	—	—	—	—	—	—
1 1/8	1.1250	1	2	4 1/2	4	—	—	44146	89.88	96135	103.36	—	—
1 1/8	1.1250	1	2	4 1/2	6	43530	78.15	43040	89.88	—	—	—	—
1 1/4	1.2500	3/4	1 1/2	3 7/8	6	43556	98.86	—	—	—	—	—	—
1 1/4	1.2500	7/8	2	4 1/4	6	43531	82.24	—	—	—	—	—	—
1 1/4	1.2500	1	2	4 1/2	6	43532	85.36	43041	98.16	96136	112.88	—	—
1 1/4	1.2500	1 1/4	2	4 1/2	4	—	—	44147	104.94	—	—	44438	120.69
1 1/4	1.2500	1 1/4	2	4 1/2	6	43533	91.26	43042	104.94	—	—	44439	120.69
1 3/8	1.3750	3/4	1 1/2	3 7/8	6	43557	110.55	—	—	—	—	—	—
1 3/8	1.3750	1	2	4 1/2	6	43534	101.68	43043	116.93	96137	134.47	—	—
1 1/2	1.5000	3/4	1 1/2	3 7/8	6	43558	127.56	—	—	—	—	—	—
1 1/2	1.5000	1	2	4 1/2	6	43535	115.03	—	—	—	—	—	—
1 1/2	1.5000	1 1/4	2	4 1/2	4	—	—	—	—	—	—	44440	158.74
1 1/2	1.5000	1 1/4	2	4 1/2	6	43536	115.03	44148	132.28	96138	152.12	44441	158.74
1 5/8	1.6250	1 1/4	2	4 1/2	6	43537	125.61	43044	144.45	—	—	—	—
1 3/4	1.7500	3/4	1 1/2	3 7/8	6	43559	152.00	—	—	—	—	—	—
1 3/4	1.7500	1 1/4	2	4 1/2	6	43538	136.22	44159	156.65	—	—	44424	187.89
1 7/8	1.8750	1 1/4	2	4 1/2	8	43539	146.63	43045	168.62	—	—	—	—
2	2.0000	3/4	1 1/2	3 7/8	8	43560	180.18	—	—	—	—	—	—
2	2.0000	1 1/4	2	4 1/2	6	—	—	44160	160.41	—	—	44425	198.67
2	2.0000	1 1/4	2	4 1/2	8	43540	164.09	43046	189.62	—	—	—	—
2	2.0000	2	4	7 3/4	6	—	—	—	—	—	—	44442	317.54

* Available While Supplies Last

CUTTING FLUIDS SELECTION

Coolants and lubricants offer many benefits including reduced friction and heat, enhanced chip removal, improved accuracy and surface finish, higher speeds and feeds, corrosion protection and increased tool life.

Proper selection and application of cutting fluids is critical to optimizing machining applications. **Please consult your cutting fluids supplier for advice on your specific machining application.**

Multi-Flute Long Length Single End Mills

High Speed Steel & M42 8% Cobalt Bright Finish & TiN Coated

Multi-Flute end mills offer higher feed rates and improved surface finish in a wide variety of medium hardness materials. They also feature greater core strength for reduced tool deflection.

Center Cutting end allows for plunge cutting like a drill into solid material.

Long Length end mills provide a longer length of cut for deeper milling applications.

M42 8% Cobalt offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications.

List No. 1900 High Speed Steel
List No. 4551 High Speed Steel Center Cutting
List No. 4551G High Speed Steel Center Cutting TiN Coated
List No. 4587 M42 8% Cobalt Center Cutting

Titanium Nitride (TiN) Coating is an excellent coating for machining a wide variety of materials at greatly increased speeds and feeds. TiN coating increases tool surface hardness, lubricity, and heat resistance and resists chip welding.

STANDARD PACKAGE All sizes — 1 each

TOOL COATINGS AVAILABLE
TiN TiCN TiALN

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	1900 High Speed Steel NON-CENTER CUTTING EDP NO.	1900 LIST PRICE	4551 High Speed Steel CENTER CUTTING EDP NO.	4551 LIST PRICE	4551G High Speed Steel CENTER CUTTING TIN COATED EDP NO.	4551G LIST PRICE	4587 COBALT CENTER CUTTING EDP NO.	4587 LIST PRICE
3/16	.1875	3/8	1 1/4	3 1/16	4	—	—	44169	$25.84	96230	$29.72	—	—
7/32	.2188	3/8	1 1/4	3 1/16	4	—	—	44170	25.84	96231	29.72	—	—
1/4	.2500	3/8	1 1/4	3 1/16	4	43776	$20.80	44171	23.92	96232	27.51	44534	$28.71
9/32	.2812	3/8	1 3/8	3 1/8	4	—	—	44180	25.84	96233	29.72	44535	31.01
5/16	.3125	3/8	1 3/8	3 1/8	4	43777	20.80	44172	23.92	96234	27.51	44536	28.71
11/32	.3438	3/8	1 1/2	3 1/4	4	—	—	44181	25.84	96235	29.72	44537	31.01
3/8	.3750	3/8	1 1/2	3 1/4	4	43778	20.80	44173	23.92	96236	27.51	44541	28.71
13/32	.4062	1/2	1 3/4	3 3/4	4	—	—	44182	28.61	96237	32.91	44538	34.33
7/16	.4375	1/2	1 3/4	3 3/4	4	43779	28.96	44183	31.86	96238	36.63	44539	38.23
15/32	.4688	1/2	2	4	4	—	—	44184	33.30	96239	38.29	—	—
1/2	.5000	1/2	2	4	4	43780	28.96	44174	33.30	96240	38.29	44542	39.96
5/8	.6250	5/8	2 1/2	4 5/8	4	43781	40.53	44175	46.61	96241	53.61	44543	55.93
3/4	.7500	3/4	3	5 1/4	4	43782	49.52	44176	56.95	96242	65.50	44544	68.34
3/4	.7500	3/4	3	5 1/4	6	—	—	—	—	—	—	44545	68.34
7/8	.8750	7/8	3 1/2	5 3/4	4	43783	62.34	44177	71.69	96244	82.44	44540	86.03
1	1.0000	1	4	6 1/2	4	43784	81.31	44178	93.51	96245	107.54	44546	112.22
1	1.0000	1	4	6 1/2	6	—	—	—	—	—	—	44547	112.22
1 1/8	1.1250	1	4	6 1/2	4	—	—	44185	119.82	—	—	—	—
1 1/8	1.1250	1	4	6 1/2	6	43785	107.75	—	—	—	—	—	—
1 1/4	1.2500	1	4	6 1/2	4	—	—	44186	139.83	—	—	—	—
1 1/4	1.2500	1	4	6 1/2	6	43786	127.12	—	—	—	—	—	—
1 1/4	1.2500	1 1/4	4	6 1/2	4	—	—	44179	139.83	—	—	44548	160.81
1 1/4	1.2500	1 1/4	4	6 1/2	6	43787	127.12	—	—	—	—	44549	160.81
1 3/8	1.3750	1	4	6 1/2	6	43788	141.91	—	—	—	—	—	—
1 1/2	1.5000	1	4	6 1/2	4	—	—	44187	173.56	—	—	—	—
1 1/2	1.5000	1	4	6 1/2	6	43789	157.78	—	—	—	—	—	—
1 1/2	1.5000	1 1/4	4	6 1/2	4	—	—	44188	173.56	—	—	—	—
1 1/2	1.5000	1 1/4	4	6 1/2	6	43790	157.78	—	—	—	—	—	—
1 3/4	1.7500	1 1/4	4	6 1/2	4	—	—	44189	226.96	—	—	—	—
1 3/4	1.7500	1 1/4	4	6 1/2	6	43791	197.68	—	—	—	—	—	—
2	2.0000	1 1/4	4	6 1/2	4	—	—	44190	227.47	—	—	—	—
2	2.0000	1 1/4	4	6 1/2	8	43792	242.72	—	—	—	—	—	—

Multi-Flute Extra Long Length Single End Mills

High Speed Steel & M42 8% Cobalt Bright Finish & TiN Coated

Multi-Flute end mills offer higher feed rates and improved surface finish in a wide variety of medium hardness materials. They also feature greater core strength for reduced tool deflection.

Center Cutting end allows for plunge cutting like a drill into solid material.

Long Length end mills provide a longer length of cut for deeper milling applications.

M42 8% Cobalt offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications.

List No. 1901 High Speed Steel
List No. 4552 High Speed Steel Center Cutting
List No. 4552G High Speed Steel Center Cutting TiN Coated
List No. 4588 M42 8% Cobalt Center Cutting

Titanium Nitride (TiN) Coating is an excellent coating for machining a wide variety of materials at greatly increased speeds and feeds. TiN coating increases tool surface hardness, lubricity, and heat resistance and resists chip welding.

STANDARD PACKAGE All sizes — 1 each

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	1901 High Speed Steel NON-CENTER CUTTING EDP NO.	1901 LIST PRICE	4552 High Speed Steel CENTER CUTTING EDP NO.	4552 LIST PRICE	4552G High Speed Steel CENTER CUTTING TIN COATED EDP NO.	4552G LIST PRICE	4588 COBALT CENTER CUTTING EDP NO.	4588 LIST PRICE
3/16	.1875	3/8	1 3/4	3 9/16	4	—	—	44199	$28.02	96250	$30.82	—	—
7/32	.2188	3/8	1 3/4	3 9/16	4	—	—	44200	28.02	96251	30.82	—	—
1/4	.2500	3/8	1 3/4	3 9/16	4	43826	$24.37	44201	28.02	96252	30.82	45390	$32.23
9/32	.2812	3/8	2	3 3/4	4	—	—	44210	30.70	96253	33.77	45391	35.31
5/16	.3125	3/8	2	3 3/4	4	43827	25.43	44202	29.24	96254	32.16	45392	33.63
11/32	.3438	3/8	2 1/2	4 1/4	4	—	—	44211	32.14	96255	35.35	45393	36.97
3/8	.3750	3/8	2 1/2	4 1/4	4	43828	26.62	44203	30.61	96256	33.68	44520	35.21
13/32	.4062	3/8	2 3/4	4 1/2	4	—	—	44212	32.85	96257	36.14	45394	37.78
7/16	.4375	3/8	2 3/4	4 1/2	4	—	—	44213	35.09	96258	38.60	45395	40.36
15/32	.4688	1/2	3	5	4	—	—	44214	37.33	96259	41.06	—	—
1/2	.5000	1/2	3	5	4	43829	34.41	44204	39.57	96260	43.53	44521	45.51
5/8	.6250	5/8	4	6 1/8	4	43830	48.96	44205	56.30	96261	61.93	44522	66.06
3/4	.7500	3/4	4	6 1/4	4	43831	57.57	44206	66.20	96262	72.82	44523	78.29
3/4	.7500	3/4	4	6 1/4	6	—	—	—	—	—	—	44524	78.29
7/8	.8750	7/8	5	7 1/4	4	43832	75.87	44207	87.25	96264	95.98	45396	100.34
1	1.0000	1	6	8 1/2	4	43833	100.38	44208	115.43	96265	126.97	44525	132.75
1	1.0000	1	6	8 1/2	6	—	—	—	—	—	—	44526	132.75
1 1/4	1.2500	1 1/4	6	8 1/2	4	—	—	44209	166.17	—	—	44527	191.10
1 1/4	1.2500	1 1/4	6	8 1/2	6	43834	151.06	44215	166.17	—	—	44528	191.10
1 1/2	1.5000	1 1/4	8	10 1/2	6	43835	215.17	44216	236.68	—	—	45397	272.19

Tool Coatings

TITANIUM NITRIDE (TiN) for increased production and lower overall tooling costs. An excellent coating for machining a wide variety of materials at greatly increased speeds and feeds. TiN coating increases tool surface hardness, lubricity, and heat resistance and resists chip welding.

TITANIUM CARBONITRIDE (TiCN) for very aggressive feeds and speeds in production applications. Especially recommended for difficult-to-machine, gummy and abrasive materials.

TITANIUM ALUMINUM NITRIDE (TiALN) for high thermal stress applications including dry machining, abrasive materials and hard-to-machine materials that generate higher cutting temperatures. An excellent universal high performance coating.

Metric 4-Flute Single End Mills

High Speed Steel
Center Cutting

Multi-Flute end mills offer higher feed rates and improved surface finish in a wide variety of medium hardness materials. They also feature greater core strength for reduced tool deflection.

List No. 1897M

STANDARD PACKAGE All sizes — 1 each

TOOL COATINGS AVAILABLE
TiN TiCN TiALN

DIA. MM	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
4.5	.1772	3/8	1/2	2 3/8	43360	$20.38
5.0	.1968	3/8	1/2	2 3/8	43361	20.38
5.5	.2165	3/8	5/8	2 7/16	43362	20.38
6.0	.2362	3/8	5/8	2 7/16	43363	20.38
6.5	.2559	3/8	5/8	2 7/16	43364	20.38
7.0	.2756	3/8	5/8	2 7/16	43365	20.38
7.5	.2953	3/8	3/4	2 1/2	43366	20.38
8.0	.3150	3/8	3/4	2 1/2	43367	20.38
8.5	.3346	3/8	3/4	2 1/2	43368	20.38
9.0	.3543	3/8	3/4	2 1/2	43369	20.38
9.5	.3740	3/8	3/4	2 1/2	43370	20.38
10.0	.3937	3/8	1	2 11/16	43371	31.07
10.5	.4134	3/8	1	2 11/16	43372	31.07
11.0	.4331	3/8	1	2 11/16	43373	31.07
11.5	.4528	3/8	1	2 11/16	43374	31.07
12.0	.4724	3/8	1	2 11/16	43375	31.07
12.5	.4921	1/2	1 1/4	3 1/4	43376	$31.07
13.0	.5118	1/2	1 1/4	3 1/4	43377	42.02
13.5	.5315	1/2	1 3/8	3 3/8	43378	42.02
14.0	.5512	1/2	1 3/8	3 3/8	43379	42.02
14.5	.5709	1/2	1 3/8	3 3/8	43380	45.98
15.0	.5906	1/2	1 3/8	3 3/8	43381	45.98
16.0	.6299	5/8	1 5/8	3 3/4	43382	45.98
17.0	.6693	5/8	1 5/8	3 3/4	43383	53.55
18.0	.7087	3/4	1 5/8	3 7/8	43384	53.55
19.0	.7480	3/4	1 5/8	3 7/8	43385	59.67
20.0	.7874	3/4	1 7/8	4 1/8	43386	59.67
21.0	.8268	7/8	1 7/8	4 1/8	43387	68.82
22.0	.8661	7/8	1 7/8	4 1/8	43388	68.82
23.0	.9055	7/8	1 7/8	4 1/8	43389	82.46
24.0	.9449	1	2	4 1/2	43390	82.46
25.0	.9843	1	2	4 1/2	43391	82.46

Morse® Plastic Wall Chart

NEW LOOK! LARGER SIZE! Redesigned for enhanced readability. Decimal Equivalents. Tap Drill Sizes for inch, metric and pipe threads. 24″ × 36″ printed on heavy duty .023″ gage plastic with three punched holes across top for wall mounting. Also available Custom Imprinted with your company logo and information.

List No. 1007 EDP No. 01650 List Price $7.00

Decimal Equivalent Pocket Chart

List No. 1005

Front

Back

NEW LOOK! LARGER SIZE! Decimal Equivalents. Tap Drill Sizes for inch, metric and pipe threads. Size: 3⅜″ × 7″, Printed on plastic

Pack of 50
EDP No. 20412
List Price $51.50

Pack of 100
EDP No. 20413
List Price $96.45

Left Hand Cut 4-Flute Single End Mills

High Speed Steel — Left Hand Cut

Left Hand Cut end mills feature a left hand helix and left hand cut for use in applications with left hand spindle rotation.

List No. 1897L

STANDARD PACKAGE All sizes — 1 each

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
3/16	.1875	3/8	1/2	2 3/8	43602*	$40.17
1/4	.2500	3/8	5/8	2 7/16	43603*	36.65
5/16	.3125	3/8	3/4	2 1/2	43604*	46.07
3/8	.3750	3/8	3/4	2 1/2	43605*	46.07
1/2	.5000	1/2	1 1/4	3 1/4	43606*	$46.07
5/8	.6250	5/8	1 5/8	3 3/4	43607*	55.82
3/4	.7500	3/4	1 5/8	3 7/8	43608*	59.03

*** Available While Supplies Last**

Left Hand Cut 4-Flute Double End Mills

High Speed Steel – Left Hand Cut

Left Hand Cut end mills feature a left hand helix and left hand cut for use in applications with left hand spindle rotation.

List No. 1895L

STANDARD PACKAGE All sizes — 1 each

TOOL COATINGS AVAILABLE
TiN TiCN TiALN

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
1/8	.1250	3/8	3/8	3 1/16	43351*	$36.49
5/32	.1562	3/8	7/16	3 1/8	43352*	36.49
3/16	.1875	3/8	1/2	3 1/4	43353*	36.49
1/4	.2500	3/8	5/8	3 3/8	43354*	36.49
5/16	.3125	3/8	3/4	3 1/2	43355*	36.49
3/8	.3750	3/8	3/4	3 1/2	43356*	$38.14
1/2	.5000	1/2	1	4 1/8	43357*	50.01
5/8	.6250	5/8	1 3/8	5	43358*	79.98
3/4	.7500	3/4	1 5/8	5 5/8	43359*	96.97

*** Available While Supplies Last**

Tool Coatings

TITANIUM NITRIDE (TiN) for increased production and lower overall tooling costs. An excellent coating for machining a wide variety of materials at greatly increased speeds and feeds. TiN coating increases tool surface hardness, lubricity, and heat resistance and resists chip welding.

TITANIUM CARBONITRIDE (TiCN) for very aggressive feeds and speeds in production applications. Especially recommended for difficult-to-machine, gummy and abrasive materials.

TITANIUM ALUMINUM NITRIDE (TiALN) for high thermal stress applications including dry machining, abrasive materials and hard-to-machine materials that generate higher cutting temperatures. An excellent universal high performance coating.

4-Flute Double End Mills

High Speed Steel & M42 8% Cobalt Bright Finish & TiN Coated

Multi-Flute end mills offer higher feed rates, improved surface finish and greater core strength for reduced tool deflection.

Center Cutting end allows for plunge cutting like a drill into solid material.

M42 8% Cobalt offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and longer life in production applications.

List No. 1895 High Speed Steel
List No. 4553 High Speed Steel Center Cutting
List No. 4553G High Speed Steel Center Cutting TiN Coated
List No. 4582 M42 8% Cobalt Center Cutting

Titanium Nitride (TiN) Coating is an excellent coating for machining a wide variety of materials at increased speeds and feeds. TiN coating increases tool surface hardness, lubricity, and heat resistance and resists chip welding.

STANDARD PACKAGE All sizes — 1 each

TOOL COATINGS AVAILABLE
TiN TiCN TiALN

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	1895 High Speed Steel NON-CENTER CUTTING EDP NO.	1895 LIST PRICE	4553 High Speed Steel CENTER CUTTING EDP NO.	4553 LIST PRICE	4553G High Speed Steel CENTER CUTTING TIN COATED EDP NO.	4553G LIST PRICE	4582 COBALT CENTER CUTTING EDP NO.	4582 LIST PRICE
1/8	.1250	3/8	3/8	3 1/16	43266	$22.87	44251	$25.16	96000	$27.67	44580	$28.93
9/64	.1406	3/8	7/16	3 1/8	43286	25.23	43050	27.75	—	—	—	—
5/32	.1562	3/8	7/16	3 1/8	43267	24.15	43051	26.57	96002	29.22	44581	30.55
11/64	.1719	3/8	1/2	3 1/4	43287	26.22	43052	28.84	—	—	—	—
3/16	.1875	3/8	1/2	3 1/4	43268	22.87	44252	25.16	96004	27.67	44582	28.93
13/64	.2031	3/8	9/16	3 1/4	43288	26.22	43053	28.84	—	—	—	—
7/32	.2188	3/8	9/16	3 1/4	43269	24.11	43054	26.52	96006	29.17	44583	30.50
15/64	.2344	3/8	5/8	3 3/8	43289	26.22	43055	28.84	—	—	—	—
1/4	.2500	3/8	5/8	3 3/8	43270	22.87	44253	25.16	96008	27.67	44584	28.93
17/64	.2656	3/8	11/16	3 3/8	43290	26.22	43056	28.84	—	—	—	—
9/32	.2812	3/8	11/16	3 3/8	43271	24.11	43057	26.52	96010	29.17	44585	30.50
19/64	.2969	3/8	3/4	3 1/2	43291	26.52	43058	29.18	—	—	—	—
5/16	.3125	3/8	3/4	3 1/2	43272	22.87	44254	25.16	96012	27.67	44586	28.93
21/64	.3281	3/8	3/4	3 1/2	43292	26.52	43059	29.18	—	—	—	—
11/32	.3438	3/8	3/4	3 1/2	43273	24.11	43060	26.52	96014	29.17	44587	30.50
23/64	.3594	3/8	3/4	3 1/2	43293	26.52	43061	29.18	—	—	—	—
3/8	.3750	3/8	3/4	3 1/2	43274	21.99	44255	24.19	96016	26.60	44588	27.81
25/64	.3906	1/2	1	4 1/8	43294	30.16	43062	33.17	—	—	—	—
13/32	.4062	1/2	1	4 1/8	43275	36.35	43063	39.99	96018	43.98	44589	45.98
27/64	.4219	1/2	1	4 1/8	43295	38.31	43064	42.15	—	—	—	—
7/16	.4375	1/2	1	4 1/8	43276	33.41	43065	36.75	96020	40.43	44590	42.26
29/64	.4531	1/2	1	4 1/8	43296	38.31	43066	42.15	—	—	—	—
15/32	.4687	1/2	1	4 1/8	43277	36.35	43067	39.99	96022	43.98	—	—
31/64	.4844	1/2	1	4 1/8	43297	38.31	43068	42.15	—	—	—	—
1/2	.5000	1/2	1	4 1/8	43278	35.04	44256	38.54	96024	42.40	44591	44.32
17/32	.5312	5/8	1 3/8	5	43298*	49.31	—	—	—	—	—	—
9/16	.5625	5/8	1 3/8	5	43279	47.84	43069	52.62	—	—	44592	60.52
19/32	.5938	5/8	1 3/8	5	43299 *	50.12	—	—	—	—	—	—
5/8	.6250	5/8	1 3/8	5	43280	49.75	44257	54.73	96026	60.20	44593	62.93
21/32	.6562	3/4	1 5/8	5 5/8	43300 *	62.92	—	—	—	—	—	—
11/16	.6875	3/4	1 5/8	5 5/8	43281	59.72	43070	65.69	—	—	44597	75.55
23/32	.7188	3/4	1 5/8	5 5/8	43301 *	69.34	—	—	—	—	—	—
3/4	.7500	3/4	1 5/8	5 5/8	43282	61.75	44258	67.93	96028	74.72	44594	78.11
25/32	.7812	7/8	1 7/8	6 1/8	43302 *	76.22	—	—	—	—	—	—
13/16	.8125	7/8	1 7/8	6 1/8	43283	76.08	43071	87.58	—	—	44598	100.98
27/32	.8438	7/8	1 7/8	6 1/8	43303 *	76.22	—	—	—	—	—	—
7/8	.8750	7/8	1 7/8	6 1/8	43284	84.26	44259	92.69	—	—	44595	106.59
29/32	.9062	1	1 7/8	6 3/8	43304 *	92.66	—	—	—	—	—	—
15/16	.9375	1	1 7/8	6 3/8	43305	88.89	43072	97.78	—	—	44599	113.35
31/32	.9688	1	1 7/8	6 3/8	43306 *	93.66	—	—	—	—	—	—
1	1.0000	1	1 7/8	6 3/8	43285	92.65	44260	101.92	96032	112.11	44596	117.20

* Available While Supplies Last

4-Flute Miniature Stub Length Double End Mills

3/16″ Shank — Center Cutting
High Speed Steel & M42 8% Cobalt

Miniature 3/16" Shank end mills are designed for small diameter milling of slots, keyways and pockets. **Center Cutting** end allows for plunge cutting like a drill into solid material. For maximum rigidity, select the shortest possible length of cut for your application.

List No. 4569 High Speed Steel
List No. 4569C M42 8% Cobalt

M42 8% Cobalt offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications.

STANDARD PACKAGE All sizes — 1 each

DIA.	DEC. EQUIV.	LENGTH OF CUT	OAL	4569 High Speed Steel EDP NO.	4569 High Speed Steel LIST PRICE	4569C COBALT EDP NO.	4569C COBALT LIST PRICE
1/16	.0625	3/32	2	44120	$15.88	44126	$18.14
3/32	.0938	9/64	2	44121	15.88	44128	18.14
1/8	.1250	3/16	2	44122	15.88	44130	18.14
5/32	.1562	15/64	2	44123	15.88	44132	18.14
3/16	.1875	9/32	2	44124	17.40	44134	20.43

TOOL COATINGS AVAILABLE
TiN TiCN TiALN

4-Flute Miniature Regular Length Double End Mills

3/16″ Dia. Shank — Center Cutting
High Speed Steel & M42 8% Cobalt

Miniature 3/16" Shank end mills are designed for small diameter milling of slots, keyways and pockets. **Center Cutting** end allows for plunge cutting like a drill into solid material. For maximum rigidity, select the shortest possible length of cut for your application.

List No. 1895 High Speed Steel
List No. 1895C M42 8% Cobalt

M42 8% Cobalt offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications.

STANDARD PACKAGE All sizes — 1 each

DIA.	DEC. EQUIV.	LENGTH OF CUT	OAL	1895 High Speed Steel EDP NO.	1895 High Speed Steel LIST PRICE	1895C COBALT EDP NO.	1895C COBALT LIST PRICE
1/16	.0625	3/16	2 1/4	43261	$18.94	43220	$21.62
3/32	.0938	9/32	2 1/4	43262	18.94	43222	21.62
1/8	.1250	3/8	2 1/4	43263	18.94	43224	21.62
5/32	.1562	7/16	2 1/4	43264	18.94	43226	21.62
3/16	.1875	1/2	2 1/4	43265	18.94	43228	21.62

Tool Coatings

TITANIUM NITRIDE (TiN) for increased production and lower overall tooling costs. An excellent coating for machining a wide variety of materials at greatly increased speeds and feeds. TiN coating increases tool surface hardness, lubricity, and heat resistance and resists chip welding.

TITANIUM CARBONITRIDE (TiCN) for very aggressive feeds and speeds in production applications. Especially recommended for difficult-to-machine, gummy and abrasive materials.

TITANIUM ALUMINUM NITRIDE (TiALN) for high thermal stress applications including dry machining, abrasive materials and hard-to-machine materials that generate higher cutting temperatures. An excellent universal high performance coating.

4-Flute Miniature Long Length Double End Mills

3/16" Dia. Shank — Center Cutting
High Speed Steel & M42 8% Cobalt

Miniature 3/16" Shank end mills are designed for small diameter milling of slots, keyways and pockets. **Center Cutting** end allows for plunge cutting like a drill into solid material. For maximum rigidity, select the shortest possible length of cut for your application.

List No. 1893 High Speed Steel
List No. 1893C M42 8% Cobalt

M42 8% Cobalt offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications.

STANDARD PACKAGE All sizes — 1 each

DIA.	DEC. EQUIV.	LENGTH OF CUT	OAL	1893 High Speed Steel EDP NO.	1893 High Speed Steel LIST PRICE	1893C COBALT EDP NO.	1893C COBALT LIST PRICE
1/16	.0625	7/32	2 1/2	43241	$24.35	44320	$27.81
3/32	.0938	9/32	2 5/8	43242	24.35	44321	27.81
1/8	.1250	3/4	3 1/8	43243	24.35	44322	27.81
5/32	.1562	7/8	3 1/4	43244	24.35	44323	27.81
3/16	.1875	1	3 3/8	43245	24.35	44324	27.81

TOOL COATINGS AVAILABLE
TiN TiCN TiALN

4-Flute Stub Length Double End Mills

High Speed Steel

Multi-Flute end mills offer higher feed rates and improved surface finish in a wide variety of medium hardness materials. They also feature greater core strength for reduced tool deflection.

Stub Length provides increased rigidity in shallow milling applications.

List No. 4561 High Speed Steel

STANDARD PACKAGE All sizes — 1 each

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
1/8	.1250	3/8	3/16	2 3/4	44193	$20.69
5/32	.1562	3/8	15/64	2 3/4	44194	24.03
3/16	.1875	3/8	9/32	2 3/4	44195	20.69
7/32	.2188	3/8	21/64	2 7/8	44196	22.12
1/4	.2500	3/8	3/8	2 7/8	44197	20.60

TOOL COATINGS AVAILABLE
TiN TiCN TiALN

CUTTING FLUIDS SELECTION

Coolants and lubricants offer many benefits including reduced friction and heat, enhanced chip removal, improved accuracy and surface finish, higher speeds and feeds, corrosion protection and increased tool life.

Proper selection and application of cutting fluids is critical to optimizing machining applications. **Please consult your cutting fluids supplier for advice on your specific machining application.**

2-Flute Ball Nose Single End Mills

High Speed Steel & M42 8% Cobalt
Bright Finish & TiN Coated
Center Cutting

Ball Nose end mills are designed for milling die cavities, fillets, round bottomed holes and radius bottom slots. **2-Flute** end mills provide increased chip capacity. **Center Cutting** end allows for plunge cutting like a drill into solid material.

List No. 1887 High Speed Steel
List No. 1887G High Speed Steel TiN Coated
List No. 4583 M42 8% Cobalt

STANDARD PACKAGE All sizes — 1 each

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	1887 High Speed Steel EDP NO.	1887 High Speed Steel LIST PRICE	1887G High Speed Steel TIN COATED EDP NO.	1887G High Speed Steel TIN COATED LIST PRICE	4583 COBALT EDP NO.	4583 COBALT LIST PRICE
1/8	.1250	3/8	3/8	2 5/16	43111	$23.16	96460	$25.48	44401	$26.64
3/16	.1875	3/8	1/2	2 3/8	43112	23.16	96461	25.48	44402	26.64
1/4	.2500	3/8	5/8	2 7/16	43113	23.16	96462	25.48	44403	26.64
5/16	.3125	3/8	3/4	2 1/2	43114	26.02	96463	28.63	44404	29.93
3/8	.3750	3/8	3/4	2 1/2	43115	26.02	96464	28.63	44405	29.93
7/16	.4375	1/2	1	3 1/4	43116	34.25	96465	37.68	—	—
1/2	.5000	1/2	1	3 1/4	43117	34.25	96466	37.68	44406	39.39
9/16	.5625	1/2	1 1/8	3 3/8	43118	42.49	—	—	—	—
5/8	.6250	1/2	1 1/8	3 3/8	43119*	48.78	—	—	—	—
5/8	.6250	5/8	1 3/8	3 3/4	43120	48.78	96467	53.66	44407	56.10
3/4	.7500	1/2	1 5/16	3 5/8	43121*	57.61	—	—	—	—
3/4	.7500	3/4	1 5/8	3 7/8	43122	57.61	96468	63.38	44408	66.25
13/16	.8125	3/4	2	4 1/4	43128	65.56	—	—	—	—
7/8	.8750	7/8	2	4 1/4	43123	73.51	96469	80.87	44412	84.54
15/16	.9375	3/4	2 1/4	4 1/2	43129	83.05	—	—	—	—
1	1.0000	1	2 1/4	4 3/4	43124	92.60	96470	101.87	44409	106.49
1 1/8	1.1250	1	2 1/4	4 3/4	43125	108.76	—	—	—	—
1 1/4	1.2500	1 1/4	2 1/2	5	43126	125.27	—	—	44410	144.06
1 1/2	1.5000	1 1/4	2 1/2	5	43127	154.38	—	—	44411	185.99

*** Available While Supplies Last**

2-Flute Ball Nose Extended Length Single End Mills

High Speed Steel & M42 8% Cobalt
Bright Finish & TiN Coated
Center Cutting

Extended Length for applications that require longer reach but not a longer length of cut. The increased rigidity of the unfluted shank reduces deflection.

List No. 1888 High Speed Steel
List No. 1888G High Speed Steel TiN Coated
List No. 4590 M42 8% Cobalt

STANDARD PACKAGE All sizes — 1 each

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	LENGTH BELOW SHANK	OAL	1888 High Speed Steel EDP NO.	1888 High Speed Steel LIST PRICE	1888G High Speed Steel TIN COATED EDP NO.	1888G High Speed Steel TIN COATED LIST PRICE	4590 COBALT EDP NO.	4590 COBALT LIST PRICE
1/8	.1250	3/8	3/8	13/16	2 3/8	43136	$30.66	96480	$35.26	45405	$38.33
3/16	.1875	3/8	1/2	1 1/8	2 11/16	43137	30.66	96481	35.26	45406	38.33
1/4	.2500	3/8	5/8	1 1/2	3 1/16	43138	30.66	96482	35.26	45407	38.33
5/16	.3125	3/8	3/4	1 3/4	3 5/16	43139	37.74	96483	43.40	45408	47.17
3/8	.3750	3/8	3/4	1 3/4	3 5/16	43140	36.78	96484	42.29	45409	45.98
7/16	.4375	1/2	1	1 7/8	3 3/4	43141	49.61	96485	57.05	—	—
1/2	.5000	1/2	1	2 1/4	4	43142	47.08	96486	54.14	45410	58.85
5/8	.6250	5/8	1 3/8	2 3/4	4 5/8	43143	65.69	—	—	—	—
3/4	.7500	3/4	1 5/8	3 3/8	5 3/8	43144	69.74	96487	80.20	45411	87.18
7/8	.8750	7/8	2	4	6	43148	90.79	—	—	—	—
1	1.0000	1	2 1/2	5	7 1/4	43146	111.84	96488	128.61	45412	139.80
1 1/4	1.2500	1 1/4	3	5	7 1/4	43147	142.36	—	—	—	—

2-Flute Ball Nose Double End Mills

High Speed Steel
Bright Finish & TiN Coated
Center Cutting

Ball Nose end mills are designed for milling die cavities, fillets, round bottom holes and radius bottom slots. **2-Flute** end mills provide increased chip capacity. **Center Cutting** end allows for plunge cutting like a drill into solid material.

List No. 1889 High Speed Steel
List No. 1889G High Speed Steel TiN Coated

Titanium Nitride (TiN) Coating is an excellent coating for machining a wide variety of materials at greatly increased speeds and feeds. TiN coating increases tool surface hardness, lubricity, and heat resistance and resists chip welding.

STANDARD PACKAGE All sizes — 1 each

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	1889 High Speed Steel EDP NO.	1889 High Speed Steel LIST PRICE	1889G High Speed Steel TIN COATED EDP NO.	1889G High Speed Steel TIN COATED LIST PRICE
1/8	.1250	3/8	3/8	3 1/16	43161	$37.97	96495	$43.67
5/32	.1562	3/8	7/16	3 1/8	43172	41.76	—	—
3/16	.1875	3/8	7/16	3 1/4	43162	37.97	96496	43.67
7/32	.2188	3/8	1/2	3 1/4	43173	41.76	—	—
1/4	.2500	3/8	1/2	3 3/8	43163	37.97	96497	43.67
9/32	.2812	3/8	9/16	3 3/8	43174	41.76	—	—
5/16	.3125	3/8	9/16	3 1/2	43164	37.97	96498	43.67
11/32	.3438	3/8	9/16	3 1/2	43175	41.76	—	—
3/8	.3750	3/8	9/16	3 1/2	43165	37.97	96499	43.67
13/32	.4062	1/2	13/16	4 1/8	43176	41.76	—	—
7/16	.4375	1/2	13/16	4 1/8	43166	53.33	—	—
1/2	.5000	1/2	13/16	4 1/8	43167	53.33	96500	61.33
5/8	.6250	5/8	1 1/8	5	43168	73.04	—	—
3/4	.7500	3/4	1 5/16	5 5/8	43169	92.73	—	—
7/8	.8750	7/8	1 9/16	6 1/8	43170	115.06	—	—
1	1.0000	1	1 5/8	6 3/8	43171	141.07	—	—

TOOL COATINGS AVAILABLE
TiN TiCN TiALN

Morse® Plastic Wall Chart

NEW LOOK! LARGER SIZE! Redesigned for enhanced readability. Decimal Equivalents. Tap Drill Sizes for inch, metric and pipe threads. 24″ × 36″ printed on heavy duty .023″ gage plastic with three punched holes across top for wall mounting. Also available Custom Imprinted with your company logo and information.

List No. 1007 EDP No. 01650 List Price $7.00

Decimal Equivalent Pocket Chart

List No. 1005

Front

Back

NEW LOOK! LARGER SIZE! Decimal Equivalents. Tap Drill Sizes for inch, metric and pipe threads. Size: 3⅜″ × 7″, Printed on plastic

Pack of 50
EDP No. 20412
List Price $51.50

Pack of 100
EDP No. 20413
List Price $96.45

MORSE CUTTING TOOLS

800.255.1701

2-Flute Miniature Ball Nose Stub Length Double End Mills

3/16″ Dia. Shank — Center Cutting
High Speed Steel & M42 8% Cobalt

Miniature 3/16" Shank ball nose end mills are designed for small diameter milling of die cavities, fillets, round bottom holes and radius bottom slots. **Center Cutting** end allows for plunge cutting like a drill into solid material. For maximum rigidity, select the shortest possible length of cut for your application.

List No. 4570 High Speed Steel
List No. 4570C M42 8% Cobalt

M42 8% Cobalt offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications.

STANDARD PACKAGE All sizes — 1 each

DIA.	DEC. EQUIV.	LENGTH OF CUT	OAL	4570 High Speed Steel EDP NO.	4570 High Speed Steel LIST PRICE	4570C COBALT EDP NO.	4570C COBALT LIST PRICE
1/16	.0625	3/32	2	44340	$29.24	43210	$33.38
3/32	.0938	9/64	2	44341	26.03	43212	30.45
1/8	.1250	3/16	2	44342	26.03	43214	30.45
5/32	.1562	15/64	2	44343	26.03	43216	30.45
3/16	.1875	9/32	2	44344	26.03	43218	30.45

TOOL COATINGS AVAILABLE
TiN TiCN TiALN

2-Flute Miniature Ball Nose Regular Length Double End Mills

3/16″ Dia. Shank — Center Cutting
High Speed Steel & M42 8% Cobalt

Miniature 3/16" Shank ball nose end mills are designed for small diameter milling of die cavities, fillets, round bottom holes and radius bottom slots. **Center Cutting** end allows for plunge cutting like a drill into solid material. For maximum rigidity, select the shortest possible length of cut for your application.

List No. 1890 High Speed Steel
List No. 1890C M42 8% Cobalt

M42 8% Cobalt offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications.

STANDARD PACKAGE All sizes — 1 each

DIA.	DEC. EQUIV.	LENGTH OF CUT	OAL	1890 High Speed Steel EDP NO.	1890 High Speed Steel LIST PRICE	1890C COBALT EDP NO.	1890C COBALT LIST PRICE
1/32	.0312	3/32	2 1/4	43186	$30.33	—	—
1/16	.0625	3/16	2 1/4	43188	30.33	43200	$34.64
3/32	.0938	9/32	2 1/4	43190	30.33	43202	34.64
1/8	.1250	3/8	2 1/4	43192	30.33	43204	34.64
5/32	.1562	7/16	2 1/4	43194	30.33	43206	34.64
3/16	.1875	1/2	2 1/4	43196	30.33	43208	34.64

TOOL COATINGS AVAILABLE
TiN TiCN TiALN

Multi-Flute Ball Nose Single End Mills

High Speed Steel & M42 8% Cobalt
Bright Finish & TiN Coated
Center Cutting

Ball Nose end mills are designed for milling die cavities, fillets, round bottom holes and radius bottom slots.

Multi-Flute end mills offer improved surface finish and feature greater core strength for reduced tool deflection.

Center Cutting end allows for plunge cutting like a drill into solid material.

List No. 4554 High Speed Steel
List No. 4554G High Speed Steel TiN Coated
List No. 4589 M42 8% Cobalt

STANDARD PACKAGE All sizes — 1 each

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	4554 High Speed Steel EDP NO.	4554 High Speed Steel LIST PRICE	4554G High Speed Steel TIN COATED EDP NO.	4554G High Speed Steel TIN COATED LIST PRICE	4589 COBALT EDP NO.	4589 COBALT LIST PRICE
1/8	.1250	3/8	3/8	2 5/16	4	44272	$32.94	96510	$36.24	44451	$37.88
3/16	.1875	3/8	1/2	2 3/8	4	44273	32.94	96511	36.24	44452	37.88
1/4	.2500	3/8	5/8	2 7/16	4	44274	32.94	96512	36.24	44453	37.88
5/16	.3125	3/8	3/4	2 1/2	4	44275	32.94	96513	36.24	44454	37.88
3/8	.3750	3/8	3/4	2 1/2	4	44276	39.16	96514	43.08	44455	45.03
1/2	.5000	1/2	1 1/4	3 1/4	4	44277	45.34	96515	49.88	44456	52.14
5/8	.6250	5/8	1 5/8	3 3/4	4	44278	67.77	96516	74.54	44457	77.93
3/4	.7500	3/4	1 5/8	3 7/8	4	44279	78.61	96517	86.47	44458	90.40
7/8	.8750	7/8	1 7/8	4 1/8	4	44280	108.85	96518	119.74	—	—
1	1.0000	1	2	4 1/2	4	44281	131.45	96519	144.59	44460	151.67
1	1.0000	1	2	4 1/2	6	—	—	—	—	44461	151.67
1 1/4	1.2500	1 1/4	2	4 1/2	4	44282	142.54	—	—	—	—
1 1/4	1.2500	1 1/4	2	4 1/2	6	—	—	—	—	—	—
1 1/2	1.5000	1 1/4	2	4 1/2	4	44283	185.32	—	—	—	—
1 1/2	1.5000	1 1/4	2	4 1/2	6	—	—	—	—	—	—

Multi-Flute Long Length Ball Nose Single End Mills

High Speed Steel
Bright Finish & TiN Coated
Center Cutting

List No. 4555 High Speed Steel
List No. 4555G High Speed Steel TiN Coated

STANDARD PACKAGE All sizes — 1 each

TOOL COATINGS AVAILABLE
TiN TiCN TiALN

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	4555 High Speed Steel EDP NO.	4555 High Speed Steel LIST PRICE	4555G High Speed Steel TIN COATED EDP NO.	4555G High Speed Steel TIN COATED LIST PRICE
1/4	.2500	3/8	1 1/4	3 1/16	4	44298	$40.11	96525	$46.13
5/16	.3125	3/8	1 3/8	3 1/8	4	44299	42.05	96526	48.36
3/8	.3750	3/8	1 1/2	3 1/4	4	44300	45.54	96527	52.37
1/2	.5000	1/2	2	4	4	44301	52.02	96528	59.82
5/8	.6250	5/8	2 1/2	4 5/8	4	44302	73.72	96529	84.78
3/4	.7500	3/4	3	5 1/4	4	44303	92.31	96530	106.16
1	1.0000	1	4	6 1/2	4	44304	149.40	—	—
1 1/4	1.2500	1 1/4	4	6 1/2	4	44305	228.29	—	—
1 1/2	1.5000	1 1/4	4	6 1/2	4	44306	239.71	—	—

Multi-Flute Coarse Pitch Roughing End Mills

High Speed Steel

Roughing end mills feature a chip breaker type cutting edge for heavier cuts, higher speeds and feeds and greatly increased productivity. Economical **High Speed Steel** roughing end mills are recommended for most materials of low to medium hardness.

List No. 4593

STANDARD PACKAGE All sizes — 1 each

TOOL COATINGS AVAILABLE
TiN TiCN TiALN

Regular Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
¼	.2500	⅜	⅝	2 7/16	3	44464	$26.23
5/16	.3125	⅜	¾	2½	3	44465	26.23
⅜	.3750	⅜	¾	2½	4	44466	26.23
½	.5000	½	1¼	3¼	4	44476	40.55
⅝	.6250	⅝	1⅝	3¾	4	44477	47.69
¾	.7500	¾	1⅝	3⅞	4	44478	58.44
1	1.0000	¾	2	4¼	5	44463	95.28
1	1.0000	1	2	4½	5	44480	96.82
1	1.0000	1	3	5½	5	44468	109.18
1¼	1.2500	¾	2	4¼	6	44469	128.97
1¼	1.2500	1¼	2	4½	6	44482	125.33
1½	1.5000	¾	2	4¼	6	44470	140.98
1½	1.5000	1¼	2	4½	6	44483	152.13
2	2.0000	1¼	2	4½	8	44471	201.53

Long Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
½	.5000	½	2	4	4	44467	$44.29
¾	.7500	¾	3	5¼	4	44488	72.43
1	1.0000	1	4	6½	5	44490	107.32
1¼	1.2500	1¼	4	6½	6	44491	141.91
1½	1.5000	1¼	4	6½	6	44492	173.15
2	2.0000	2	4	7¾	8	44485	306.22
2	2.0000	2	6	9¾	8	44494	344.62
2	2.0000	2	8	11¾	8	44495	486.47

Technical Publications

Machinist's Practical Guide

The original concept of a pocket size manual covering a wide range of practical information for the machinist, tool maker, engineer and student. End mills, cutters, drills, reamers, taps and tool bits are some of the cutting tool areas covered. Tool steels, tapers, speeds, feeds, cutting fluids, and a wealth of additional useful information is found in this complete 108-page handbook. Fits handily into shop coats, tool boxes, desk drawers, etc.

Machinist's Guide for Taps

Taps and screw threads play a very important part in "holding the world together by a thread." This booklet contains all the needed information for correct tapping work. Included are thread forms and dimensions, fits and limits, hole preparation and size, type of taps, speeds and lubricants, tap sharpening, and troubleshooting hints.

Machinist's Guide for Carbide Tooling

Carbide and its many applications is fully explained in this handy booklet. Complete coverage is given from the introduction and manufacture of carbide to its present major position in the cutting tools field. Included are design, application, geometrics, troubleshooting, speeds and feeds.

GUIDES	LIST NO.	DISPLAY BOX OF 50 (1 BOX) EDP. NO.	LIST PRICE	INDIVIDUAL COPIES EDP NO.	LIST PRICE
Machinist's Practical Guide	1001	20401	$336.00	20402	$7.20
Machinist's Guide for Taps	1002	20403	336.00	20404	7.20
Machinist's Guide for Carbide Tooling	1004	20407	336.00	20408	7.20

End Mill Sets

Single End and Double End
High Speed Steel
In Wooden Stand

2-Flute 6-Pc. Sets

Sizes 1/8″, 3/16″, 1/4″, 5/16″, 3/8″, 1/2″

(Sizes 1/8″ - 3/8″ are 3/8″ shank, size 1/2″ is 1/2″ shank)

High Speed Steel
Center Cutting

SET NO.	LIST NO.	DESCRIPTION	EDP NO.	LIST PRICE
W-11	1887	2 Flute, Single End, Ball Nose	45001	$152.28
W-13	1896	2 Flute, Double End	45015	144.37
W-15	1898	2 Flute, Single End	45025	101.40

4-Flute 6-Pc. Sets

Sizes 1/8″, 3/16″, 1/4″, 5/16″, 3/8″, 1/2″

(Sizes 1/8″ - 3/8″ are 3/8″ shank, size 1/2″ is 1/2″ shank)

High Speed Steel
Non-Center Cutting

SET NO.	LIST NO.	DESCRIPTION	EDP NO.	LIST PRICE
W-12	1895	4 Flute, Double End	45010	$145.40
W-14	1897	4 Flute, Single End	45020	100.80

3/4″ Shank 6-Pc. Multi-Flute Set

Sizes 3/4″, 7/8″, 1″, 1-1/8″, 1-1/4″, 1-1/2″

High Speed Steel
Non-Center Cutting

SET NO.	LIST NO.	DESCRIPTION	EDP NO.	LIST PRICE
W-21	1897	Multi-Flute, Single End	45021	$445.32

M42 8% Cobalt Coarse Pitch Roughing End Mills

Roughing end mills feature a chip breaker type cutting edge for heavier cuts, higher speeds and feeds and greatly increased productivity. **Coarse Pitch** is recommended for a wide variety of materials of soft to medium hardness including titanium and aluminum alloys.

List No. 4594

M42 8% Cobalt offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications.

STANDARD PACKAGE All sizes — 1 each

Regular Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
1/4	.2500	3/8	5/8	2 7/16	3	44496	$30.09
5/16	.3125	3/8	3/4	2 1/2	3	44497	30.09
3/8	.3750	3/8	3/4	2 1/2	4	44498	30.09
1/2	.5000	1/2	1 1/4	3 1/4	4	44501	41.88
5/8	.6250	5/8	1 5/8	3 3/4	4	44502	48.30
3/4	.7500	5/8	1 5/8	3 7/8	4	44635	69.80
3/4	.7500	3/4	1 5/8	3 7/8	4	44503	65.90
7/8	.8750	3/4	1 7/8	4 1/8	5	44636	93.46
7/8	.8750	7/8	1 7/8	4 1/8	5	44637	105.79
1	1.0000	3/4	2	4 1/4	5	44500	96.13
1	1.0000	1	2	4 1/2	5	44505	99.52
1 1/8	1.1250	1	2	4 1/2	6	44638	117.25
1 1/4	1.2500	1 1/4	2	4 1/2	6	44508	126.97
1 1/4	1.2500	3/4	2	4 1/4	6	44639	134.61
1 1/2	1.5000	3/4	2	4 1/4	6	44640	170.74
1 1/2	1.5000	1 1/4	2	4 1/2	6	44511	184.20
1 3/4	1.7500	1 1/4	2	4 1/2	6	44641	187.55
2	2.0000	1 1/4	2	4 1/2	6	44519	222.57
2	2.0000	2	2	5 3/4	8	44642	293.04

Long Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
1/2	.2500	1/2	2	4	4	44499	$59.83
5/8	.6250	5/8	2 1/2	4 5/8	4	44643	82.31
3/4	.7500	3/4	3	5 1/8	4	44504	81.50
1	1.0000	1	4	6 1/2	5	44507	113.34
1 1/4	1.2500	1 1/4	4	6 1/2	6	44510	182.85
1 1/2	1.5000	1 1/4	4	6 1/2	6	44513	218.49
1 3/4	1.7500	1 1/4	4	6 1/2	6	44644	294.91
2	2.0000	1 1/4	4	6 1/2	6	44645	353.45
2	2.0000	2	4	7 3/4	8	44516	304.08
2	2.0000	2	6	9 3/4	8	44517	379.78
2	2.0000	2	8	11 3/4	8	44518	568.15

End Mills with 2" dia. shanks are provided with a dual drive shank.

M42 8% Cobalt Fine Pitch Roughing End Mills

Roughing end mills feature a chip breaker type cutting edge for heavier cuts, higher speeds and feeds and greatly increased productivity. **Fine Pitch** is recommended for difficult-to-machine, high tensile strength, abrasive and harder materials up to 40 Rc.

List No. 4596

M42 8% Cobalt offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications.

STANDARD PACKAGE All sizes — 1 each

Regular Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
1/4	.2500	3/8	5/8	2 7/16	3	44650	$35.70
5/16	.3125	3/8	3/4	2 1/2	3	44651	35.70
3/8	.3750	3/8	3/4	2 1/2	4	44652	35.70
7/16	.4375	3/8	1	2 11/16	4	44653	51.41
1/2	.5000	1/2	1 1/4	3 1/4	4	44654	51.41
9/16	.5625	1/2	1 3/8	3 3/8	4	44655	61.79
5/8	.6250	5/8	1 5/8	3 3/4	4	44656	58.91
3/4	.7500	5/8	1 5/8	3 3/4	4	44657	78.79
3/4	.7500	3/4	1 5/8	3 7/8	4	44658	78.79
7/8	.8750	3/4	1 7/8	4 1/8	5	44659	102.59
7/8	.8750	7/8	1 7/8	4 1/8	5	44660	105.08
1	1.0000	3/4	2	4 1/8	5	44661	113.62
1	1.0000	1	2	4 1/2	5	44662	113.62
1 1/8	1.1250	1	2	4 1/2	6	44663	134.74
1 1/4	1.2500	3/4	3 1/2	4 1/2	6	44664	154.79
1 1/4	1.2500	1 1/4	2	4 1/2	6	44665	154.79
1 1/2	1.5000	3/4	1 1/2	4 1/2	6	44666	215.98
1 1/2	1.5000	1 1/4	2	4 1/2	6	44667	196.35
1 3/4	1.7500	1 1/4	2	4 1/2	6	44668	225.45
2	2.0000	3/4	2	4 1/2	6	44669	233.38
2	2.0000	1 1/4	2	4 1/2	6	44670	233.38

Long Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
1/2	.5000	1/2	2	4	4	44671	$62.35
5/8	.6250	5/8	2 1/2	4 5/8	4	44672	94.66
3/4	.7500	3/4	3	5 1/8	4	44673	99.33
7/8	.8750	7/8	3 1/2	5 3/4	5	44674	104.76
1	1.0000	1	4	6 1/2	5	44675	134.33
1 1/2	1.5000	1 1/4	4	6 1/2	6	44678*	254.64
2	2.0000	1 1/4	4	6 1/2	6	44679*	393.12

*** Available While Supplies Last**

M42 8% Cobalt Coarse Pitch Center Cutting Roughing End Mills

Center Cutting

Roughing end mills feature a chip breaker type cutting edge for heavier cuts, higher speeds and feeds and greatly increased productivity. **Coarse Pitch** is recommended for a wide variety of materials of soft to medium hardness including titanium and aluminum alloys. **Center Cutting** end allows for plunge cutting like a drill into solid material.

List No. 4611 — Regular Length
List No. 4612 — Medium & Long Length

M42 8% Cobalt offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications. **Tool Coatings** further enhance milling performance.

STANDARD PACKAGE All sizes — 1 each

List No. 4611 - Uncoated / 4611G - TiN / 4611C - TiCN - Regular Length

						UNCOATED		TiN COATED		TiCN COATED	
DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
½	.5000	½	1¼	3¼	4	44910	$55.53	44921	$63.46	44932	$64.10
⅝	.6250	⅝	1⅝	3¾	4	44911	75.46	44922	86.04	44933	89.92
¾	.7500	¾	1⅝	3⅞	4	44912	85.82	44923	97.13	44934	98.02
⅞	.8750	¾	1⅞	4⅛	5	44913	104.24	44924	124.18	44935	131.46
1	1.0000	1	2	4½	5	44914	122.82	44925	146.58	44936	156.80
1¼	1.2500	1¼	2	4½	6	44915	170.70	44926	201.13	44937	212.26
1½	1.5000	1¼	2	4½	6	44916	197.67	44927	235.52	44938	249.35
2	2.0000	2	2	5¾	8	44917*	386.29	44928*	459.10	44939*	483.25
2	2.0000	2	3	6¾	8	44918*	411.44	44929*	492.66	44940*	522.23
2	2.0000	2	4	7¾	8	44919*	454.56	44930*	545.91	44941*	579.22
2	2.0000	2	6	9¾	8	44920*	585.71	44931*	697.38	44942*	738.06

End Mills with 2" dia. shanks are provided with a dual drive shank

*** Available while supplies last**

List No. 4612 - Uncoated / 4612G - TiN / 4612C - TiCN - Medium & Long Length

						UNCOATED		TiN COATED		TiCN COATED	
DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
½	.5000	½	2	4	4	44943	$95.73	44952	$103.82	44961	$107.30
⅝	.6250	⅝	2½	4⅝	4	44944	111.40	44953	124.14	44962	128.77
¾	.7500	¾	3	5¼	4	44945	113.22	44954	129.38	44963	131.36
1	1.0000	1	3	5½	5	44946	150.93	44955	180.50	44964	191.31
1	1.0000	1	4	6½	5	44947	170.70	44956	204.50	44965	216.83
1¼	1.2500	1¼	3	5½	6	44948	203.01	44957	238.54	44966	251.50
1¼	1.2500	1¼	4	6½	6	44949	233.57	44958	274.10	44967	288.97
1½	1.5000	1¼	3	5½	6	44950	231.79	44959	276.21	44968	292.41
1½	1.5000	1¼	4	6½	6	44951	276.70	44960	327.45	44969	345.95

Tool Coatings

TITANIUM NITRIDE (TiN) for increased production and lower overall tooling costs. An excellent coating for machining a wide variety of materials at greatly increased speeds and feeds. TiN coating increases tool surface hardness, lubricity, and heat resistance and resists chip welding.

TITANIUM CARBONITRIDE (TiCN) for very aggressive feeds and speeds in production applications. Especially recommended for difficult-to-machine, gummy and abrasive materials.

TITANIUM ALUMINUM NITRIDE (TiALN) for high thermal stress applications including dry machining, abrasive materials and hard-to-machine materials that generate higher cutting temperatures. An excellent universal high performance coating.

M42 8% Cobalt Fine Pitch Center Cutting Roughing End Mills

Center Cutting

Roughing end mills feature a chip breaker type cutting edge for heavier cuts, higher speeds and feeds and greatly increased productivity. **Fine Pitch** is recommended for difficult-to-machine, high tensile strength, abrasive and harder materials up to 40 Rc. **Center Cutting** end allows for plunge cutting like a drill into solid material.

List No. 4613 — Regular Length
List No. 4614 — Medium & Long Length

M42 8% Cobalt offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications. **Tool Coatings** further enhance milling performance.

STANDARD PACKAGE All sizes — 1 each

List No. 4613 - Uncoated / 4613G - TiN / 4613C - TiCN - Regular Length

						UNCOATED		TiN COATED		TiCN COATED	
DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
½	.5000	½	1¼	3¼	4	44970	$58.16	44981	$66.47	45050	$69.52
⅝	.6250	⅝	1⅝	3¾	4	44971	75.46	44982	86.04	45051	100.99
¾	.7500	¾	1⅝	3¼	4	44972	96.31	44983	97.94	45052	102.82
⅞	.8750	¾	1⅞	4⅛	5	44973	104.24	44984	124.18	45053	131.46
1	1.0000	1	2	4½	5	44974	131.14	44985	156.53	45054	165.78
1¼	1.2500	1¼	2	4½	6	44975	170.70	44986	201.13	45055	212.25
1½	1.5000	1¼	2	4½	6	44976	197.67	44987	235.52	45056	249.35
2	2.0000	2	2	5¾	8	44977*	386.29	—	—	45057*	563.58
2	2.0000	2	3	6¾	8	44978*	411.44	44989*	546.49	45058*	614.03
2	2.0000	2	4	7¾	8	44979*	457.05	44990*	608.99	45059*	684.99
2	2.0000	2	6	9¾	8	44980*	585.71	44991*	771.43	45060*	864.31

End Mills with 2" dia. shanks are provided with a dual drive shank
*** Available while supplies last**

List No. 4614 - Uncoated / 4614G - TiN / 4614C - TiCN - Medium & Long Length

						UNCOATED		TiN COATED		TiCN COATED	
DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
½	.5000	½	2	4	4	45061	$95.73	45070	$103.82	45079	$107.30
⅝	.6250	⅝	2½	4⅝	4	45062	111.40	45071	124.14	45080	128.77
¾	.7500	¾	3	5¼	4	45063	118.61	45072	135.54	45081	141.72
1	1.0000	1	3	5½	5	45064	150.93	45073	180.50	45082	191.31
1	1.0000	1	4	6½	5	45065	170.70	45074	204.50	45083	216.83
1¼	1.2500	1¼	3	5½	6	45066	203.01	45075	238.54	45084	251.50
1¼	1.2500	1¼	4	6½	6	45067	233.57	45076	274.10	45085	288.97
1½	1.5000	1¼	3	5½	6	45068	231.79	45077	276.21	45086	292.41
1½	1.5000	1¼	4	6½	6	45069	276.70	45078	327.45	45087	345.95

CUTTING FLUIDS SELECTION

Coolants and lubricants offer many benefits including reduced friction and heat, enhanced chip removal, improved accuracy and surface finish, higher speeds and feeds, corrosion protection and increased tool life.

Proper selection and application of cutting fluids is critical to optimizing machining applications. **Please consult your cutting fluids supplier for advice on your specific machining application.**

M42 8% Cobalt Coarse Pitch Ball Nose Roughing End Mills

Center Cutting

Roughing end mills feature a chip breaker type cutting edge for heavier cuts, higher speeds and feeds and greatly increased productivity. **Ball Nose** end mills are designed for milling die cavities, fillets, round bottom holes and radius bottom slots. **Coarse Pitch** is recommended for a wide variety of materials of soft to medium hardness including titanium and aluminum alloys. **Center Cutting** end allows for plunge cutting like a drill into solid material.

List No. 4607 — Regular Length
List No. 4608 — Medium & Long Length

M42 8% Cobalt offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications. **Tool Coatings** further enhance milling performance.

STANDARD PACKAGE All sizes — 1 each

List No. 4607 - Uncoated / 4607G - TiN / 4607C - TiCN - Regular Length

						UNCOATED		TiN COATED		TiCN COATED	
DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
½	.5000	½	1¼	3¼	4	44817*	$92.53	44826*	$100.47	44835*	$103.89
⅝	.6250	⅝	1⅝	3¾	4	44818*	123.99	44827*	134.55	44836*	138.44
¾	.7500	¾	1⅝	3⅞	4	44819*	134.62	44828*	145.95	44837*	150.82
1	1.0000	1	2	4½	5	44820*	226.39	44829*	251.76	44838*	261.01
1¼	1.2500	1¼	2	4½	6	44821*	283.88	44830*	314.33	44839*	325.43
1½	1.5000	1¼	2	4½	6	44822*	359.31	—	—	—	—
2	2.0000	2	4	7¾	8	44824*	598.28	44833*	689.65	44842*	722.94
2	2.0000	2	6	9¾	8	44825*	770.77	44834*	882.44	44843*	923.11

End Mills with 2″ dia. shanks are provided with a dual drive shank
***Available while supplies last**

List No. 4608 - Uncoated / 4608G - TiN / 4608C - TiCN - Medium & Long Length

						UNCOATED		TiN COATED		TiCN COATED	
DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
½	.5000	½	2	4	4	44844*	$123.99	44850*	$132.46	44856*	$135.50
⅝	.6250	⅝	2½	4⅝	4	44845*	154.53	44851*	167.26	44857*	171.89
¾	.7500	¾	3	5¼	4	44846*	167.08	44852*	184.03	44858*	190.20
1	1.0000	1	4	6½	5	44847*	260.50	44853*	294.32	44859*	306.63
1¼	1.2500	1¼	4	6½	6	44848*	344.96	44854*	385.57	44860*	400.37
1½	1.5000	1¼	4	6½	6	44849*	404.23	44855*	455.00	44861*	473.48

***Available while supplies last**

Tool Coatings

TITANIUM NITRIDE (TiN) for increased production and lower overall tooling costs. An excellent coating for machining a wide variety of materials at greatly increased speeds and feeds. TiN coating increases tool surface hardness, lubricity, and heat resistance and resists chip welding.

TITANIUM CARBONITRIDE (TiCN) for very aggressive feeds and speeds in production applications. Especially recommended for difficult-to-machine, gummy and abrasive materials.

TITANIUM ALUMINUM NITRIDE (TiALN) for high thermal stress applications including dry machining, abrasive materials and hard-to-machine materials that generate higher cutting temperatures. An excellent universal high performance coating.

M42 8% Cobalt Fine Pitch Ball Nose Roughing End Mills

Center Cutting

Roughing end mills feature a chip breaker type cutting edge for heavier cuts, higher speeds and feeds and greatly increased productivity. **Ball Nose** end mills are designed for milling die cavities, fillets, round bottom holes and radius bottom slots. **Fine Pitch** is recommended for difficult-to-machine, high tensile strength, abrasive and harder materials up to 40 Rc. **Center Cutting** end allows for plunge cutting like a drill into solid material.

List No. 4609

M42 8% Cobalt offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications. **Tool Coatings** further enhance milling performance.

STANDARD PACKAGE All sizes — 1 each

List No. 4609 - Uncoated / 4609G - TiN / 4609C - TiCN

						UNCOATED		TiN COATED		TiCN COATED	
DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
½	.5000	½	1¼	3¼	4	44862*	$98.81	44871*	$107.28	44880*	$110.39
⅝	.6250	⅝	1⅝	3¾	4	44863*	123.99	44872*	134.55	44881*	138.44
¾	.7500	¾	1⅝	3⅞	4	44864*	143.75	44873*	155.85	44882*	160.27
1	1.0000	1	2	4½	5	44865*	226.39	44874*	251.76	44883*	261.01
1¼	1.2500	1¼	2	4½	6	—	—	44875*	314.33	44884*	325.43
1½	1.5000	1¼	2	4½	6	44867*	359.31	44876*	397.19	44885*	411.00
2	2.0000	2	4	7¾	8	44869*	598.28	44878*	689.65	44887*	722.94
2	2.0000	2	6	9¾	8	44870*	770.77	44879*	882.44	44888*	923.11

End Mills with 2″ dia. shanks are provided with a dual drive shank

***Available while supplies last**

M42 8% Cobalt Coarse Pitch Stub Length Roughing End Mills

Center Cutting

Roughing end mills feature a chip breaker type cutting edge for heavier cuts, higher speeds and feeds and greatly increased productivity. **Stub Length** provides increased rigidity in shallow milling applications. **Coarse Pitch** is recommended for a wide variety of materials of soft to medium hardness including titanium and aluminum alloys. **Center Cutting** end allows for plunge cutting like a drill into solid material.

List No. 4610

M42 8% Cobalt offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications. **Tool Coatings** further enhance milling performance.

STANDARD PACKAGE All sizes — 1 each

List No. 4610 - Uncoated / 4610G - TiN / 4610C - TiCN

						UNCOATED		TiN COATED		TiCN COATED	
DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
¼	.2500	⅜	¼	2 1/16	3	44889	$31.54	44896	$34.76	44903	$36.63
⅜	.3750	⅜	⅜	2 5/32	4	44890	32.52	44897	36.29	44904	38.17
½	.5000	½	½	2½	4	44891	43.55	44898	49.60	44905	61.45
⅝	.6250	⅝	⅝	2¾	4	44892	54.55	44899	62.11	44906	74.89
¾	.7500	¾	¾	2⅞	4	44893	65.03	44900	72.82	44907	90.22
1	1.0000	1	1	3½	5	44894	98.08	44901	116.97	44908	142.62
1¼	1.2500	1¼	1¼	3¾	6	44895*	130.09	44902*	152.74	—	—

***Available while supplies last**

M42 8% Cobalt Roughing / Finishing End Mills

Center Cutting

List No. 4640 — Bright Finish

List No. 4640G — TiN Coated

List No. 4640C — TiCN Coated

Roughing / Finishing end mills rough and finish in a single pass, removing material at roughing rates while producing a finish near that produced by standard end mills. Recommended for a wide variety of materials of soft to medium hardness including titanium and aluminum alloys.

M42 8% Cobalt offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications. **Tool Coatings** further enhance milling performance.

						UNCOATED		TiN COATED		TiCN COATED	
DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
3/16	.1875	3/8	1/2	2 3/8	4	45100	$28.58	45200	$36.51	45300	$40.46
1/4	.2500	3/8	5/8	2 7/16	4	45101	28.58	45201	36.51	45301	40.46
5/16	.3125	3/8	3/4	2 1/2	4	45102	28.58	45202	36.51	45302	40.46
5/16	.3125	3/8	1 3/8	3 1/8	4	45103	35.71	45203	45.93	45303	51.11
3/8	.3750	3/8	3/4	2 1/2	4	45104	28.58	45204	36.51	45304	40.46
7/16	.4375	3/8	1	2 11/16	4	45105	43.86	45205	53.72	45305	58.67
1/2	.5000	1/2	1 1/4	3 1/4	4	45106	43.86	45206	56.45	45306	62.75
1/2	.5000	1/2	2	4	4	45107	53.57	45207	66.14	45307	72.44
1/2	.5000	1/2	3	5	4	45108	61.14	45208	76.49	45308	84.14
1/2	.5000	1/2	1	3	4	45109*	39.12	45209*	48.53	—	—
1/2	.5000	1/2	1 5/8	3 5/8	4	45110*	46.15	—	—	45310*	64.15
1/2	.5000	1/2	2 1/2	4 1/2	4	45111*	53.85	45211*	68.44	—	—
9/16	.5625	1/2	1 3/8	3 3/8	4	45112	55.14	45212	69.23	45312	76.28
5/8	.6250	5/8	1 5/8	3 3/4	4	45113	55.14	45213	69.23	45313	76.28
5/8	.6250	5/8	2 1/2	4 5/8	4	45114	71.43	45214	88.16	45314	96.58
5/8	.6250	5/8	3 1/8	5 1/4	4	45115*	81.54	45215*	97.58	45315*	105.60
5/8	.6250	5/8	3/4	2 7/8	4	45116*	42.86	45216*	53.67	45316*	59.08
5/8	.6250	5/8	1 1/4	3 3/8	4	45117*	47.25	45217*	60.66	45317*	67.36
5/8	.6250	5/8	2 1/8	4 1/4	4	45118*	61.10	45218*	71.91	45318*	77.32
11/16	.6875	5/8	1 5/8	3 3/4	4	45119	69.14	45219	86.31	45319	94.97
3/4	.7500	5/8	1 5/8	3 3/4	4	45120	69.14	45220	86.31	45320	94.97
3/4	.7500	3/4	1 5/8	3 3/4	4	45121	69.14	45221	86.31	45321	94.97
3/4	.7500	3/4	3	5 1/4	4	45122	85.43	45222	105.14	45322	115.02
3/4	.7500	3/4	4 1/8	6 3/8	4	45123	99.71	45223	128.86	45323	142.80
3/4	.7500	3/4	3/4	3	4	45124*	56.48	45224*	69.45	45324*	75.93
3/4	.7500	3/4	1 1/4	3 1/2	4	45125*	60.44	45225*	76.92	45325*	85.16
3/4	.7500	3/4	2 1/2	4 5/8	4	45126*	73.41	45226*	92.22	45326*	101.63
13/16	.8125	3/4	1 7/8	4 1/8	5	45127	76.29	45227	95.91	45327	105.79
7/8	.8750	3/4	1 7/8	4 1/8	5	45128	86.00	45228	115.76	45328	130.59
7/8	.8750	3/4	1 1/8	3 3/8	5	45129*	75.82	45229*	99.38	—	—
7/8	.8750	7/8	1 7/8	4 1/8	5	45130*	81.98	45230*	110.24	45330*	124.37
7/8	.8750	7/8	3 1/2	5 3/4	5	45131*	95.38	45231*	129.05	45331*	145.89
1	1.0000	3/4	2	4 1/4	5	45132	104.29	45232	133.75	45332	148.60
1	1.0000	3/4	4	6 1/4	5	45133*	112.97	45233*	146.64	45333*	163.47
1	1.0000	3/4	1 1/8	3 3/8	5	45134*	79.78	45234*	103.34	45334*	115.12
1	1.0000	3/4	1 1/2	3 3/4	5	45135*	89.01	45235*	112.57	45335*	124.35
1	1.0000	3/4	3	5 1/4	5	45136*	103.96	45236*	137.63	45336*	154.46
1	1.0000	1	2	4 1/2	5	45137	104.29	45237	133.75	45337	148.68
1	1.0000	1	4	6 1/2	5	45138	118.86	45238	153.98	45338	171.65
1	1.0000	1	6	8 1/2	5	45139	155.00	45239	202.30	45339	226.02
1	1.0000	1	1 1/8	3 5/8	5	45140*	79.78	45240*	103.34	45340*	115.12
1	1.0000	1	1 5/8	4 1/8	5	45141*	89.01	45241*	117.27	—	—
1	1.0000	1	3	5 1/2	5	45142	109.29	45242	138.84	45342	153.67
1 1/8	1.1250	3/4	2	4 1/4	6	45143	121.43	45243	159.47	45343	178.50
1 1/8	1.1250	1	2	4 1/2	6	45144*	115.60	45244*	151.87	45344*	170.00
1 1/4	1.2500	3/4	2	4 1/4	6	45145	145.14	45245	183.24	45345	202.28
1 1/4	1.2500	3/4	1 1/8	3 3/8	6	45146*	125.71	45246*	155.16	45346*	169.89
1 1/4	1.2500	1 1/4	2	4 1/2	6	45147	145.14	45247	183.24	45347	202.28
1 1/4	1.2500	1 1/4	4	6 1/2	6	45148	176.57	45248	222.05	45348	244.80
1 1/4	1.2500	1 1/4	6	8 1/2	6	45149	230.29	45249	283.25	45349	309.84
1 1/4	1.2500	1 1/4	3	5 1/2	6	45150*	157.14	45250*	193.41	45350*	211.54
1 3/8	1.3750	3/4	2	4 1/4	6	45151*	147.91	45251*	205.58	45351*	234.42
1 3/8	1.3750	3/4	1 1/8	3 3/8	6	45152*	132.31	45252*	179.38	45352*	202.92
1 1/2	1.5000	3/4	2	4 1/2	6	45153	173.14	45253	233.64	45353	263.91
1 1/2	1.5000	3/4	1 1/8	3 3/8	6	45154*	143.52	45254*	190.59	45354*	214.13
1 1/2	1.5000	3/4	1 1/2	3 3/4	6	45155*	150.33	45255*	224.48	45355*	261.56
1 1/2	1.5000	1 1/4	2	4 1/2	6	45156	173.14	45256	233.64	45356	263.91
1 1/2	1.5000	1 1/4	4	6 1/2	6	45157	223.57	45257	322.25	45357	371.68
1 1/2	1.5000	1 1/4	6	8 1/2	6	45158	308.57	45258	426.65	45358	487.20
1 1/2	1.5000	1 1/4	3	5 1/2	6	45159*	196.04	45259*	270.20	45359*	307.27

*** Available while supplies last**

M42 8% Cobalt High Helix 4-Flute Coolant Fed Roughing / Finishing End Mills

Center Cutting – 38° Helix Angle

Roughing / Finishing end mills rough and finish in a single pass. Deep Flutes and **38° High Helix** angle designed for milling **Aluminum**, aluminum alloys, magnesium, zinc alloys and other soft non-ferrous materials. **Center Cutting** end allows for plunge cutting like a drill into solid material. **Coolant Flow** through the center reduces friction and heat, flushes out chips and extends tool life.

List No. 4601* — Regular Length
List No. 4602* — Medium Length
List No. 4603* — Long Length
List No. 4604* — Extra Long Length

M42 8% Cobalt offers increased wear and heat resistance for abrasive and difficult materials, higher speeds and feeds and long life in production applications. **Tool Coatings** further enhance milling performance.

STANDARD PACKAGE All sizes — 1 each

List No. 4601* - Uncoated / 4601G - TiN / 4601C - TiCN - Regular Length

					UNCOATED		TiN COATED		TiCN COATED	
DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1	1.0000	1	2	4½	—	—	44704*	$237.50	44708*	$246.18
1¼	1.2500	1¼	2	4½	44701*	$290.66	44705*	318.56	44709*	327.86
1½	1.5000	1¼	2	4½	44702*	326.58	44706*	370.96	44710*	385.30
2	2.0000	2	2	5¾	44703*	629.30	44707*	698.22	44711*	720.30

*Available While Supplies Last

List No. 4602* - Uncoated / 4602G - TiN / 4602C - TiCN - Medium Length

					UNCOATED		TiN COATED		TiCN COATED	
DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1	1.0000	1	3	5½	44712*	$239.66	—	—	—	—
1¼	1.2500	1¼	3	5½	—	—	44717*	$357.57	44721*	$368.73
1½	1.5000	1¼	3	5½	44714*	362.64	44718*	407.02	44722*	424.80
2	2.0000	2	3	6¾	44715*	726.72	44719*	803.94	44723*	828.18

*Available While Supplies Last

List No. 4603* - Uncoated / 4603G - TiN / 4603C - TiCN - Long Length

					UNCOATED		TiN COATED		TiCN COATED	
DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1	1.0000	1	4	6½	44724*	$266.68	44728*	$292.60	44732*	$302.98
1¼	1.2500	1¼	4	6½	—	—	44729*	407.99	44733*	421.32
1½	1.5000	1¼	4	6½	44726*	419.57	44730*	471.19	44734*	491.89
2	2.0000	2	4	7¾	44727*	824.12	44731*	912.70	44735*	941.15

*Available While Supplies Last

List No. 4604* - Uncoated / 4604G - TiN / 4604C - TiCN - Extra Long Length

					UNCOATED		TiN COATED		TiCN COATED	
DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
1	1.0000	1	6	8½	44736*	$373.27	44740*	$403.71	44744*	$415.89
1¼	1.2500	1¼	6	8½	44737*	485.72	—	—	44745*	540.28
1½	1.5000	1¼	6	8½	44738*	629.57	44742*	689.34	44746*	713.28
2	2.0000	2	6	9¾	44739*	973.95	44743*	1085.06	44747*	1120.77

End Mills with 2" dia. shanks are provided with a dual drive shank

*Available While Supplies Last

Carbide Tipped End Mills for High Strength and Hardened Steels

6° Left Hand Helix – Right Hand Cut

Left Hand Helix flutes absorb the impact shock when entering the cut, keep a constant pressure on the workpiece and minimize chatter. Recommended for peripheral milling of tough high strength steel alloys and hardened steels.

List No. 5964

Carbide Tipped end mills offer excellent heat and wear resistance, increased speeds and feeds and enhanced tool life. They are also tougher than solid carbide tools in less than optimal machining setups.

STANDARD PACKAGE All sizes — 1 each

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF C-TIP	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
1/4	.2500	3/8	1/2	2 1/2	2	57701	$73.43
5/16	.3125	3/8	5/8	2 1/2	2	57702	79.19
3/8	.3750	3/8	5/8	2 1/2	2	57703	84.16
7/16	.4375	3/8	1	2 11/16	2	57704	84.20
1/2	.5000	1/2	1	3	4	57705	94.06
9/16	.5625	1/2	1	3 3/8	4	57706	101.17
5/8	.6250	1/2	1	3 3/8	4	57707	124.70
3/4	.7500	5/8	1	3 5/8	4	57708	134.15
7/8	.8750	5/8	1 1/4	4	4	57709	$149.05
1	1.0000	7/8	1 1/4	4	6	57710	171.33
1 1/8	1.1250	1	1 1/4	4 1/4	6	57711	181.87
1 1/4	1.2500	1	1 1/4	4 1/4	6	57712	211.53
1 1/2	1.5000	1 1/4	1 1/2	4 1/2	6	57713	247.82
1 3/4	1.7500	1 1/4	1 1/2	4 1/2	8	57714	298.26
2	2.0000	1 1/4	1 1/2	4 1/2	8	57715	333.11

Carbide Tipped Shear Cut End Mills for Non-Ferrous Materials

25° Right Hand Helix – Center Cutting 2-Flutes

25° Helix Shear Cut design improves cutting action, surface finish, chip removal and tool life. **2-Flutes** feature a large flute capacity for heavy milling of long chipping non-ferrous materials. **Center Cutting** end allows for plunge cutting like a drill into solid material.

List No. 5966

Carbide Tipped end mills offer excellent heat and wear resistance, increased speeds and feeds and enhanced tool life. They are also tougher than solid carbide tools in less than optimal machining setups.

STANDARD PACKAGE All sizes — 1 each

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF C-TIP	OAL	EDP NO.	LIST PRICE
1/2	.5000	1/2	1	3	57751*	$216.26
5/8	.6250	5/8	1 1/4	3 3/8	57752*	241.77
3/4	.7500	3/4	1 1/4	3 3/8	57753*	256.04
7/8	.8750	7/8	1 1/2	3 3/4	57754*	281.65
1	1.0000	1	1 1/2	4	57755*	323.70
1 1/4	1.2500	1 1/4	1 3/4	4 1/4	57756*	403.57
1 1/2	1.5000	1 1/2	2	4 3/4	57757*	476.71

*** Available While Supplies Last**

TOOL COATING SERVICE

Morse Cutting tools now offers a variety of tool coatings for enhanced cutting performance and increased tool life. Please inquire.

TiN — Titanium Carbide

TiCN — Titanium Carbonitride

TiALN — Titanium Aluminum Nitride

CrN — Chromium Nitride

Carbide Tipped End Mills for Non-Ferrous Materials

6° Right Hand Helix

Spiral Flutes improve cutting action and chip flow for increased speeds and feeds. Recommended for milling of zinc, aluminum and other non-ferrous materials.

List No. 5921

Carbide Tipped end mills offer excellent heat and wear resistance, increased speeds and feeds and enhanced tool life. They are also tougher than solid carbide tools in less than optimal machining setups.

STANDARD PACKAGE All sizes — 1 each

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF C-TIP	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
1/4	.2500	3/8	1/2	2 1/2	2	57301*	$63.60
5/16	.3125	3/8	5/8	2 1/2	2	57302*	66.00
3/8	.3750	3/8	5/8	2 1/2	2	57303*	70.69
7/16	.4375	3/8	1	2 11/16	2	57304*	70.78
1/2	.5000	1/2	1	3	2	57305*	75.30
9/16	.5625	1/2	1	3 3/8	2	57306*	83.37
5/8	.6250	1/2	1	3 3/8	4	57307*	93.39
3/4	.7500	5/8	1	3 5/8	4	57308*	$102.82
1	1.0000	7/8	1 1/4	4	4	57310*	140.52
1 1/8	1.1250	1	1 1/4	4 1/4	4	57311*	159.31
1 1/4	1.2500	1	1 1/4	4 1/4	4	57312*	172.50
1 1/2	1.5000	1 1/4	1 1/2	4 1/2	4	57313*	205.80

* Available While Supplies Last

Carbide Tipped Straight Flute End Mills

Straight Flutes for general purpose milling in a variety of materials.

Carbide Tipped end mills offer excellent heat and wear resistance, increased speeds and feeds and enhanced tool life. They are also tougher than solid carbide tools in less than optimal machining setups.

List No. 5923
2-Flute for Cast Iron and Short Chipping Non-Ferrous Materials

List No. 5923 — 2-Flute

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF C-TIP	OAL	EDP NO. 5923	LIST PRICE
1/4	.2500	3/8	1/2	2 1/2	57331*	$72.05
5/16	.3125	3/8	5/8	2 1/2	57332*	74.79
3/8	.3750	3/8	5/8	2 1/2	57333*	80.09
7/16	.4375	3/8	1	2 11/16	57334*	80.09
1/2	.5000	1/2	1	3	57335*	85.29
9/16	.5625	1/2	1	3 3/8	57336*	85.87
5/8	.6250	1/2	1	3 3/8	57337*	85.87
11/16	.6875	5/8	1	3 3/8	57338*	98.92
3/4	.7500	5/8	1	3 5/8	57339*	102.04
13/16	.8125	5/8	1	3 5/8	57340*	112.97
7/8	.8750	5/8	1 1/4	4	57341*	124.25
15/16	.9375	7/8	1 1/4	4	57342*	127.81
1	1.0000	7/8	1 1/4	4	57343*	133.46
1 1/8	1.1250	1	1 1/4	4 1/4	57344*	136.93
1 1/4	1.2500	1	1 1/4	4 1/4	57345*	147.08
1 1/2	1.5000	1 1/4	1 1/2	4 1/2	57346*	173.65

List No. 5935
3-Flute – Center Cutting for Cast Iron and Short Chipping Non-Ferrous Materials

List No. 5936
3-Flute – Center Cutting for Low to Medium Strength Steels

List Nos. 5935 - 5936 — 3-Flute

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF C-TIP	OAL	EDP NO. 5935	LIST PRICE	EDP NO. 5936	LIST PRICE
3/8	.3750	3/8	1/2	2 1/2	57431*	$118.38	57442*	$118.38
7/16	.4375	3/8	3/4	2 1/2	57432*	121.04	57443*	121.04
1/2	.5000	1/2	3/4	3	57433*	128.80	57444*	128.80
9/16	.5625	1/2	3/4	3	57434*	133.93	57445*	133.93
5/8	.6250	5/8	3/4	3 1/4	57435*	156.72	57446*	156.74
3/4	.7500	5/8	3/4	3 3/8	57436*	164.04	57447*	164.04
7/8	.8750	7/8	3/4	3 27/32	57437*	191.52	57448*	191.52
1	1.0000	7/8	3/4	3 3/4	57438*	210.25	57449*	210.25
1 1/8	1.1250	1	3/4	4	57439*	225.23	57450*	225.23
1 1/4	1.2500	1	3/4	4	57440*	304.20	57451*	251.40
1 1/2	1.5000	1 1/4	3/4	4	57441*	306.27	57452*	298.81

* Available While Supplies Last

Carbide Tipped Shear Cut End Mills

Multi-Flute

Shear Cut design improves cutting action, surface finish, chip removal and tool life.

Carbide Tipped end mills offer excellent heat and wear resistance, increased speeds and feeds and enhanced tool life. They are also tougher than solid carbide tools in less than optimal machining setups.

List No. 5958
25° Right Hand Helix
for Long Chipping Non-Ferrous Materials

List No. 5960
15° Right Hand Helix
for Low to Medium Strength Steels

List No. 5962
15° Right Hand Helix
for Cast Iron and Other Non-Ferrous Materials

					LIST NO. 5958			LIST NO. 5960			LIST NO. 5962		
DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CARBIDE TIP	OAL	EDP NO. 5958	NO. OF FLUTES	LIST PRICE	EDP NO. 5960	NO. OF FLUTES	LIST PRICE	EDP NO. 5962	NO. OF FLUTES	LIST PRICE
1/2	.5000	3/8	1	3	57551*	2	$131.49	57601*	4	$131.49	57651*	2	$122.99
1/2	.5000	1/2	1	3	57552*	2	131.49	—	—	—	57652*	2	122.99
9/16	.5625	1/2	1	3	57553*	2	141.26	57603*	4	141.30	57653*	2	132.32
5/8	.6250	1/2	1 1/4	3 1/4	—	—	—	57604*	4	151.94	57654*	2	142.12
5/8	.6250	5/8	1 1/4	3 3/8	57555*	2	151.94	57605*	4	151.94	57655*	2	142.12
11/16	.6875	1/2	1 1/4	3 1/4	57556*	2	158.27	—	—	—	57656*	2	148.07
11/16	.6875	5/8	1 1/4	3 3/8	57557*	2	158.27	57607*	4	158.27	57657*	2	148.07
3/4	.7500	1/2	1 1/4	3 1/4	57558*	2	162.99	57608*	4	162.99	57658*	2	152.50
3/4	.7500	5/8	1 1/4	3 3/8	57559*	2	162.99	57609*	4	162.99	57659*	2	152.50
13/16	.8125	5/8	1 1/2	3 5/8	57560*	2	175.68	—	—	—	57660*	2	180.79
7/8	.8750	5/8	1 1/2	3 5/8	57561*	2	186.60	57611*	4	177.78	57661*	2	174.59
7/8	.8750	7/8	1 1/2	3 3/4	57562*	2	186.60	57612*	4	186.60	57662*	2	174.59
15/16	.9375	5/8	1 1/2	3 5/8	57563*	2	201.14	57613*	4	276.39	57663*	3	258.58
15/16	.9375	7/8	1 1/2	3 3/4	57564*	2	211.16	57614*	4	276.39	—	—	—
1	1.0000	7/8	1 1/2	3 3/4	57565*	2	215.44	57615*	6	249.29	57665*	3	244.89
1	1.0000	1	1 1/2	4	57566*	2	215.44	57616*	6	249.29	57666*	3	244.89
1 1/8	1.1250	1	1 3/4	4 1/4	57567*	2	224.67	—	—	—	57667*	3	288.20
1 1/4	1.2500	1	1 3/4	4 1/4	57568*	3	301.46	—	—	—	57668*	4	318.14
1 3/8	1.3750	1 1/4	1 3/4	4 1/4	57569*	3	311.40	—	—	—	57669*	4	371.63
1 1/2	1.5000	1 1/4	2	4 1/2	57570*	3	308.69	57620*	6	376.85	57670*	4	352.54
1 5/8	1.6250	1 1/4	2	4 1/2	57571*	3	382.70	57621*	8	444.38	57671*	4	404.10
1 3/4	1.7500	1 1/4	2	4 1/2	57572*	3	410.74	57622*	8	473.89	57672*	4	443.35
1 7/8	1.8750	1 1/4	2	4 1/2	57573*	3	442.03	57623*	8	506.88	57673*	4	474.40
2	2.0000	1 1/4	2	4 1/2	57574*	3	472.64	57624*	8	535.49	—	—	—

*** Available While Supplies Last**

SPECIAL TAPS FAST QUOTE SERVICE

Call Morse Cutting Tools for all of your special tap needs.
To expedite your quote please provide the following information:

TAP SIZE _____ CLASS of FIT or H LIMIT _____ # of FLUTES _____
TYPE of TAP _____ SURFACE TREATMENT _____
MATERIAL to be THREADED _____ HARDNESS _____
BLIND or THROUGH HOLE _____ LENGTH of THREAD _____
# of HOLES to TAP _____ TAPPING EQUIPMENT USED _____
CURRENT TAP USED _____ TAPPING PROBLEM _____

MORSE CUTTING TOOLS

Carbide Tipped Straight Flute End Mills for Cast Iron or Steel

Carbide Tipped end mills offer excellent heat and wear resistance, increased speeds and feeds and enhanced tool life. They are also tougher than solid carbide tools in less than optimal machining setups.

Straight Flutes for general purpose milling in a variety of materials

List No. 5925
4-Flute for Cast Iron and Short Chipping Non-Ferrous Materials

List No. 5927
2-Flute for Low to Medium Strength Steels

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CARBIDE TIP	OAL	EDP NO. 5925	LIST PRICE	EDP NO. 5927	LIST PRICE
1/4	.2500	3/8	1/2	2 1/2	57361	$65.09	57401*	$71.12
5/16	.3125	3/8	5/8	2 1/2	57362	70.62	57402*	74.27
3/8	.3750	3/8	5/8	2 1/2	57363	73.38	57403*	79.32
7/16	.4375	3/8	1	2 11/16	57364	73.49	57404*	79.36
1/2	.5000	1/2	1	3 1/4	57365	80.22	57405*	84.33
9/16	.5625	1/2	1	3 3/8	57366	87.66	57406*	93.40
5/8	.6250	1/2	1	3 3/8	57367	91.72	57407*	93.40
3/4	.7500	5/8	1	3 3/8	57368	100.95	57408*	100.99
7/8	.8750	5/8	1 1/4	4	57369	119.36	57409*	119.34
1	1.0000	7/8	1 1/4	4	57370	137.92	57410*	131.94
1 1/8	1.1250	1	1 1/4	4 1/4	57371	156.37	57411*	135.05
1 1/4	1.2500	1	1 1/4	4 1/4	57372	169.31	57412*	145.16
1 1/2	1.5000	1 1/4	1 1/2	4 1/2	57373	202.22	57413*	180.24
1 3/4	1.7500	1 1/4	1 1/2	4 1/2	57374*	260.80	57414*	201.93
2	2.0000	1 1/4	1 1/2	4 1/2	57375*	300.33	57415*	241.09

*** Available While Supplies Last**

Technical Publications

Machinist's Practical Guide

The original concept of a pocket size manual covering a wide range of practical information for the machinist, tool maker, engineer and student. End mills, cutters, drills, reamers, taps and tool bits are some of the cutting tool areas covered. Tool steels, tapers, speeds, feeds, cutting fluids, and a wealth of additional useful information is found in this complete 108-page handbook. Fits handily into shop coats, tool boxes, desk drawers, etc.

Machinist's Guide for Taps

Taps and screw threads play a very important part in "holding the world together by a thread." This booklet contains all the needed information for correct tapping work. Included are thread forms and dimensions, fits and limits, hole preparation and size, type of taps, speeds and lubricants, tap sharpening, and troubleshooting hints.

Machinist's Guide for Carbide Tooling

Carbide and its many applications is fully explained in this handy booklet. Complete coverage is given from the introduction and manufacture of carbide to its present major position in the cutting tools field. Included are design, application, geometrics, troubleshooting, speeds and feeds.

GUIDES	LIST NO.	DISPLAY BOX OF 50 (1 BOX) EDP. NO.	LIST PRICE	INDIVIDUAL COPIES EDP NO.	LIST PRICE
Machinist's Practical Guide	1001	20401	$336.00	20402	$7.20
Machinist's Guide for Taps	1002	20403	336.00	20404	7.20
Machinist's Guide for Carbide Tooling	1004	20407	336.00	20408	7.20

Solid Carbide 2-Flute Single End Mills

Micrograin Carbide – Center Cutting 30° Helix Angle

2-Flute end mills provide increased chip capacity for higher feed rates. Recommended for easy-to-machine materials including low alloy steels, non-ferrous materials and cast iron. Ideal for plunge cutting and slotting. **Center Cutting** end allows for plunge cutting like a drill into solid material.

TOLERANCES

Size to 1/4"	+.000 - .002
9/32" to 1"	+.000 - .003
Shank Dia.	+.0000 - .0005

STANDARD PACKAGE
All sizes – 1 each

List No. 5944 Regular Length

List No. 5954 Long Length

List No. 5950 Extra Long Length

Solid Carbide offers higher cutting speeds, high rigidity, excellent hardness, wear resistance and heat resistance and long tool life. **Tool Coatings** further enhance milling performance in a wide range of applications.

List No. 5944 Regular Length

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED EDP NO.	UNCOATED LIST PRICE	TiN COATED EDP NO.	TiN COATED LIST PRICE	TiCN COATED EDP NO.	TiCN COATED LIST PRICE	TiALN COATED EDP NO.	TiALN COATED LIST PRICE
1/16	1/8	3/16	1 1/2	58004	$9.60	90002	$11.36	90039	$12.25	90076	$12.88
5/64	1/8	3/16	1 1/2	58005	10.11	90003	11.87	90040	12.76	90077	13.39
3/32	1/8	3/8	1 1/2	58006	9.60	90004	11.36	90041	12.25	90078	12.88
7/64	1/8	3/8	1 1/2	58007	10.11	90005	11.87	90042	12.76	90079	13.39
1/8	1/8	1/2	1 1/2	58008	9.60	90006	11.36	90043	12.25	90080	12.88
9/64	3/16	9/16	2	58009	13.57	90007	15.77	90044	16.88	90081	17.68
5/32	3/16	9/16	2	58010	13.57	90008	15.77	90045	16.88	90082	17.68
11/64	3/16	5/8	2	58011	13.57	90009	15.77	90046	16.88	90083	17.68
3/16	3/16	5/8	2	58012	13.57	90010	15.77	90047	16.88	90084	17.68
13/64	1/4	5/8	2 1/2	58013	17.86	90011	22.64	90048	25.04	90085	26.77
7/32	1/4	5/8	2 1/2	58014	17.86	90012	22.64	90049	25.04	90086	26.77
1/4	1/4	3/4	2 1/2	58016	17.14	90014	21.92	90051	24.32	90088	26.05
9/32	5/16	3/4	2 1/2	58018	23.47	90016	30.45	90053	33.96	90090	36.50
5/16	5/16	13/16	2 1/2	58020	23.47	90018	30.45	90055	33.96	90092	36.50
3/8	3/8	7/8	2 1/2	58024	26.67	90022	33.65	90059	37.16	90096	39.70
7/16	7/16	7/8	2 1/2	58028	41.10	90026	49.84	90063	54.20	90100	57.41
1/2	1/2	1	3	58032	43.09	90030	51.83	90067	56.19	90104	59.40
9/16	9/16	1 1/4	3 1/2	58036	74.73	90031	87.18	90068	93.42	90105	97.97
5/8	5/8	1 1/4	3 1/2	58040	83.57	90032	96.02	90069	102.26	90106	106.81
11/16	3/4	1 1/2	4	58044	129.85	90033	145.16	90070	152.83	90107	158.42
3/4	3/4	1 1/2	4	58048	125.27	90034	140.58	90071	148.25	90108	153.84
7/8	7/8	1 1/2	4	58056	184.62	90035	206.50	90072	217.44	90109	225.46
1	1	1 1/2	4	58064	208.79	90036	230.67	90073	241.61	90110	249.63

List No. 5954 Long Length

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED EDP NO.	UNCOATED LIST PRICE	TiN COATED EDP NO.	TiN COATED LIST PRICE	TiCN COATED EDP NO.	TiCN COATED LIST PRICE	TiALN COATED EDP NO.	TiALN COATED LIST PRICE
1/8	1/8	3/4	2 1/4	58238	$14.05	90120	$16.46	90130	$17.68	90140	$18.55
3/16	3/16	3/4	2 1/2	58239	17.38	90121	20.85	90131	22.61	90141	23.86
1/4	1/4	1 1/8	3	58241	22.34	90122	27.12	90132	29.52	90142	31.25
5/16	5/16	1 1/8	3	58250	28.57	90123	35.55	90133	39.06	90143	41.60
3/8	3/8	1 1/8	3	58254	34.76	90124	41.74	90134	45.25	90144	47.79
7/16	7/16	2	4	58258	58.37	90125	69.51	90135	75.11	90145	79.17
1/2	1/2	2	4	58262	62.65	90126	73.79	90136	79.39	90146	83.45
5/8	5/8	2 1/4	5	58270	111.25	90127	126.15	90137	133.62	90147	139.06
3/4	3/4	2 1/4	5	58278	175.39	90128	192.86	90138	201.59	90148	208.00
1	1	2 1/4	5	58294	294.05	90129	320.30	90139	333.44	90149	343.04

List No. 5950 Extra Long Length

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED EDP NO.	UNCOATED LIST PRICE	TiN COATED EDP NO.	TiN COATED LIST PRICE	TiCN COATED EDP NO.	TiCN COATED LIST PRICE	TiALN COATED EDP NO.	TiALN COATED LIST PRICE
1/8	1/8	1	3	58408	$18.57	90160	$20.98	90170	$22.20	90180	$23.07
3/16	3/16	1 1/8	3	58412	20.20	90161	23.67	90171	25.43	90181	26.68
1/4	1/4	1 1/2	4	58416	25.49	90162	30.96	90172	33.69	90182	35.70
5/16	5/16	1 5/8	4	58420	37.14	90163	46.32	90173	50.94	90183	54.28
3/8	3/8	1 3/4	4	58424	41.76	90164	50.94	90174	55.56	90184	58.90
7/16	7/16	3	6	58428	75.92	90165	94.49	90175	103.80	90185	110.59
1/2	1/2	3	6	58432	104.95	90166	123.52	90176	132.83	90186	139.62
5/8	5/8	3	6	58440	144.62	90167	166.50	90177	177.44	90187	185.46
3/4	3/4	3	6	58448	211.84	90168	237.39	90178	250.17	90188	259.54
1	1	3	6	58464	352.88	90169	384.15	90179	399.78	90189	411.24

Solid Carbide Metric 2-Flute Single End Mills

Micrograin Carbide – Center Cutting
30° Helix Angle

List No. 5959

2-Flute end mills provide increased chip capacity for higher feed rates. Recommended for easy-to-machine materials including low alloy steels, non-ferrous materials and cast iron. Ideal for plunge cutting and slotting. **Center Cutting** end allows for plunge cutting like a drill into solid material.

TOLERANCES
All Sizes +.000mm/-.051mm
Shank Dia. +000mm/-.013mm

STANDARD PACKAGE
All sizes – 1 each

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED EDP NO.	UNCOATED LIST PRICE	TiN COATED EDP NO.	TiN COATED LIST PRICE	TiCN COATED EDP NO.	TiCN COATED LIST PRICE	TiALN COATED EDP NO.	TiALN COATED LIST PRICE
1 mm	3 mm	3 mm	39 mm	59280	$14.25	90200	$16.01	90220	$16.90	90240	$17.53
1.5 mm	3 mm	5 mm	39 mm	59281	13.41	90201	15.17	90221	16.06	90241	16.69
2 mm	3 mm	7 mm	39 mm	59282	13.41	90202	15.17	90222	16.06	90242	16.69
2.5 mm	3 mm	7 mm	39 mm	59283	13.41	90203	15.17	90223	16.06	90243	16.69
3 mm	3 mm	9 mm	39 mm	59284	13.41	90204	15.17	90224	16.06	90244	16.69
3.5 mm	4 mm	12 mm	51 mm	59285	17.90	90205	21.37	90225	23.13	90245	24.38
4 mm	4 mm	14 mm	51 mm	59286	17.90	90206	21.37	90226	23.13	90246	24.38
4.5 mm	5 mm	14 mm	51 mm	59287	19.78	90207	23.25	90227	25.01	90247	26.26
5 mm	5 mm	16 mm	51 mm	59288	19.78	90208	24.56	90228	26.96	90248	28.69
6 mm	6 mm	19 mm	64 mm	59289	25.80	90209	30.58	90229	32.98	90249	34.71
7 mm	8 mm	19 mm	64 mm	59290	33.24	90210	40.22	90230	43.73	90250	46.27
8 mm	8 mm	21 mm	64 mm	59291	36.43	90211	43.41	90231	46.92	90251	49.46
9 mm	10 mm	22 mm	70 mm	59292	49.92	90212	56.90	90232	60.41	90252	62.95
10 mm	10 mm	22 mm	70 mm	59293	49.92	90213	58.66	90233	63.02	90253	66.23
11 mm	11 mm	25 mm	70 mm	59294	57.02	90214	65.76	90234	70.12	90254	73.33
12 mm	12 mm	25 mm	76 mm	59295	68.91	90215	80.05	90235	85.65	90255	89.71
14 mm	14 mm	31 mm	89 mm	59297	93.62	90216	106.07	90236	112.31	90256	116.86
16 mm	16 mm	32 mm	89 mm	59298	107.90	90217	123.21	90237	130.88	90257	136.47
18 mm	18 mm	35 mm	102 mm	59299	152.49	90218	169.96	90238	178.69	90258	185.10
20 mm	20 mm	38 mm	102 mm	59300	183.94	90219	210.19	90239	223.33	90259	232.93
22 mm	22 mm	38 mm	102 mm	59301*	267.05	—	—	—	—	—	—
25 mm	25 mm	38 mm	102 mm	59302*	284.25	—	—	—	—	—	—

*** Available While Supplies Last**

Solid Carbide 2-Flute Double End Mills

Speeds & Feeds: Page 248

Micrograin Carbide – Center Cutting
30° Helix Angle

List No. 5947 Stub Length

List No. 5896 Regular Length

List No. 5947 Stub Length

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED EDP NO.	UNCOATED LIST PRICE	TiN COATED EDP NO.	TiN COATED LIST PRICE	TiCN COATED EDP NO.	TiCN COATED LIST PRICE	TiALN COATED EDP NO.	TiALN COATED LIST PRICE
1/16	1/8	1/8	1½	57250	$14.69	90300	$17.34	90311	$18.69	90322	$19.64
3/32	1/8	3/16	1½	57251	14.69	90301	17.34	90312	18.69	90323	19.64
1/8	3/16	1/4	2	57252	13.88	90302	16.53	90313	17.88	90324	18.83
5/32	3/16	5/16	2	57253	18.78	90303	22.09	90314	23.76	90325	24.95
3/16	3/16	3/8	2	57254	18.78	90304	22.09	90315	23.76	90326	24.95
7/32	1/4	1/2	2½	57255	22.86	90305	30.04	90316	33.64	90327	36.27
1/4	1/4	1/2	2½	57256	22.86	90306	30.04	90317	33.64	90328	36.27
5/16	5/16	1/2	2½	57257	36.65	90307	47.14	90318	52.41	90329	56.23
3/8	3/8	9/16	3	57258	38.98	90308	49.47	90319	54.74	90330	58.56
7/16	7/16	9/16	3	57259	55.96	90309	69.06	90320	75.63	90331	80.42
1/2	1/2	5/8	3	57260	62.86	90310	75.96	90321	82.53	90332	87.32

List No. 5896 Regular Length

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED EDP NO.	UNCOATED LIST PRICE	TiN COATED EDP NO.	TiN COATED LIST PRICE	TiCN COATED EDP NO.	TiCN COATED LIST PRICE	TiALN COATED EDP NO.	TiALN COATED LIST PRICE
1/8	3/8	3/8	3⅛	57158	$36.26	90350	$50.06	90360	$56.95	90370	$62.01
5/32	3/8	7/16	3⅛	57160	38.57	90351	52.37	90361	59.26	90371	64.32
3/16	3/8	1/2	3¼	57162	38.57	90352	52.37	90362	59.26	90372	64.32
7/32	3/8	9/16	3⅜	57164	45.00	90353	58.80	90363	65.69	90373	70.75
1/4	3/8	5/8	3⅜	57166	45.00	90354	58.80	90364	65.69	90374	70.75
9/32	3/8	11/16	3⅜	57168	50.17	90355	63.97	90365	70.86	90375	75.92
5/16	3/8	3/4	3½	57170	52.04	90356	65.84	90366	72.73	90376	77.79
3/8	3/8	3/4	3½	57174	54.51	90357	68.31	90367	75.20	90377	80.26
7/16	7/16	7/8	4	57178	86.79	90358	103.53	90368	111.89	90378	118.03
1/2	1/2	1	4	57182	89.80	90359	106.54	90369	114.90	90379	121.04

Solid Carbide 2-Flute Ball Nose Single End Mills

Micrograin Carbide – Center Cutting 30° Helix Angle

2-Flute end mills provide increased chip capacity for higher feed rates. Recommended for easy-to-machine materials including low alloy steels, non-ferrous materials and cast iron. **Ball Nose** mills are recommended for milling die cavities, fillets, radius bottom slots and special contours. **Center Cutting** end allows for plunge cutting like a drill into solid material.

TOLERANCES

Size to 1/4"	+.000 - .002
9/32" to 1"	+.000 - .003
Shank Dia.	+.0000 - .0005

STANDARD PACKAGE
All sizes – 1 each

List No. 5940 Regular Length

List No. 5956 Long Length

List No. 5952 Extra Long Length

Solid Carbide offers higher cutting speeds, high rigidity, excellent hardness, wear resistance and heat resistance and long tool life. **Tool Coatings** further enhance milling performance in a wide range of applications.

List No. 5940 Regular Length

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED EDP NO.	UNCOATED LIST PRICE	TiN COATED EDP NO.	TiN COATED LIST PRICE	TiCN COATED EDP NO.	TiCN COATED LIST PRICE	TiALN COATED EDP NO.	TiALN COATED LIST PRICE
1/16	1/8	3/16	1 1/2	58104	$12.86	90400	$14.62	90423	$15.51	90446	$16.14
5/64	1/8	3/16	1 1/2	58105	14.08	90401	15.84	90424	16.73	90447	17.36
3/32	1/8	3/8	1 1/2	58106	12.86	90402	14.62	90425	15.51	90448	16.14
7/64	1/8	3/8	1 1/2	58107	14.08	90403	15.84	90426	16.73	90449	17.36
1/8	1/8	1/2	1 1/2	58108	12.86	90404	14.62	90427	15.51	90450	16.14
9/64	3/16	9/16	2	58109	17.36	90405	19.56	90428	20.67	90451	21.47
5/32	3/16	9/16	2	58110	16.53	90406	18.73	90429	19.84	90452	20.64
11/64	3/16	5/8	2	58111	17.36	90407	19.56	90430	20.67	90453	21.47
3/16	3/16	5/8	2	58112	16.53	90408	18.73	90431	19.84	90454	20.64
13/64	1/4	5/8	2 1/2	58113	25.51	90409	30.29	90432	32.69	90455	34.42
7/32	1/4	5/8	2 1/2	58114	22.34	90410	27.12	90433	29.52	90456	31.25
1/4	1/4	3/4	2 1/2	58116	20.48	90411	25.26	90434	27.66	90457	29.39
9/32	5/16	3/4	2 1/2	58118	28.65	90412	35.63	90435	39.14	90458	41.68
5/16	5/16	13/16	2 1/2	58120	27.92	90413	34.90	90436	38.41	90459	40.95
3/8	3/8	7/8	2 1/2	58124	32.09	90414	39.07	90437	42.58	90460	45.12
7/16	7/16	1	2 3/4	58128	48.15	90415	56.89	90438	61.25	90461	64.46
1/2	1/2	1	3	58132	56.19	90416	64.93	90439	69.29	90462	72.50
9/16	9/16	1 1/4	3 1/2	58136	90.20	90417	102.65	90440	108.89	90463	113.44
5/8	5/8	1 1/4	3 1/2	58140	108.10	90418	120.55	90441	126.79	90464	131.34
11/16	3/4	1 1/2	4	58144	162.62	90419	177.93	90442	185.60	90465	191.19
3/4	3/4	1 1/2	4	58148	153.51	90420	168.82	90443	176.49	90466	182.08
7/8	7/8	1 1/2	4	58156	222.86	90421	244.74	90444	255.68	90467	263.70
1	1	1 1/2	4	58164	252.04	90422	273.92	90445	284.86	90468	292.88

List No. 5956 Long Length

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED EDP NO.	UNCOATED LIST PRICE	TiN COATED EDP NO.	TiN COATED LIST PRICE	TiCN COATED EDP NO.	TiCN COATED LIST PRICE	TiALN COATED EDP NO.	TiALN COATED LIST PRICE
1/8	1/8	3/4	2 1/4	57575	$19.18	90470	$21.59	90480	$22.81	90490	$23.68
3/16	3/16	3/4	2 1/2	57577	21.76	90471	25.23	90481	26.99	90491	28.24
1/4	1/4	1 1/8	3	57581	26.67	90472	31.45	90482	33.85	90492	35.58
5/16	5/16	1 1/8	3	57583	37.14	90473	44.12	90483	47.63	90493	50.17
3/8	3/8	1 1/8	3	57585	38.78	90474	45.76	90484	49.27	90494	51.81
7/16	7/16	2	4	57587	75.92	90475	87.06	90485	92.66	90495	96.72
1/2	1/2	2	4	57589	81.43	90476	92.57	90486	98.17	90496	102.23
5/8	5/8	2 1/4	5	57591	134.29	90477	149.19	90487	156.66	90497	162.10
3/4	3/4	2 1/4	5	57593	211.84	90478	229.31	90488	238.04	90498	244.45
1	1	2 1/4	5	57595	352.97	90479	379.22	90489	392.36	90499	401.96

List No. 5952 Extra Long Length

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED EDP NO.	UNCOATED LIST PRICE	TiN COATED EDP NO.	TiN COATED LIST PRICE	TiCN COATED EDP NO.	TiCN COATED LIST PRICE	TiALN COATED EDP NO.	TiALN COATED LIST PRICE
1/8	1/8	1	3	58608	$24.08	90500	$26.49	90510	$27.71	90520	$28.58
3/16	3/16	1 1/8	3	58612	27.35	90501	30.82	90511	32.58	90521	33.83
1/4	1/4	1 1/2	4	58616	30.82	90502	36.29	90512	39.02	90522	41.03
5/16	5/16	1 5/8	4	58620	48.38	90503	57.56	90513	62.18	90523	65.52
3/8	3/8	1 3/4	4	58624	50.41	90504	59.59	90514	64.21	90524	67.55
7/16	7/16	3	6	58628	98.78	90505	117.35	90515	126.66	90525	133.45
1/2	1/2	3	6	58632	146.12	90506	164.69	90516	174.00	90526	180.79
5/8	5/8	3	6	58640	174.49	90507	196.37	90517	207.31	90527	215.33
3/4	3/4	3	6	58648	275.51	90508	301.06	90518	313.84	90528	323.21
1	1	3	6	58664	382.29	90509	413.56	90519	429.19	90529	440.65

Solid Carbide Metric 2-Flute Ball Nose Single End Mills

Micrograin Carbide – Center Cutting 30° Helix Angle

2-Flute end mills provide increased chip capacity for higher feed rates. Recommended for easy-to-machine materials including low alloy steels, non-ferrous materials and cast iron. **Ball Nose** mills are recommended for milling die cavities, fillets, radius bottom slots and special contours. **Center Cutting** end allows for plunge cutting like a drill into solid material.

List No. 5963

Solid Carbide offers higher cutting speeds, high rigidity, excellent hardness, wear resistance and heat resistance and long tool life. **Tool Coatings** further enhance milling performance in a wide range of applications.

TOLERANCES
All Sizes +.000mm/-.051mm
Shank Dia. +000mm/-.013mm

STANDARD PACKAGE
All sizes – 1 each

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED EDP NO.	UNCOATED LIST PRICE	TiN COATED EDP NO.	TiN COATED LIST PRICE	TiCN COATED EDP NO.	TiCN COATED LIST PRICE	TiALN COATED EDP NO.	TiALN COATED LIST PRICE
1 mm	3 mm	3 mm	39 mm	59400	$16.68	90540	$18.44	90560	$19.33	90580	$19.96
1.5 mm	3 mm	5 mm	39 mm	59401	15.43	90541	17.19	90561	18.08	90581	18.71
2 mm	3 mm	7 mm	39 mm	59402	15.43	90542	17.19	90562	18.08	90582	18.71
2.5 mm	3 mm	7 mm	39 mm	59403	15.43	90543	17.19	90563	18.08	90583	18.71
3 mm	3 mm	9 mm	39 mm	59404	15.43	90544	17.19	90564	18.08	90584	18.71
3.5 mm	4 mm	12 mm	51 mm	59405	20.55	90545	24.02	90565	25.78	90585	27.03
4 mm	4 mm	14 mm	51 mm	59406	20.55	90546	24.02	90566	25.78	90586	27.03
4.5 mm	5 mm	14 mm	51 mm	59407	22.77	90547	26.24	90567	28.00	90587	29.25
5 mm	5 mm	16 mm	51 mm	59408	22.77	90548	27.55	90568	29.95	90588	31.68
6 mm	6 mm	19 mm	64 mm	59409	29.19	90549	33.97	90569	36.37	90589	38.10
7 mm	8 mm	19 mm	64 mm	59410	38.23	90550	45.21	90570	48.72	90590	51.26
8 mm	8 mm	21 mm	64 mm	59411	41.90	90551	48.88	90571	52.39	90591	54.93
9 mm	10 mm	22 mm	70 mm	59412	57.36	90552	64.34	90572	67.85	90592	70.39
10 mm	10 mm	22 mm	70 mm	59413	57.36	90553	66.10	90573	70.46	90593	73.67
11 mm	11 mm	25 mm	70 mm	59414	65.59	90554	74.33	90574	78.69	90594	81.90
12 mm	12 mm	25 mm	76 mm	59415	79.20	90555	90.34	90575	95.95	90595	100.00
14 mm	14 mm	31 mm	89 mm	59417	107.61	90556	120.06	90576	126.30	90596	130.85
16 mm	16 mm	32 mm	89 mm	59418	124.08	90557	139.39	90577	147.06	90597	152.65
18 mm	18 mm	35 mm	102 mm	59419	175.34	90558	192.81	90578	201.54	90598	207.95
20 mm	20 mm	38 mm	102 mm	59420	211.65	90559	237.90	90579	251.04	90599	260.64
22 mm	22 mm	38 mm	102 mm	59421*	307.10	—	—	—	—	—	—
25 mm	25 mm	38 mm	102 mm	59422*	326.50	—	—	—	—	—	—

*** Available While Supplies Last**

Speeds & Feeds: Page 248

Solid Carbide 2-Flute Stub Length Ball Nose Double End Mills

Micrograin Carbide – Center Cutting 30° Helix Angle

TOLERANCES

Size to 1/4"	+.000 - .002
9/32" to 1"	+.000 - .003
Shank Dia.	+.0000 - .0005

STANDARD PACKAGE
All sizes – 1 each

List No. 5948

2-Flute end mills provide increased chip capacity for higher feed rates. Recommended for easy-to-machine materials including low alloy steels, non-ferrous materials and cast iron. **Ball Nose** mills are recommended for milling die cavities, fillets, radius bottom slots and special contours. **Center Cutting** end allows for plunge cutting like a drill into solid material.

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED EDP NO.	UNCOATED LIST PRICE	TiN COATED EDP NO.	TiN COATED LIST PRICE	TiCN COATED EDP NO.	TiCN COATED LIST PRICE	TiALN COATED EDP NO.	TiALN COATED LIST PRICE
1/16	1/8	1/8	1 1/2	58304	$18.82	90600	$21.47	90611	$22.82	90622	$23.77
3/32	1/8	3/16	1 1/2	58306	18.82	90601	21.47	90612	22.82	90623	23.77
1/8	3/16	1/4	2	58308	17.43	90602	20.08	90613	21.43	90624	22.38
5/32	3/16	5/16	2	58310	25.63	90603	28.94	90614	30.61	90625	31.80
3/16	3/16	3/8	2	58312	25.63	90604	28.94	90615	30.61	90626	31.80
7/32	1/4	1/2	2 1/2	58314	33.96	90605	41.14	90616	44.74	90627	47.37
1/4	1/4	1/2	2 1/2	58316	32.45	90606	39.63	90617	43.23	90628	45.86
5/16	5/16	1/2	2 1/2	58320	45.63	90607	56.12	90618	61.39	90629	65.21
3/8	3/8	9/16	3	58324	48.78	90608	59.27	90619	64.54	90630	68.36
7/16	7/16	9/16	3	58328	62.69	90609	75.79	90620	82.36	90631	87.15
1/2	1/2	5/8	3	58332	82.20	90610	95.30	90621	101.87	90632	106.66

Solid Carbide 4-Flute Single End Mills

Micrograin Carbide – Center Cutting 30° Helix Angle

4-Flute end mills with a greater core thickness offer increased tool strength and reduced tool defection. 4-Flutes also reduce chip load per tooth for the milling of tougher materials, greater wear resistance and improved surface finish. **Center Cutting** end allows for plunge cutting like a drill into solid material.

TOLERANCES

Size to 1/4"	+.000 - .002
9/32" to 1"	+.000 - .003
Shank Dia.	+.0000 - .0005

STANDARD PACKAGE
All sizes – 1 each

List No. 5943 Regular Length

List No. 5955 Long Length

List No. 5951 Extra Long Length

Solid Carbide offers higher cutting speeds, high rigidity, excellent hardness, wear resistance and heat resistance and long tool life. **Tool Coatings** further enhance milling performance in a wide range of applications.

List No. 5943 Regular Length

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED EDP NO.	UNCOATED LIST PRICE	TiN COATED EDP NO.	TiN COATED LIST PRICE	TiCN COATED EDP NO.	TiCN COATED LIST PRICE	TiALN COATED EDP NO.	TiALN COATED LIST PRICE
1/16	1/8	3/16	1 1/2	57904	$9.60	90702	$11.36	90739	$12.25	90776	$12.88
5/64	1/8	3/16	1 1/2	57905	10.11	90703	11.87	90740	12.76	90777	13.39
3/32	1/8	3/8	1 1/2	57906	9.60	90704	11.36	90741	12.25	90778	12.88
7/64	1/8	3/8	1 1/2	57907	10.11	90705	11.87	90742	12.76	90779	13.39
1/8	1/8	1/2	1 1/2	57908	9.60	90706	11.36	90743	12.25	90780	12.88
9/64	3/16	9/16	2	57909	13.57	90707	15.77	90744	16.88	90781	17.68
5/32	3/16	9/16	2	57910	13.57	90708	15.77	90745	16.88	90782	17.68
11/64	3/16	5/8	2	57911	13.57	90709	15.77	90746	16.88	90783	17.68
3/16	3/16	5/8	2	57912	13.57	90710	15.77	90747	16.88	90784	17.68
13/64	1/4	5/8	2 1/2	57913	17.86	90711	22.64	90748	25.04	90785	26.77
7/32	1/4	5/8	2 1/2	57914	17.86	90712	22.64	90749	25.04	90786	26.77
1/4	1/4	3/4	2 1/2	57916	17.14	90714	21.92	90751	24.32	90788	26.05
9/32	5/16	3/4	2 1/2	57918	23.47	90716	30.45	90753	33.96	90790	36.50
5/16	5/16	13/16	2 1/2	57920	23.47	90718	30.45	90755	33.96	90792	36.50
3/8	3/8	7/8	2 1/2	57924	26.67	90722	33.65	90759	37.16	90796	39.70
7/16	7/16	7/8	2 1/2	57928	41.10	90726	49.84	90763	54.20	90800	57.41
1/2	1/2	1	3	57932	43.09	90730	51.83	90767	56.19	90804	59.40
9/16	9/16	1 1/4	3 1/2	57936	74.73	90731	87.18	90768	93.42	90805	97.97
5/8	5/8	1 1/4	3 1/2	57940	83.57	90732	96.02	90769	102.26	90806	106.81
11/16	3/4	1 1/2	4	57944	129.85	90733	145.16	90770	152.83	90807	158.42
3/4	3/4	1 1/2	4	57948	125.27	90734	140.58	90771	148.25	90808	153.84
7/8	7/8	1 1/2	4	57956	184.62	90735	206.50	90772	217.44	90809	225.46
1	1	1 1/2	4	57964	208.79	90736	230.67	90773	241.61	90810	249.63

List No. 5955 Long Length

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED EDP NO.	UNCOATED LIST PRICE	TiN COATED EDP NO.	TiN COATED LIST PRICE	TiCN COATED EDP NO.	TiCN COATED LIST PRICE	TiALN COATED EDP NO.	TiALN COATED LIST PRICE
1/8	1/8	3/4	2 1/4	58138	$14.05	90820	$16.46	90830	$17.68	90840	$18.55
3/16	3/16	3/4	2 1/2	58139	17.38	90821	20.85	90831	22.61	90841	23.86
1/4	1/4	1 1/8	3	58141	22.34	90822	27.12	90832	29.52	90842	31.25
5/16	5/16	1 1/8	3	58150	28.57	90823	35.55	90833	39.06	90843	41.60
3/8	3/8	1 1/8	3	58154	34.76	90824	41.74	90834	45.25	90844	47.79
7/16	7/16	2	4	58158	58.37	90825	69.51	90835	75.11	90845	79.17
1/2	1/2	2	4	58162	62.65	90826	73.79	90836	79.39	90846	83.45
5/8	5/8	2 1/4	5	58170	111.25	90827	126.15	90837	133.62	90847	139.06
3/4	3/4	2 1/4	5	58178	175.39	90828	192.86	90838	201.59	90848	208.00
1	1	2 1/4	5	58194	294.05	90829	320.30	90839	333.44	90849	343.04

List No. 5951 Extra Long Length

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED EDP NO.	UNCOATED LIST PRICE	TiN COATED EDP NO.	TiN COATED LIST PRICE	TiCN COATED EDP NO.	TiCN COATED LIST PRICE	TiALN COATED EDP NO.	TiALN COATED LIST PRICE
1/8	1/8	1	3	58508	$18.57	90860	$20.98	90870	$22.20	90880	$23.07
3/16	3/16	1 1/8	3	58512	20.20	90861	23.67	90871	25.43	90881	26.68
1/4	1/4	1 1/2	4	58516	25.49	90862	30.96	90872	33.69	90882	35.70
5/16	5/16	1 5/8	4	58520	37.14	90863	46.32	90873	50.94	90883	54.28
3/8	3/8	1 3/4	4	58524	41.76	90864	50.94	90874	55.56	90884	58.90
7/16	7/16	3	6	58528	75.92	90865	94.49	90875	103.80	90885	110.59
1/2	1/2	3	6	58532	104.95	90866	123.52	90876	132.83	90886	139.62
5/8	5/8	3	6	58540	144.62	90867	166.50	90877	177.44	90887	185.46
3/4	3/4	3	6	58548	211.84	90868	237.39	90878	250.17	90888	259.54
1	1	3	6	58564	352.88	90869	384.15	90879	399.78	90889	411.24

Solid Carbide Metric 4-Flute Single End Mills

Micrograin Carbide
Center Cutting
30° Helix Angle

TOLERANCE
All Sizes +.000mm/-.051mm
Shank Dia. +.000mm/-.013mm

List No. 5961

4-Flute end mills with a greater core thickness offer increased tool strength and reduced tool defection. 4-Flutes also reduce chip load per tooth for the milling of tougher materials, greater wear resistance and improved surface finish. **Center Cutting** end allows for plunge cutting like a drill into solid material.

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED EDP NO.	UNCOATED LIST PRICE	TiN COATED EDP NO.	TiN COATED LIST PRICE	TiCN COATED EDP NO.	TiCN COATED LIST PRICE	TiALN COATED EDP NO.	TiALN COATED LIST PRICE
1 mm	3 mm	3 mm	39 mm	59310	$14.25	90900	$16.01	90920	$16.90	90940	$17.53
1.5 mm	3 mm	5 mm	39 mm	59311	13.41	90901	15.17	90921	16.06	90941	16.69
2 mm	3 mm	7 mm	39 mm	59312	13.41	90902	15.17	90922	16.06	90942	16.69
2.5 mm	3 mm	7 mm	39 mm	59313	13.41	90903	15.17	90923	16.06	90943	16.69
3 mm	3 mm	9 mm	39 mm	59314	13.41	90904	15.17	90924	16.06	90944	16.69
3.5 mm	4 mm	12 mm	51 mm	59315	17.90	90905	21.37	90925	23.13	90945	24.38
4 mm	4 mm	14 mm	51 mm	59316	17.90	90906	21.37	90926	23.13	90946	24.38
4.5 mm	5 mm	14 mm	51 mm	59317	19.78	90907	23.25	90927	25.01	90947	26.26
5 mm	5 mm	16 mm	51 mm	59318	19.78	90908	24.56	90928	26.96	90948	28.69
6 mm	6 mm	19 mm	64 mm	59319	25.80	90909	30.58	90929	32.98	90949	34.71
7 mm	8 mm	19 mm	64 mm	59320	33.24	90910	40.22	90930	43.73	90950	46.27
8 mm	8 mm	21 mm	64 mm	59321	36.43	90911	43.41	90931	46.92	90951	49.46
9 mm	10 mm	22 mm	70 mm	59322	49.92	90912	56.90	90932	60.41	90952	62.95
10 mm	10 mm	22 mm	70 mm	59323	49.92	90913	58.66	90933	63.02	90953	66.23
11 mm	11 mm	25 mm	70 mm	59324	57.02	90914	65.76	90934	70.12	90954	73.33
12 mm	12 mm	25 mm	76 mm	59325	68.91	90915	80.05	90935	85.65	90955	89.71
14 mm	14 mm	31 mm	89 mm	59327	93.62	90916	106.07	90936	112.31	90956	116.86
16 mm	16 mm	32 mm	89 mm	59328	107.90	90917	123.21	90937	130.88	90957	136.47
18 mm	18 mm	35 mm	102 mm	59329	152.49	90918	169.96	90938	178.69	90958	185.10
20 mm	20 mm	38 mm	102 mm	59330	183.94	90919	210.19	90939	223.33	90959	232.93
22 mm	22 mm	38 mm	102 mm	59331*	267.05	—	—	—	—	—	—

*** Available While Supplies Last**

Solid Carbide 4-Flute Double End Mills

Speeds & Feeds: Page 248

List No. 5946 Stub Length

List No. 5895 Regular Length

Micrograin Carbide – Center Cutting
30° Helix Angle

STANDARD PACKAGE
All sizes – 1 each

List No. 5946 Stub Length

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED EDP NO.	UNCOATED LIST PRICE	TiN COATED EDP NO.	TiN COATED LIST PRICE	TiCN COATED EDP NO.	TiCN COATED LIST PRICE	TiALN COATED EDP NO.	TiALN COATED LIST PRICE
1/16	1/8	1/8	1 1/2	57270	$14.69	91000	$17.34	91011	$18.69	91022	$19.64
3/32	1/8	3/16	1 1/2	57271	14.69	91001	17.34	91012	18.69	91023	19.64
1/8	3/16	1/4	2	57272	13.88	91002	16.53	91013	17.88	91024	18.83
5/32	3/16	5/16	2	57273	18.78	91003	22.09	91014	23.76	91025	24.95
3/16	3/16	3/8	2	57274	18.78	91004	22.09	91015	23.76	91026	24.95
7/32	1/4	1/2	2 1/2	57275	22.86	91005	30.04	91016	33.64	91027	36.27
1/4	1/4	1/2	2 1/2	57276	22.86	91006	30.04	91017	33.64	91028	36.27
5/16	5/16	1/2	2 1/2	57277	36.65	91007	47.14	91018	52.41	91029	56.23
3/8	3/8	9/16	3	57278	38.98	91008	49.47	91019	54.74	91030	58.56
7/16	7/16	9/16	3	57279	55.96	91009	69.06	91020	75.63	91031	80.42
1/2	1/2	5/8	3	57280	62.86	91010	75.96	91021	82.53	91032	87.32

List No. 5895 Regular Length

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED EDP NO.	UNCOATED LIST PRICE	TiN COATED EDP NO.	TiN COATED LIST PRICE	TiCN COATED EDP NO.	TiCN COATED LIST PRICE	TiALN COATED EDP NO.	TiALN COATED LIST PRICE
1/8	3/8	3/8	3 1/8	57108	$36.26	91050	$50.06	91060	$56.95	91070	$62.01
5/32	3/8	7/16	3 1/8	57110	38.57	91051	52.37	91061	59.26	91071	64.32
3/16	3/8	1/2	3 1/4	57112	38.57	91052	52.37	91062	59.26	91072	64.32
7/32	3/8	9/16	3 3/8	57114	45.00	91053	58.80	91063	65.69	91073	70.75
1/4	3/8	5/8	3 3/8	57116	45.00	91054	58.80	91064	65.69	91074	70.75
9/32	3/8	11/16	3 3/8	57118	50.17	91055	63.97	91065	70.86	91075	75.92
5/16	3/8	3/4	3 1/2	57120	52.04	91056	65.84	91066	72.73	91076	77.79
3/8	3/8	3/4	3 1/2	57124	54.51	91057	68.31	91067	75.20	91077	80.26
7/16	7/16	7/8	4	57128	86.79	91058	103.53	91068	111.89	91078	118.03
1/2	1/2	1	4	57132	89.80	91059	106.54	91069	114.90	91079	121.04

Solid Carbide 4-Flute Ball Nose Single End Mills

Micrograin Carbide – Center Cutting 30° Helix Angle

4-Flute end mills with a greater core thickness offer increased tool strength and reduced tool defection. 4-Flutes also reduce chip load per tooth for the milling of tougher materials, greater wear resistance and improved surface finish. **Ball Nose** mills are recommended for milling die cavities, fillets, radius bottom slots and special contours. **Center Cutting** end allows for plunge cutting like a drill into solid material.

List No. 5942 Regular Length

List No. 5957 Long Length

List No. 5953 Extra Long Length

TOLERANCES		STANDARD PACKAGE
Size to 1/4"	+.000 - .002	All sizes – 1 each
9/32" to 1"	+.000 - .003	
Shank Dia.	+.0000 - .0005	

List No. 5942 Regular Length

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED EDP NO.	UNCOATED LIST PRICE	TiN COATED EDP NO.	TiN COATED LIST PRICE	TiCN COATED EDP NO.	TiCN COATED LIST PRICE	TiALN COATED EDP NO.	TiALN COATED LIST PRICE
1/16	1/8	3/16	1 1/2	58204	$12.86	91100	$14.62	91123	$15.51	91146	$16.14
5/64	1/8	3/16	1 1/2	58205	14.08	91101	15.84	91124	16.73	91147	17.36
3/32	1/8	3/8	1 1/2	58206	12.86	91102	14.62	91125	15.51	91148	16.14
7/64	1/8	3/8	1 1/2	58207	14.08	91103	15.84	91126	16.73	91149	17.36
1/8	1/8	1/2	1 1/2	58208	12.86	91104	14.62	91127	15.51	91150	16.14
9/64	3/16	9/16	2	58209	17.36	91105	19.56	91128	20.67	91151	21.47
5/32	3/16	9/16	2	58210	16.53	91106	18.73	91129	19.84	91152	20.64
11/64	3/16	5/8	2	58211	17.36	91107	19.56	91130	20.67	91153	21.47
3/16	3/16	5/8	2	58212	16.53	91108	18.73	91131	19.84	91154	20.64
13/64	1/4	5/8	2 1/2	58213	25.51	91109	30.29	91132	32.69	91155	34.42
7/32	1/4	5/8	2 1/2	58214	22.34	91110	27.12	91133	29.52	91156	31.25
1/4	1/4	3/4	2 1/2	58216	20.48	91111	25.26	91134	27.66	91157	29.39
9/32	5/16	3/4	2 1/2	58218	28.65	91112	35.63	91135	39.14	91158	41.68
5/16	5/16	13/16	2 1/2	58220	27.92	91113	34.90	91136	38.41	91159	40.95
3/8	3/8	7/8"	2 1/2	58224	32.09	91114	39.07	91137	42.58	91160	45.12
7/16	7/16	1	2 3/4	58228	48.15	91115	56.89	91138	61.25	91161	64.46
1/2	1/2	1	3	58232	56.19	91116	64.93	91139	69.29	91162	72.50
9/16	9/16	1 1/4	3 1/2	58236	90.20	91117	102.65	91140	108.89	91163	113.44
5/8	5/8	1 1/4	3 1/2	58240	108.10	91118	120.55	91141	126.79	91164	131.34
11/16	3/4	1 1/2	4	58244	162.62	91119	177.93	91142	185.60	91165	191.19
3/4	3/4	1 1/2	4	58248	153.51	91120	168.82	91143	176.49	91166	182.08
7/8	7/8	1 1/2	4	58256	222.86	91121	244.74	91144	255.68	91167	263.70
1	1	1 1/2	4	58264	252.04	91122	273.92	91145	284.86	91168	292.88

List No. 5957 Long Length

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED EDP NO.	UNCOATED LIST PRICE	TiN COATED EDP NO.	TiN COATED LIST PRICE	TiCN COATED EDP NO.	TiCN COATED LIST PRICE	TiALN COATED EDP NO.	TiALN COATED LIST PRICE
1/8	1/8	3/4	2 1/4	58838	$19.18	91170	$21.59	91180	$22.81	91190	$23.68
3/16	3/16	3/4	2 1/2	58840	21.76	91171	25.23	91181	26.99	91191	28.24
1/4	1/4	1 1/8	3	58844	26.67	91172	31.45	91182	33.85	91192	35.58
5/16	5/16	1 1/8	3	58850	37.14	91173	44.12	91183	47.63	91193	50.17
3/8	3/8	1 1/8	3	58854	38.78	91174	45.76	91184	49.27	91194	51.81
7/16	7/16	2	4	58858	75.92	91175	87.06	91185	92.66	91195	96.72
1/2	1/2	2	4	58862	81.43	91176	92.57	91186	98.17	91196	102.23
5/8	5/8	2 1/4	5	58870	134.29	91177	149.19	91187	156.66	91197	162.10
3/4	3/4	2 1/4	5	58878	211.84	91178	229.31	91188	238.04	91198	244.45
1	1	2 1/4	5	58894	352.97	91179	379.22	91189	392.36	91199	401.96

List No. 5953 Extra Long Length

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED EDP NO.	UNCOATED LIST PRICE	TiN COATED EDP NO.	TiN COATED LIST PRICE	TiCN COATED EDP NO.	TiCN COATED LIST PRICE	TiALN COATED EDP NO.	TiALN COATED LIST PRICE
1/8	1/8	1	3	58708	$24.08	91200	$26.49	91210	$27.71	91220	$28.58
3/16	3/16	1 1/8	3	58712	27.35	91201	30.82	91211	32.58	91221	33.83
1/4	1/4	1 1/2	4	58716	30.82	91202	36.29	91212	39.02	91222	41.03
5/16	5/16	1 5/8	4	58720	48.38	91203	57.56	91213	62.18	91223	65.52
3/8	3/8	1 3/4	4	58724	50.41	91204	59.59	91214	64.21	91224	67.55
7/16	7/16	3	6	58728	98.78	91205	117.35	91215	126.66	91225	133.45
1/2	1/2	3	6	58732	146.12	91206	164.69	91216	174.00	91226	180.79
5/8	5/8	3	6	58740	174.49	91207	196.37	91217	207.31	91227	215.33
3/4	3/4	3	6	58748	275.51	91208	301.06	91218	313.84	91228	323.21
1	1	3	6	58764	382.29	91209	413.56	91219	429.19	91229	440.65

Solid Carbide Metric 4-Flute Ball Nose Single End Mills

Micrograin Carbide – Center Cutting 30° Helix Angle

List No. 5965

4-Flute end mills with a greater core thickness offer increased tool strength and reduced tool deflection. 4-Flutes also reduce chip load per tooth for the milling of tougher materials, greater wear resistance and improved surface finish. **Ball Nose** mills are recommended for milling die cavities, fillets, radius bottom slots and special contours. **Center Cutting** end allows for plunge cutting like a drill into solid material.

Solid Carbide offers higher cutting speeds, high rigidity, excellent hardness, wear resistance and heat resistance and long tool life. **Tool Coatings** further enhance milling performance in a wide range of applications.

TOLERANCE
All Sizes +.000mm/-.051mm
Shank Dia. +.000mm/-.013mm

STANDARD PACKAGE
All sizes – 1 each

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED EDP NO.	UNCOATED LIST PRICE	TiN COATED EDP NO.	TiN COATED LIST PRICE	TiCN COATED EDP NO.	TiCN COATED LIST PRICE	TiALN COATED EDP NO.	TiALN COATED LIST PRICE
1 mm	3 mm	3 mm	39 mm	59440	$16.68	91240	$18.44	91260	$19.33	91280	$19.96
1.5 mm	3 mm	5 mm	39 mm	59441	15.43	91241	17.19	91261	18.08	91281	18.71
2 mm	3 mm	7 mm	39 mm	59442	15.43	91242	17.19	91262	18.08	91282	18.71
2.5 mm	3 mm	7 mm	39 mm	59443	15.43	91243	17.19	91263	18.08	91283	18.71
3 mm	3 mm	9 mm	39 mm	59444	15.43	91244	17.19	91264	18.08	91284	18.71
3.5 mm	4 mm	12 mm	51 mm	59445	20.55	91245	24.02	91265	25.78	91285	27.03
4 mm	4 mm	14 mm	51 mm	59446	20.55	91246	24.02	91266	25.78	91286	27.03
4.5 mm	5 mm	14 mm	51 mm	59447	22.77	91247	26.24	91267	28.00	91287	29.25
5 mm	5 mm	16 mm	51 mm	59448	22.77	91248	27.55	91268	29.95	91288	31.68
6 mm	6 mm	19 mm	64 mm	59449	29.19	91249	33.97	91269	36.37	91289	38.10
7 mm	8 mm	19 mm	64 mm	59450	38.23	91250	45.21	91270	48.72	91290	51.26
8 mm	8 mm	21 mm	64 mm	59451	41.90	91251	48.88	91271	52.39	91291	54.93
9 mm	10 mm	22 mm	70 mm	59452	57.36	91252	64.34	91272	67.85	91292	70.39
10 mm	10 mm	22 mm	70 mm	59453	57.36	91253	66.10	91273	70.46	91293	73.67
11 mm	11 mm	25 mm	70 mm	59454	65.59	91254	74.33	91274	78.69	91294	81.90
12 mm	12 mm	25 mm	76 mm	59455	79.20	91255	90.34	91275	95.94	91295	100.00
14 mm	14 mm	31 mm	89 mm	59457	107.61	91256	120.06	91276	126.30	91296	130.85
16 mm	16 mm	32 mm	89 mm	59458	124.08	91257	139.39	91277	147.06	91297	152.65
18 mm	18 mm	35 mm	102 mm	59459	175.34	91258	192.81	91278	201.54	91298	207.95
20 mm	20 mm	38 mm	102 mm	59460	211.65	91259	237.90	91279	251.04	91299	260.64
22 mm	22 mm	38 mm	102 mm	59461*	307.10	—	—	—	—	—	—
25 mm	25 mm	38 mm	102 mm	59462*	326.50	—	—	—	—	—	—

*** Available While Supplies Last**

Solid Carbide 4-Flute Stub Length Ball Nose Double End Mills

Micrograin Carbide – Center Cutting 30° Helix Angle

List No. 5949

4-Flute end mills with a greater core thickness offer increased tool strength and reduced tool deflection. 4-Flutes also reduce chip load per tooth for the milling of tougher materials, greater wear resistance and improved surface finish. **Ball Nose** mills are recommended for milling die cavities, fillets, radius bottom slots and special contours. **Center Cutting** end allows for plunge cutting like a drill into solid material.

TOLERANCES
Size to 1/4" +.000 - .002
9/32" to 1" +.000 - .003
Shank Dia. +.0000 - .0005

STANDARD PACKAGE
All sizes – 1 each

DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED EDP NO.	UNCOATED LIST PRICE	TiN COATED EDP NO.	TiN COATED LIST PRICE	TiCN COATED EDP NO.	TiCN COATED LIST PRICE	TiALN COATED EDP NO.	TiALN COATED LIST PRICE
1/16	1/8	1/8	1½	58354	$18.82	91300	$21.47	91311	$22.82	91322	$23.77
3/32	1/8	3/16	1½	58356	18.82	91301	21.47	91312	22.82	91323	23.77
1/8	3/16	1/4	2	58358	17.43	91302	20.08	91313	21.43	91324	22.38
5/32	3/16	5/16	2	58360	25.63	91303	28.94	91314	30.61	91325	31.80
3/16	3/16	3/8	2	58362	25.63	91304	28.94	91315	30.61	91326	31.80
7/32	1/4	1/2	2½	58364	33.96	91305	41.14	91316	44.74	91327	47.37
1/4	1/4	1/2	2½	58366	32.45	91306	39.63	91317	43.23	91328	45.86
5/16	5/16	1/2	2½	58370	45.63	91307	56.12	91318	61.39	91329	65.21
3/8	3/8	9/16	3	58374	48.78	91308	59.27	91319	64.54	91330	68.36
7/16	7/16	9/16	3	58378	62.69	91309	75.79	91320	82.36	91331	87.15
1/2	1/2	5/8	3	58382	82.20	91310	95.30	91321	101.87	91332	106.66

Solid Carbide Corner Radius Single End Mills

Micrograin Carbide – Center Cutting 30° Helix Angle

Corner Radius strengthens the end mill corners to minimize chipping especially in tougher milling applications. **Corner Radius** also used when the finished part requires a radius.

2-Flute end mills provide increased chip capacity for higher feed rates. Recommended for easy-to-machine materials including low alloy steels, non-ferrous materials and cast iron.

4-Flute end mills with a greater core thickness offer increased tool strength and reduced tool defection. 4-Flutes also reduce chip load per tooth for the milling of tougher materials, greater wear resistance and improved surface finish.

Speeds & Feeds: Page 248

List No. 5967 2-Flute

List No. 5968 4-Flute

Solid Carbide offers higher cutting speeds, high rigidity, excellent hardness, wear resistance and heat resistance, and long tool life. **Tool Coatings** further enhance milling performance in a wide range of applications.

TOLERANCES

Size to 1/4"	+.000 - .002
5/16" to 1"	+.000 - .003
Shank Dia.	+.0000 - .0005

STANDARD PACKAGE
All sizes – 1 each

List No. 5967 – 2-Flute

DIA.	SHANK DIA.	LOC	OAL	CORNER RADIUS	UNCOATED EDP NO.	UNCOATED LIST PRICE	TiN COATED EDP NO.	TiN COATED LIST PRICE	TiCN COATED EDP NO.	TiCN COATED LIST PRICE	TiALN COATED EDP NO.	TiALN COATED LIST PRICE
1/8	1/8	1/2	1 1/2	.020	58910	$15.10	94830	$16.16	94875	$16.91	94920	$16.91
3/16	3/16	5/8	2	.020	58913	19.80	94833	21.18	94878	22.17	94923	22.17
3/16	3/16	5/8	2	.030	58914	19.80	94834	21.18	94879	22.17	94924	22.17
1/4	1/4	3/4	2 1/2	.020	58916	24.49	94836	26.20	94881	27.43	94926	27.43
1/4	1/4	3/4	2 1/2	.030	58917	24.49	94837	26.20	94882	27.43	94927	27.43
5/16	5/16	13/16	2 1/2	.020	58920	31.43	94840	33.63	94885	35.20	94930	35.20
5/16	5/16	13/16	2 1/2	.030	58921	31.43	94841	33.63	94886	35.20	94931	35.20
3/8	3/8	1	2 1/2	.020	58924	39.39	94844	42.14	94889	44.11	94934	44.11
3/8	3/8	1	2 1/2	.030	58925	39.39	94845	42.14	94890	44.11	94935	44.11
1/2	1/2	1	3	.020	58929	68.57	94849	73.37	94894	76.80	94939	76.80
1/2	1/2	1	3	.030	58930	68.57	94850	73.37	94895	76.80	94940	76.80
1/2	1/2	1	3	.060	58932	68.57	94852	73.37	94897	76.80	94942	76.80
5/8	5/8	1 1/4	3 1/2	.020	58936	114.69	94856	122.72	94901	128.46	94946	128.46
5/8	5/8	1 1/4	3 1/2	.030	58937	114.69	94857	122.72	94902	128.46	94947	128.46
5/8	5/8	1 1/4	3 1/2	.060	58939	114.69	94859	122.72	94904	128.46	94949	128.46
5/8	5/8	1 1/4	3 1/2	.090	58940	114.69	94860	122.72	94905	128.46	94950	128.46
3/4	3/4	1 1/2	4	.020	58942	163.06	94862	174.48	94907	182.63	94952	182.63
3/4	3/4	1 1/2	4	.030	58943	163.06	94863	174.48	94908	182.63	94953	182.63
3/4	3/4	1 1/2	4	.060	58945	163.06	94865	174.48	94910	182.63	94955	182.63
3/4	3/4	1 1/2	4	.090	58946	163.06	94866	174.48	94911	182.63	94956	182.63
3/4	3/4	1 1/2	4	.125	58947	163.06	94867	174.48	94912	182.63	94957	182.63
1	1	1 1/2	4	.020	58949	301.43	94869	322.53	94914	337.60	94959	337.60
1	1	1 1/2	4	.030	58950	301.43	94870	322.53	94915	337.60	94960	337.60
1	1	1 1/2	4	.060	58952	301.43	94872	322.53	94917	337.60	94962	337.60
1	1	1 1/2	4	.090	58953	301.43	94873	322.53	94918	337.60	94963	337.60
1	1	1 1/2	4	.125	58954	301.43	94874	322.53	94919	337.60	94964	337.60

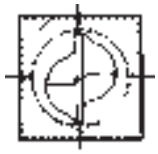
(continued)

Solid Carbide Corner Radius Single End Mills (continued)

List No. 5968 – 4-Flute

DIA.	SHANK DIA.	LOC	OAL	CORNER RADIUS	UNCOATED EDP NO.	UNCOATED LIST PRICE	TiN COATED EDP NO.	TiN COATED LIST PRICE	TiCN COATED EDP NO.	TiCN COATED LIST PRICE	TiALN COATED EDP NO.	TiALN COATED LIST PRICE
1/8	1/8	1/2	1 1/2	.020	59000	$15.10	94965	$16.16	95010	$16.91	95055	$16.91
3/16	3/16	5/8	2	.020	59003	19.80	94968	21.18	95013	22.17	95058	22.17
3/16	3/16	5/8	2	.030	59004	19.80	94969	21.18	95014	22.17	95059	22.17
1/4	1/4	3/4	2 1/2	.020	59006	24.49	94971	26.20	95016	27.43	95061	27.43
1/4	1/4	3/4	2 1/2	.030	59007	24.49	94972	26.20	95017	27.43	95062	27.43
5/16	5/16	13/16	2 1/2	.020	59010	31.43	94975	33.63	95020	35.20	95065	35.20
5/16	5/16	13/16	2 1/2	.030	59011	31.43	94976	33.63	95021	35.20	95066	35.20
3/8	3/8	1	2 1/2	.020	59014	39.39	94979	42.14	95024	44.11	95069	44.11
3/8	3/8	1	2 1/2	.030	59015	39.39	94980	42.14	95025	44.11	95070	44.11
1/2	1/2	1	3	.020	59019	68.57	94984	73.37	95029	76.80	95074	76.80
1/2	1/2	1	3	.030	59020	68.57	94985	73.37	95030	76.80	95075	76.80
1/2	1/2	1	3	.060	59022	68.57	94987	73.37	95032	76.80	95077	76.80
5/8	5/8	1 1/4	3 1/2	.020	59026	114.69	94991	122.72	95036	128.46	95081	128.46
5/8	5/8	1 1/4	3 1/2	.030	59027	114.69	94992	122.72	95037	128.46	95082	128.46
5/8	5/8	1 1/4	3 1/2	.060	59029	114.69	94994	122.72	95039	128.46	95084	128.46
5/8	5/8	1 1/4	3 1/2	.090	59030	114.69	94995	122.72	95040	128.46	95085	128.46
3/4	3/4	1 1/2	4	.020	59032	163.06	94997	174.48	95042	182.63	95087	182.63
3/4	3/4	1 1/2	4	.030	59033	163.06	94998	174.48	95043	182.63	95088	182.63
3/4	3/4	1 1/2	4	.060	59035	163.06	95000	174.48	95045	182.63	95090	182.63
3/4	3/4	1 1/2	4	.090	59036	163.06	95001	174.48	95046	182.63	95091	182.63
3/4	3/4	1 1/2	4	.125	59037	163.06	95002	174.48	95047	182.63	95092	182.63
1	1	1 1/2	4	.020	59039	301.43	95004	322.53	95049	337.60	95094	337.60
1	1	1 1/2	4	.030	59040	301.43	95005	322.53	95050	337.60	95095	337.60
1	1	1 1/2	4	.060	59042	301.43	95007	322.53	95052	337.60	95097	337.60
1	1	1 1/2	4	.090	59043	301.43	95008	322.53	95053	337.60	95098	337.60
1	1	1 1/2	4	.125	59044	301.43	95009	322.53	95054	337.60	95099	337.60

CARBIDE DRILL-MILL™



Micrograin Carbide

DRILL-MILL performs drilling, spotting, countersinking, chamfering, slotting, side milling, profile milling, "V" grooving and other drilling & milling operations with the same tool in vertical milling machine applications.

TOLERANCE +.000 - .002

List No. 5989

90° Point Angle
2-Flute
30° Right Hand Helix

STANDARD PACKAGE All sizes — 1 each

DIA.	SHANK DIA.	LOC*	OAL*	UNCOATED EDP NO.	UNCOATED LIST PRICE	TiN COATED EDP NO.	TiN COATED LIST PRICE	TiCN COATED EDP NO.	TiCN COATED LIST PRICE	TiALN COATED EDP NO.	TiALN COATED LIST PRICE
1/8	1/8	1/2	1 1/2	59060	$16.94	95300	$20.69	95320	$20.69	95340	$20.69
1/8**	1/8	1/2	1 1/2	59061	16.94	95301	20.69	95321	20.69	95341	20.69
3/16	3/16	5/8	2	59062	23.88	95302	27.59	95322	27.59	95342	27.59
3/16**	3/16	5/8	2	59063	23.88	95303	27.59	95323	27.59	95343	27.59
1/4	1/4	3/4	2 1/2	59064	29.84	95304	38.16	95324	38.16	95344	38.16
1/4**	1/4	3/4	2 1/2	59065	29.84	95305	38.16	95325	38.16	95345	38.16
5/16	5/16	13/16	2 1/2	59066	37.02	95306	46.98	95326	46.98	95346	46.98
5/16**	5/16	13/16	2 1/2	59067	37.02	95307	46.98	95327	46.98	95347	46.98
3/8	3/8	1	2 1/2	59068	46.53	95308	56.49	95328	56.49	95348	56.49
3/8**	3/8	1	2 1/2	59069	46.53	95309	56.49	95329	56.49	95349	56.49
7/16	7/16	1	2 3/4	59070	62.94	95310	74.20	95330	74.20	95350	74.20
1/2	1/2	1	3	59071	77.14	95311	88.41	95331	88.41	95351	88.41
1/2**	1/2	1	3	59072	77.14	95312	88.41	95332	88.41	95352	88.41
5/8	5/8	1 1/4	3 1/2	59073	147.47	95313	164.86	95333	164.86	95353	164.86
5/8**	5/8	1 1/4	3 1/2	59074	147.47	95314	164.86	95334	164.86	95354	164.86
3/4	3/4	1 1/2	4	59075	217.02	95315	245.43	95335	245.43	95355	245.43

* Lengths include the 90° conical cutting point
** Features sharper point with a .005"/.008" tip diameter for "V" grooving where a sharper point is required. (Standard carbide Drill-Mills supplied with tip diameter of .030" or larger to provide strength.)

Solid Carbide 3-Flute 60° High Helix Single End Mills

Micrograin Carbide – Center Cutting 30° Helix Angle

3-Flute end mills are a compromise between the chip capacity of 2-Flute mills and the strength and wear resistance of 4-Flute mills. **60° High Helix** angle keeps the cutting edges constantly engaged in the workpiece reducing cutting load variations. The result is a clean efficient cutting action with decreased cutting resistance, enhanced chip control, excellent surface finish and long tool life. Recommended for difficult-to-machine materials including stainless steels, alloy steels, titanium, inconel and other materials that generate high cutting forces. **Center Cutting** end allows for plunge cutting like a drill into solid material.

List No. 5945

Solid Carbide offers higher cutting speeds, high rigidity, excellent hardness, wear resistance and heat resistance and long tool life. **Tool Coatings** further enhance milling performance in a wide range of applications.

TOLERANCES

Size to 1/4"	+.000 - .002
9/32" to 1"	+.000 - .003
Shank Dia.	+.0000 - .0005

STANDARD PACKAGE
All sizes – 1 each

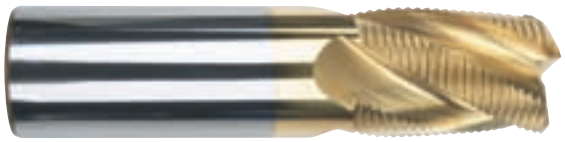
DIA.	SHANK DIA.	L.O.C.	OAL	UNCOATED EDP NO.	UNCOATED LIST PRICE	TiN COATED EDP NO.	TiN COATED LIST PRICE	TiCN COATED EDP NO.	TiCN COATED LIST PRICE	TiALN COATED EDP NO.	TiALN COATED LIST PRICE
1/4	1/4	3/4	2 1/2	57677	$38.69	90640	$43.47	90648	$45.87	90656	$47.60
5/16	5/16	13/16	2 1/2	57678	46.51	90641	53.49	90649	57.00	90657	59.54
3/8	3/8	7/8	2 1/2	57679	81.55	90642	88.53	90650	92.04	90658	94.58
7/16	7/16	1	2 3/4	57680	97.90	90643	106.64	90651	111.00	90659	114.21
1/2	1/2	1	3	57681	97.90	90644	106.64	90652	111.00	90660	114.21
5/8	5/8	1 1/4	3 1/2	57682	170.62	90645	183.07	90653	189.31	90661	193.86
3/4	3/4	1 1/2	4	57683	250.13	90646	265.44	90654	273.11	90662	278.70
1	1	1 1/2	4	57684	463.06	90647	484.94	90655	495.88	90663	503.90

Solid Carbide Multi-Flute Roughing End Mills

Micrograin Carbide – Center Cutting 30° Helix Angle

Roughing end mills feature a chip breaker type cutting edge for heavier cuts, higher speeds and feeds and greatly increased productivity. Recommended for a wide range of materials including mild steel, steel alloys, stainless steel, cast iron and many other applications. **Center Cutting** end allows for plunge cutting like a drill into solid material.

Solid Carbide offers higher cutting speeds, high rigidity, excellent hardness, wear resistance and heat resistance and long tool life. **Tool Coatings** further enhance milling performance in a wide range of applications.



List No. 5972G — TiN Coated

List No. 5972C — TiCN Coated

STANDARD PACKAGE
All sizes – 1 each

DIA.	SHANK DIA.	L.O.C.	OAL	NO. OF FLUTES	5972G TiN EDP NO.	LIST PRICE	5972C TiCN EDP NO.	LIST PRICE
1/4	1/4	3/4	2 1/2	4	56760	$75.08	56780	$77.45
5/16	5/16	13/16	2 1/2	4	56761	85.05	56781	88.04
3/8	3/8	7/8	2 1/2	4	56762	93.85	56782	96.84
7/16	7/16	1	3	4	56763	110.64	56783	115.43
1/2	1/2	1	3	4	56764	128.22	56784	133.01
5/8	5/8	1 1/4	3 1/2	4	56765	221.49	56785	228.97
3/4	3/4	1 1/2	4	4	56766	289.54	56786	298.07
1	1	1 1/2	4	4	56767	456.13	56787	471.03

OmegaCut Ultra™ Solid Carbide – TiALN Coated 2-Flute Single End Mills

List No. 5980

OmegaCut Ultra high performance end mills feature 12% cobalt .5 sub-micron carbide, unique geometry and a TiALN coating for excellent wear resistance, heat resistance and long tool life. Recommended for tough milling applications including dry machining, abrasive materials and difficult materials that generate higher cutting temperatures.

High Performance – Center Cutting
12% Cobalt .5 Sub-Micron Carbide
30° Helix Angle

STANDARD PACKAGE All sizes — 1 each

Regular Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
3/16	.1875	3/16	5/8	2	56202*	25.93
5/16	.3125	5/16	13/16	2½	56204*	45.49
5/8	.6250	5/8	1¼	3½	56207*	150.55
3/4	.7500	3/4	1½	4	56208*	212.75
1	1.0000	1	1½	4	56209*	357.80

Long Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
1/8	.1250	1/8	3/4	2¼	56210*	$30.55
3/16	.1875	3/16	3/4	2½	56211*	32.53
1/4	.2500	1/4	1⅛	3	56212*	41.54
5/16	.3125	5/16	1⅛	3	56213*	60.00
3/8	.3750	3/8	1⅛	3	56214*	64.40
½	.5000	½	2	4	56215*	113.19
5/8	.6250	5/8	2¼	5	56216*	233.63
3/4	.7500	3/4	2¼	5	56217*	330.33
1	1.0000	1	2¼	5	56218*	458.68

* Available While Supplies Last

OmegaCut Ultra™ Solid Carbide – TiALN Coated 4-Flute Single End Mills

List No. 5981

OmegaCut Ultra high performance end mills feature 12% cobalt .5 sub-micron carbide, unique geometry and a TiALN coating for excellent wear resistance, heat resistance and long tool life. Recommended for tough milling applications including dry machining, abrasive materials and difficult materials that generate higher cutting temperatures.

High Performance – Center Cutting
12% Cobalt .5 Sub-Micron Carbide
30° Helix Angle

STANDARD PACKAGE All sizes — 1 each

Regular Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
1/16	.0625	1/8	3/16	1½	56219*	$23.08
1/8	.1250	1/8	½	1½	56220*	23.08
1/4	.2500	1/4	3/4	2½	56222*	31.43
3/8	.3750	3/8	1	2½	56224*	53.85
5/8	.6250	5/8	1¼	3½	56226*	150.55
3/4	.7500	3/4	1½	4	56227*	212.75
1	1.0000	1	1½	4	56228*	357.80

Long Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
1/8	.1250	1/8	3/4	2¼	56229*	$30.55
3/16	.1875	3/16	3/4	2½	56230*	32.53
1/4	.2500	1/4	1⅛	3	56231*	41.54
5/16	.3125	5/16	1⅛	3	56232*	60.00
½	.5000	½	2	4	56234*	113.19
5/8	.6250	5/8	2¼	5	56235*	233.63
3/4	.7500	3/4	2¼	5	56236*	330.33

* Available While Supplies Last

OmegaCut Ultra™ Solid Carbide – TiALN Coated 2-Flute Ball Nose Extra Long Length Single End Mills

High Performance – Center Cutting
12% Cobalt .5 Sub-Micron Carbide
30° Helix Angle

List No. 5982

OmegaCut Ultra high performance end mills feature 12% cobalt .5 sub-micron carbide, unique geometry and a TiALN coating for excellent wear resistance, heat resistance and long tool life. Recommended for tough milling applications including dry machining, abrasive materials and difficult materials that generate higher cutting temperatures.

STANDARD PACKAGE All sizes — 1 each

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
1/8	.1250	1/8	5/16	2 3/8	56238*	$41.10
5/16	.3125	5/16	9/16	4	56241*	81.54
1/2	.5000	1/2	7/8	4 1/4	56243*	143.96
5/8	.6250	5/8	1 1/4	5 1/2	56244*	300.22
3/4	.7500	3/4	1 1/2	6 1/4	56245*	468.35
1	1.0000	1	2	7 1/8	56246*	749.23

* Available While Supplies Last

OmegaCut Ultra™ Solid Carbide – TiALN Coated 4-Flute Ball Nose Extra Long Length Single End Mills

High Performance – Center Cutting
12% Cobalt .5 Sub-Micron Carbide
30° Helix Angle

List No. 5982

OmegaCut Ultra high performance end mills feature 12% cobalt .5 sub-micron carbide, unique geometry and a TiALN coating for excellent wear resistance, heat resistance and long tool life. Recommended for tough milling applications including dry machining, abrasive materials and difficult materials that generate higher cutting temperatures.

STANDARD PACKAGE All sizes — 1 each

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.	LIST PRICE
5/16	.3125	5/16	9/16	4	56250*	$94.07
5/8	.6250	5/8	1 1/4	5 1/2	56253*	338.68
3/4	.7500	3/4	1 1/2	6 1/4	56254*	563.96
1	1.0000	1	2	7 1/8	56255*	902.42

* Available While Supplies Last

OmegaCut Ultra™ Solid Carbide – TiALN Coated Multi-Flute High Helix Single End Mills

High Performance – Center Cutting
12% Cobalt .5 Sub-Micron Carbide
45° Helix Angle

List No. 5983

OmegaCut Ultra high performance end mills feature 12% cobalt .5 sub-micron carbide, unique geometry and a TiALN coating for excellent wear resistance, heat resistance and long tool life. Recommended for tough milling applications including dry machining, abrasive materials and difficult materials that generate higher cutting temperatures.

STANDARD PACKAGE All sizes — 1 each

Regular Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
¼	.2500	¼	½	2¼	6	56256*	$61.98
5/16	.3125	5/16	¾	2½	6	56257*	78.46

* Available While Supplies Last

OmegaCut Rough™ Solid Carbide – TiALN Coated Multi-Flute Roughing End Mills

High Performance – Center Cutting
12% Cobalt .5 Sub-Micron Carbide
20° Helix Angle

List No. 5984

OmegaCut Rough high performance end mills feature 12% cobalt .5 sub-micron carbide, unique geometry and a TiALN coating for excellent wear resistance, heat resistance and long tool life. Recommended for tough milling applications including dry machining, abrasive materials and difficult materials that generate higher cutting temperatures.

STANDARD PACKAGE All sizes — 1 each

Regular Length

DIA.	DEC. EQUIV.	SHANK DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	EDP NO.	LIST PRICE
5/16	.3125	5/16	¾	2½	3	56263*	$88.06
¾	.7500	¾	1⅝	4	4	56267*	298.06
1	1.0000	1	1¾	4	5	56268*	471.03

* Available While Supplies Last

TOOL COATING SERVICE

Morse Cutting tools now offers a variety of tool coatings for enhanced cutting performance and increased tool life. Please inquire.

TiN — Titanium Carbide

TiCN — Titanium Carbonitride

TiALN — Titanium Aluminum Nitride

CrN — Chromium Nitride

Solid Carbide End Mill Speed and Feed Recommendations

MATERIAL	SPEED (SFM)	FEED PER TOOTH BY END MILL DIA. 1/8″	1/4″	1/2″	3/4″	1″
Aluminum and Aluminum Alloys	600-1200	.0005	.0020	.0040	.0060	.0080
Copper and Copper Alloys	350-850	.0010	.0020	.0030	.0040	.0060
Brass and Bronze	250-400	.0010	.0020	.0030	.0040	.0050
Graphite	500-800	.0020	.0030	.0040	.0050	.0070
Plastics	600-1100	.0020	.0030	.0060	.0100	.0150
Plastics, Glass Filled	300-800	.0020	.0030	.0040	.0060	.0120
Iron, Cast (Soft)	250-450	.0010	.0020	.0030	.0060	.0080
Iron, Cast (Hard)	100-250	.0004	.0008	.0020	.0030	.0040
Iron, Ductile	80-400	.0005	.0010	.0020	.0040	.0060
Iron, Malleable	150-500	.0005	.0010	.0030	.0050	.0070
Steel, Low Carbon	200-400	.0005	.0010	.0030	.0050	.0070
Steel, Medium Carbon	100-250	.0006	.0015	.0020	.0040	.0050
Steel, Hardened to 35 Rc	130-230	.0005	.0010	.0015	.0020	.0030
Steel, Hardened to 50 Rc	70-130	.0003	.0007	.0010	.0020	.0030
Steel, Hardened to 60 Rc	30-70	.0002	.0005	.0010	.0015	.0020
Steel, Mold	200-350	.0005	.0010	.0020	.0030	.0040
Steel, Tool	100-250	.0005	.0010	.0020	.0030	.0040
Stainless Steel, Soft	250-400	.0005	.0010	.0020	.0040	.0060
Stainless Steel, Hard	150-200	.0002	.0005	.0010	.0030	.0050
Magnesium and Magnesium Alloys	800-1300	.0010	.0020	.0040	.0060	.0100
Monel and High-Nickel Steel	75-175	.0005	.0010	.0020	.0030	.0040
Titanium, Soft	125-300	.0005	.0010	.0020	.0040	.0060
Titanium, Hard	50-150	.0003	.0005	.0010	.0020	.0040
Nickel-Based High-Temp Alloys	50-100	.0004	.0008	.0010	.0015	.0020
Cobalt-Based Alloys	20-80	.0005	.0008	.0010	.0015	.0020
Refractory Alloys	80-300	.0005	.0010	.0010	.0015	.0020

The speeds and feeds shown are suggested starting points only and may be increased or decreased depending on actual material and machining conditions.

In general: Use lower speeds for hard or abrasive materials and heavier cuts. Use lower feeds for slotting cuts, smaller cutter diameters and better finishes. Use higher speeds for softer materials, lighter cuts, small cutter diameters and better finishes. Use higher feeds for easy-to-machine materials, lighter cuts and abrasive materials.

For slotting applications, reduce speed 20% from the low end of the speed recommendations.

For lighter radial depths of cut, use the higher end of the speed recommendations. For greater radial depths of cut, use the lower end of the speed recommendations.

For long and extra-long end mills, reduce feed per tooth by 50%.

For TiN coated tools, increase speed by 20% with the feed rate unchanged. For TiCN coated tools, start at the high end of the speed recommendations with the feed rate unchanged. For TiALN coated tools, increase speed by 50% with the feed rate unchanged.

Three Coatings Now in Stock!

TiN—Titanium Nitride (gold in color)
Is an excellent general-purpose coating that is ideal for a wide range of applications. TiN offers:

- Increased hardness
- Excellent wear resistance
- High lubricity
- Improved surface finish
- Thermal stability
- Reduced edge build-up
- Higher speeds and feeds
- Longer tool life

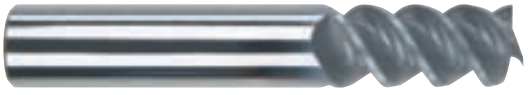
Applications: TiN is a good general coating for carbon steels, high-tensile steels and stainless steels.

TiALN—Titanium Aluminum Nitride (violet in color)
Is recommended for high thermal stress applications including:

- Dry machining
- Abrasive materials
- Hard-to-machine materials which generate higher cutting temperatures

TiALN actually forms a hard aluminum oxide layer in hot dry machining applications. This reflects heat back into the chip and away from the tool for longer tool life. TiALN allows for higher speeds and feeds.

Applications: High-strength steels, hard die steels and high-temperature alloys, including nickel-based classes.



TiCN—Titanium Carbonitride (blue-gray in color)
Has the same lubricity as TiN but is 30% harder for increased wear resistance and toughness. TiCN is excellent for:

- Maximizing tool life in long production runs
- Operating at aggressive speeds and feeds
- Cutting extremely abrasive or difficult-to-machine materials
- High-shock applications

Applications: Excellent for cast irons, high silicon aluminum alloys, copper and all abrasive materials. Because of TiCN's low oxidation temperature, coolant must be applied to control the temperature at the cutting edge.

Machinist's Practical Guide

The original concept of a pocket size manual covering a wide range of practical information for the machinist, tool maker, engineer and student. End mills, cutters, drills, reamers, taps and tool bits are some of the cutting tool areas covered. Tool steels, tapers, speeds, feeds, cutting fluids, and a wealth of additional useful information is found in this complete 108-page handbook. Fits handily into shop coats, tool boxes, desk drawers, etc.

Machinist's Guide for Taps

Taps and screw threads play a very important part in "holding the world together by a thread." This booklet contains all the needed information for correct tapping work. Included are thread forms and dimensions, fits and limits, hole preparation and size, type of taps, speeds and lubricants, tap sharpening and troubleshooting hints.

Machinist's Guide for Carbide Tooling

Carbide and its many applications is fully explained in this handy booklet. Complete coverage is given from the introduction and manufacture of carbide to its present major position in the cutting tools field. Included are design, application, geometrics, troubleshooting, speeds and feeds.

GUIDES	LIST NO.	DISPLAY BOX OF 50 (1 BOX) EDP. NO.	LIST PRICE	INDIVIDUAL COPIES EDP NO.	LIST PRICE
Machinist's Practical Guide	1001	20401	$336.00	20402	$7.20
Machinist's Guide for Taps	1002	20403	336.00	20404	7.20
Machinist's Guide for Carbide Tooling	1004	20407	336.00	20408	7.20

Morse® Plastic Wall Chart

NEW LOOK! LARGER SIZE! Redesigned for enhanced readability. Decimal Equivalents. Tap Drill Sizes for inch, metric and pipe threads. 24″ × 36″ printed on heavy duty .023″ gage plastic with three punched holes across top for wall mounting. Also available Custom Imprinted with your company logo and information.

List No. 1007 **EDP No. 01650** **List Price $7.00**

Decimal Equivalent Pocket Chart

List No. 1005

Front

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NEW LOOK! LARGER SIZE! Decimal Equivalents. Tap Drill Sizes for inch, metric and pipe threads. Size: 3⅜″ × 7″, Printed on plastic

Pack of 50
EDP No. 20412
List Price $51.50

Pack of 100
EDP No. 20413
List Price $96.45

MILLING CUTTERS & SAWS

Plain
Metal Slitting Saws

High Speed Steel

Plain metal slitting saws are ground concave to the hub for clearance. Recommended for shallower slotting and cutoff applications in a wide variety of materials.

STANDARD PACKAGE All sizes — 1 each

List No. 1841

DIA.	WIDTH	ARBOR HOLE	NO. TEETH	EDP NO.	LIST PRICE
1¼	1/32	½	28	41033	$16.36
1¼	1/16	½	28	41034	16.36
1½	1/32	½	32	41035	20.25
1½	3/32	½	26	41037	21.45
1¾	1/32	½	34	41039	23.43
1¾	1/16	½	30	41040*	23.43
1¾	3/32	½	30	41041*	24.21
2	1/32	½	38	41043	25.36
2	1/16	½	34	41044	25.36
2	3/32	½	34	41045	28.10
2	1/8	½	34	41046	29.32
2	5/32	½	34	41047	31.26
2½	1/32	⅞	36	40276	32.62
2½	3/64	⅞	36	41049	32.62
2½	1/16	⅞	36	40278	32.62
2½	3/32	⅞	36	40279*	34.22
2½	1/8	⅞	36	40280*	35.40
3	1/32	1	32	40281	37.73
3	3/64	1	32	40282	37.73
3	1/16	1	32	40283	38.95
3	5/64	1	32	41051	70.07
3	3/32	1	32	40284	41.91
3	7/64	1	32	41052	80.10
3	1/8	1	32	40285	42.71
3	9/64	1	32	41053	84.27
3	5/32	1	32	40286	52.43
3	11/64	1	32	41054*	92.30
3	3/16	1	32	41055	92.30
3½	1/32	1	30	41058*	57.46
3½	3/64	1	30	41059*	57.46
3½	1/16	1	30	41060	57.46
4	1/32	1	36	40287	48.18
4	3/64	1	36	40288	49.54
4	1/16	1	36	40289	51.50
4	5/64	1	36	41064	112.33
4	3/32	1	36	40290	56.01
4	7/64	1	36	41065	119.05
4	1/8	1	36	40291	66.42
4	9/64	1	36	41066	$124.41
4	5/32	1	36	40292	82.91
4	11/64	1	36	41067*	132.65
4	3/16	1	36	40293	84.27
4½	1/16	1	36	41070	97.11
4½	3/32	1	36	41071*	112.29
5	1/16	1	40	40294	75.65
5	5/64	1	40	41075*	158.18
5	3/32	1	40	40295*	79.41
5	7/64	1	40	41076*	172.53
5	1/8	1	40	40296	94.34
5	1/8	1¼	40	40297*	94.34
5	9/64	1¼	40	41078*	180.57
5	3/16	1	40	41080	123.74
6	1/16	1	44	40298	97.40
6	3/64	1	44	41082*	110.10
6	7/64	1	44	41084*	110.10
6	1/8	1	44	40300	131.92
6	3/16	1	44	41087	164.52
6	3/16	1¼	44	40302	164.52
7	5/64	1	44	41091*	146.37
7	3/32	1	44	41092*	146.37
7	5/32	1	44	41094*	146.37
8	1/8	1	52	40303*	268.00
8	5/64	1	52	41100*	238.44
8	5/32	1	52	41102*	238.44
8	3/16	1	52	41103*	238.44
8	1/8	1¼	52	40304*	268.00
8	3/16	1¼	52	41104*	283.69
8	1/4	1	52	41106*	252.40
10	1/16	1¼	62	41109*	405.54
10	5/64	1	62	41110*	405.54
10	1/8	1¼	62	41113*	405.54
10	5/32	1	62	41114*	405.54
10	3/16	1¼	62	41116	405.54
10	7/32	1	62	41117*	405.54

*Available While Supplies Last

CUTTING FLUIDS SELECTION

Coolants and lubricants offer many benefits including reduced friction and heat, enhanced chip removal, improved accuracy and surface finish, higher speeds and feeds, corrosion protection and increased tool life.

Proper selection and application of cutting fluids is critical to optimizing machining applications. **Please consult your cutting fluids supplier for advice on your specific machining application.**

Screw Slotting Saws

High Speed Steel

Screw Slotting saws are ground concave for clearance. Designed for slotting screw heads and shallower slotting applications in a wide variety of materials.

STANDARD PACKAGE All sizes — 1 each

List No. 1845

DIA.	WIDTH	ARBOR HOLE	NO. TEETH	EDP NO.	LIST PRICE
1¾	.006	⅝	90	41304*	$22.03
1¾	.008	⅝	90	41305*	20.45
1¾	.010	⅝	90	41306*	18.88
1¾	.012	⅝	90	41307*	18.34
1¾	.013	⅝	90	41308*	15.06
1¾	.016	⅝	90	41310*	16.92
1¾	.018	⅝	90	41311*	15.94
1¾	.020	⅝	90	40664*	15.36
1¾	.023	⅝	90	41312*	15.36
1¾	.025	⅝	90	41313*	15.36
1¾	.028	⅝	90	41314	15.36
1¾	.032	⅝	90	40660	15.56
1¾	.035	⅝	90	41315*	16.14
1¾	.036	⅝	90	41316*	16.14
1¾	.040	⅝	90	40658*	16.14
1¾	.045	⅝	90	40657	16.14
1¾	.057	⅝	90	40655*	18.14
1¾	.064	⅝	90	40654*	18.88
1¾	.102	⅝	90	41320*	21.34
1¾	.114	⅝	90	41321*	16.80
2¼	.006	⅝	60	41322*	26.47
2¼	.008	⅝	60	41323*	23.59
2¼	.012	⅝	60	41325*	19.69
2¼	.013	⅝	60	41326*	16.61
2¼	.014	⅝	60	41327*	18.68
2¼	.018	⅝	60	41329*	15.70
2¼	.020	⅝	60	40644	15.70
2¼	.023	⅝	60	40643*	15.70
2¼	.025	⅝	60	41330*	15.70
2¼	.028	⅝	60	41331	15.70
2¼	.032	⅝	60	40640	18.34
2¼	.035	⅝	60	41332*	16.31
2¼	.036	⅝	60	40639*	18.34
2¼	.040	⅝	60	41333*	18.34
2¼	.045	⅝	60	41334*	19.69
2¼	.051	⅝	60	40636	19.69
2¼	.057	⅝	60	41335	21.05
2¼	.064	⅝	60	40634	21.05
2¼	.072	⅝	60	41336*	24.03
2¼	.081	⅝	60	41337*	25.59
2¼	.091	⅝	60	41338*	$27.53
2¼	.102	⅝	60	41339*	29.46
2¾	.006	1	72	41341*	30.68
2¾	.006	¾	72	41342*	30.68
2¾	.008	1	72	41343*	26.73
2¾	.008	¾	72	41344*	26.73
2¾	.010	¾	72	41346*	22.99
2¾	.012	1	72	41347*	21.68
2¾	.012	¾	72	41348*	21.68
2¾	.013	1	72	41349*	18.21
2¾	.013	¾	72	41350*	18.21
2¾	.014	1	72	41351	20.47
2¾	.014	¾	72	41352*	20.47
2¾	.016	1	72	41353*	18.68
2¾	.016	¾	72	41354*	18.68
2¾	.018	1	72	41355*	18.10
2¾	.018	¾	72	41356*	18.10
2¾	.020	1	72	40624	16.14
2¾	.020	¾	72	41357*	16.14
2¾	.023	1	72	40623*	16.14
2¾	.023	¾	72	41358*	16.14
2¾	.025	1	72	40622	16.14
2¾	.025	1	56	41359*	16.14
2¾	.025	1	44	41360	16.14
2¾	.028	1	72	40621	16.14
2¾	.028	1	56	41362*	16.14
2¾	.028	1	44	41363*	16.14
2¾	.028	¾	72	41364*	16.14
2¾	.032	1	72	40620	18.39
2¾	.032	1	56	41365	18.39
2¾	.032	1	44	41366*	18.39
2¾	.032	¾	72	41367*	18.39
2¾	.036	1	72	40619*	18.39
2¾	.036	1	56	41369*	18.39
2¾	.036	1	44	41370*	18.39
2¾	.036	¾	72	41371*	18.39
2¾	.040	1	72	40618	18.39
2¾	.040	1	56	41372	18.39

*Available While Supplies Last

(continued)

Screw Slotting Saws (continued)

List No. 1845

DIA.	WIDTH	ARBOR HOLE	NO. TEETH	EDP NO.	LIST PRICE
2¾	.045	1	72	40617	$20.65
2¾	.045	1	56	41375*	20.65
2¾	.045	1	44	41376*	20.65
2¾	.045	¾	72	41377*	20.65
2¾	.051	1	72	40616	21.83
2¾	.051	1	56	41378*	21.83
2¾	.051	¾	72	41380*	21.83
2¾	.057	1	72	40615	22.99
2¾	.057	1	56	41381*	22.99
2¾	.057	1	44	41382*	22.99
2¾	.057	¾	72	41383*	22.99
2¾	.064	1	72	40614	23.59
2¾	.064	1	56	41384	23.59
2¾	.064	1	44	41385*	23.59
2¾	.072	1	72	40613	23.83
2¾	.072	1	44	41388	23.83
2¾	.072	¾	72	41389*	23.83
2¾	.081	1	72	40612	25.36
2¾	.081	1	44	41391	25.36
2¾	.081	¾	72	41392*	25.36
2¾	.091	1	72	40611	$27.76
2¾	.091	1	56	41393*	27.76
2¾	.091	1	44	41394*	27.76
2¾	.102	1	56	41396*	30.68
2¾	.102	1	44	41397*	30.68
2¾	.102	¾	72	41398*	30.68
2¾	.114	1	72	41399	37.34
2¾	.114	1	56	41400*	37.34
2¾	.114	¾	72	41402*	37.34
2¾	.128	1	56	41403*	40.11
2¾	.128	1	44	41404*	40.11
2¾	.128	¾	72	41405	40.11
2¾	.144	1	72	40607*	44.99
2¾	.144	1	56	41406*	44.99
2¾	.144	1	44	41407*	44.99
2¾	.162	1	72	41408*	47.62
2¾	.162	1	56	41409*	47.62
2¾	.162	1	44	41410*	47.62
2¾	.182	1	56	41412*	54.08
2¾	.182	1	44	41413*	54.08

* Available While Supplies Last

Morse® Plastic Wall Chart

NEW LOOK! LARGER SIZE! Redesigned for enhanced readability. Decimal Equivalents. Tap Drill Sizes for inch, metric and pipe threads. 24″ × 36″ printed on heavy duty .023″ gage plastic with three punched holes across top for wall mounting. Also available Custom Imprinted with your company logo and information.

List No. 1007 **EDP No. 01650** **List Price $7.00**

Decimal Equivalent Pocket Chart

List No. 1005

Front

Back

NEW LOOK! LARGER SIZE! Decimal Equivalents. Tap Drill Sizes for inch, metric and pipe threads. Size: 3⅜″ × 7″, Printed on plastic

Pack of 50
EDP No. 20412
List Price $51.50

Pack of 100
EDP No. 20413
List Price $96.45

Jewelers Slotting Saws

High Speed Steel

Jewelers slotting saws are designed for slotting very thin materials, for cutting wire and thin tubing and for other similar light duty applications.

STANDARD PACKAGE All sizes — 1 each

List No. 1844

DIA.	WIDTH	ARBOR HOLE	NO. TEETH	EDP NO.	LIST PRICE
1	.032	⅜	80	41476	$10.06
1	.028	⅜	80	41477*	10.06
1	.025	⅜	80	41478*	8.80
1	.023	⅜	80	41479*	8.80
1	.020	⅜	80	41480*	8.80
1	.018	⅜	80	41481*	8.80
1	.016	⅜	80	41482*	9.80
1	.014	⅜	80	41483*	9.80
1	.012	⅜	90	41484*	9.80
1	.008	⅜	90	41486*	10.87
1	.006	⅜	90	41487*	12.89
1¼	.032	⅜	100	41488	10.61
1¼	.028	⅜	100	41489*	10.61
1¼	.025	⅜	100	41490*	9.80
1¼	.023	⅜	100	41491*	9.80
1¼	.020	⅜	100	41492*	10.06
1¼	.018	⅜	100	41493*	9.65
1¼	.016	⅜	100	41494*	9.65
1¼	.014	⅜	100	41495*	11.02
1¼	.012	⅜	120	41496*	11.02
1¼	.010	⅜	120	41497*	11.69
1¼	.008	⅜	120	41498*	12.89
1¼	.006	⅜	120	41499*	14.78
1½	.028	½	110	41500	11.02
1½	.025	½	110	41501	10.87
1½	.023	½	110	41502	10.87
1½	.020	½	110	41503	10.87
1½	.018	½	110	41504*	10.87
1½	.016	½	110	41505	11.89
1½	.014	½	110	41506	12.70
1½	.010	½	140	41508	14.80
1½	.008	½	140	41509*	16.36
1½	.006	½	140	41510*	16.92
1¾	.028	½	130	41511*	11.89
1¾	.025	½	130	41512*	11.68
1¾	.018	½	130	41515*	12.89
1¾	.016	½	130	41516*	13.10
1¾	.012	½	160	41518*	13.86
1¾	.010	½	160	41519*	15.97
1¾	.008	½	160	41520*	16.80
2	.057	½	110	41522	16.80
2	.051	½	110	41523	16.80
2	.045	½	110	41524*	15.70
2	.040	½	110	41525*	15.70
2	.035	½	110	41526	15.16
2	.032	½	110	41527	$15.16
2	.028	½	150	41528	13.91
2	.025	½	150	41529	13.91
2	.023	½	150	41530*	13.91
2	.020	½	150	41531	13.91
2	.018	½	150	41532*	15.35
2	.016	½	150	41533	16.60
2	.014	½	150	41534*	18.10
2	.012	½	190	41535*	18.10
2	.008	½	190	41537*	21.29
2	.006	½	190	41538*	21.83
2½	.057	½	140	41539*	21.29
2½	.051	½	140	41540	21.29
2½	.045	½	140	41541*	19.63
2½	.040	½	140	41542*	19.63
2½	.035	½	140	41543*	18.88
2½	.032	½	140	41544*	18.48
2½	.028	½	190	41545*	18.88
2½	.025	½	190	41546*	15.97
2½	.023	½	190	41547*	15.97
2½	.020	½	190	41548*	16.60
2½	.018	½	190	41549*	17.59
2½	.016	½	190	41550*	18.76
2½	.014	½	190	41551*	19.63
2½	.012	½	240	41552*	20.82
2½	.008	½	240	41554*	29.82
2½	.006	½	240	41555*	33.00
3	.057	½	170	41556*	25.19
3	.057	1	170	41557	25.19
3	.051	½	170	41558	25.19
3	.051	1	170	41559*	25.19
3	.045	½	170	41560	22.99
3	.045	1	170	41561*	22.99
3	.035	½	170	41564*	22.99
3	.035	1	170	41565	22.99
3	.032	½	170	41566	21.63
3	.032	1	170	41567	21.63
3	.028	½	230	41568*	21.63
3	.025	½	230	41570*	18.85
3	.025	1	230	41571	18.85
3	.023	½	230	41572*	18.85
3	.020	½	230	41574	20.47
3	.020	1	230	41575	20.47

* Available While Supplies Last

(continued)

Jewelers Slotting Saws (continued)

List No. 1844

DIA.	WIDTH	ARBOR HOLE	NO. TEETH	EDP NO.	LIST PRICE
3	.018	½	230	41576*	$22.03
3	.018	1	230	41577*	22.03
3	.016	1	230	41579*	24.21
3	.014	½	230	41580*	25.36
3	.014	1	230	41581*	25.36
3	.012	½	280	41582*	25.36
3	.012	1	280	41583*	25.36
3	.010	½	280	41584*	29.82
3	.010	1	280	41585	29.82
3	.008	½	280	41586*	38.84
3	.008	1	280	41587*	38.84
4	.057	½	220	41588*	41.91
4	.057	1	220	41589	41.91
4	.051	½	220	41590*	40.71
4	.051	1	220	41591	40.71
4	.045	½	220	41592*	40.71
4	.045	1	220	41593*	40.71
4	.040	½	220	41594	35.97
4	.035	½	220	41596*	35.97
4	.035	1	220	41597	35.97
4	.028	½	300	41600*	29.72
4	.028	1	300	41601*	29.72
4	.025	½	300	41602*	29.72
4	.025	1	300	41603	29.72
4	.023	½	300	41604*	34.04
4	.023	1	300	41605*	34.04
4	.020	½	300	41606*	37.02
4	.020	1	300	41607	37.02
4	.018	½	300	41608*	39.90
4	.018	1	300	41609*	39.90
4	.016	½	300	41610*	41.71
4	.016	1	300	41611*	41.71
4	.014	½	300	41612*	41.91
4	.014	1	300	41613*	41.91
4	.010	1	380	41617*	37.57
5	.057	½	280	41618*	54.72
5	.057	1	280	41619*	54.72
5	.045	½	280	41622*	54.20
5	.045	1	280	41623*	54.20
5	.040	½	280	41624*	$48.70
5	.040	1	280	41625	48.70
5	.035	1	280	41627*	48.70
5	.032	½	280	41628*	48.70
5	.032	1	280	41629*	48.70
5	.028	½	380	41630*	49.71
5	.028	1	380	41631*	49.71
5	.025	½	380	41632*	49.71
5	.025	1	380	41633*	49.71
5	.023	½	380	41634*	52.58
5	.023	1	380	41635*	52.58
5	.020	½	380	41636*	54.83
5	.018	½	380	41638*	57.46
5	.018	1	380	41639*	57.46
5	.016	½	380	41640*	59.68
5	.016	1	380	41641*	59.68
6	.091	½	230	41642*	92.74
6	.091	1	230	41643*	92.74
6	.081	½	230	41644*	85.88
6	.081	1	230	41645*	85.88
6	.072	½	230	41646*	85.88
6	.072	1	230	41647*	85.88
6	.064	1	230	41649	71.86
6	.057	½	340	41650*	71.86
6	.051	½	340	41652*	71.86
6	.051	1	340	41653*	71.86
6	.045	½	340	41654*	67.47
6	.045	1	340	41655*	67.47
6	.040	½	340	41656*	67.47
6	.035	½	340	41658*	67.27
6	.035	1	340	41659*	67.27
6	.032	½	340	41660	67.27
6	.032	1	340	41661*	67.27
6	.028	½	440	41662*	72.78
6	.028	1	440	41663*	72.78
6	.025	½	440	41664*	75.85
6	.025	1	440	41665*	75.85

*Available While Supplies Last

TOOL COATING SERVICE

Morse Cutting tools now offers a variety of tool coatings for enhanced cutting performance and increased tool life. Please inquire.

TiN — Titanium Carbide

TiCN — Titanium Carbonitride

TiALN — Titanium Aluminum Nitride

CrN — Chromium Nitride

Straight Tooth Metal Slitting Saws

High Speed Steel

Straight Tooth saws with side chip clearance offer greater chip capacity, more accurate cuts and improved surface finish. Recommended for deeper sawing applications and for thin walled parts in a wide variety of materials.

List No. 1842

STANDARD PACKAGE All sizes — 1 each

DIA.	WIDTH	ARBOR HOLE	NO. TEETH	EDP NO.	LIST PRICE
2½	1/16	7/8	28	40326	$75.19
2½	3/32	7/8	28	40327	75.19
2½	1/8	7/8	28	40328*	75.19
3	1/16	1	32	40329	98.42
3	5/64	1	32	41133*	137.74
3	3/32	1	32	40330	98.41
3	5/64	1¼	32	41134*	139.79
3	7/64	1	32	41135*	137.74
3	7/64	1¼	32	41136*	109.26
3	1/8	1	32	40331	98.42
3	9/64	1	32	41137*	140.41
3	9/64	1¼	32	41138*	144.03
3	11/64	1	32	41139*	152.48
3	11/64	1¼	32	41140*	147.94
3	3/16	1	32	41141*	148.96
3	7/32	1	32	41143*	144.43
3	7/32	1¼	32	41144*	114.57
3	1/4	1	32	41145*	147.34
3	1/4	1¼	32	41146*	158.67
4	1/16	1	36	40333	130.52
4	1/16	1¼	36	41147	170.10
4	5/64	1¼	36	41149*	176.24
4	3/32	1	36	40334	130.52
4	3/32	1¼	36	41150*	170.10
4	7/64	1	36	41151*	187.20
4	7/64	1¼	36	41152	187.20
4	1/8	1	36	40335	131.84
4	1/8	1¼	36	41153	170.10
4	9/64	1	36	41154*	191.38
4	9/64	1¼	36	41155*	191.38
4	5/32	1	36	40336	136.12
4	5/32	1¼	36	41156*	$184.27
4	11/64	1	36	41157*	196.44
4	11/64	1¼	36	41158*	196.44
4	3/16	1¼	36	41159*	184.27
4	7/32	1¼	36	41161*	195.50
5	1/16	1	40	40338	164.49
5	1/16	1¼	40	41162*	203.27
5	3/32	1	40	40339	170.10
5	3/32	1¼	40	41163*	226.81
5	7/64	1¼	40	41165*	195.50
5	1/8	1	40	40340	175.71
5	9/64	1¼	40	41167*	230.94
5	5/32	1	40	40342*	181.32
5	5/32	1¼	40	41168*	243.91
5	11/64	1	40	41169*	254.75
5	3/16	1	40	40343	184.27
5	3/16	1¼	40	41171*	243.91
6	3/32	1	48	40345	215.57
6	3/32	1¼	48	41173*	328.96
6	7/64	1	48	41174*	317.65
6	7/64	1¼	48	41175*	317.65
6	1/8	1	48	40346	221.18
6	1/8	1¼	48	40347	221.18
6	9/64	1	48	41176*	343.01
6	9/64	1¼	48	41177*	343.01
6	5/32	1	48	41178*	326.01
6	5/32	1¼	48	41179*	326.01
6	3/16	1	48	40348*	243.91
6	3/16	1¼	48	40349*	243.91
10	3/16	1½	60	41190*	648.90

*Available While Supplies Last

Staggered Tooth Metal Slitting Saws

High Speed Steel

Staggered Tooth saws with side chip clearance offer much greater chip capacity and are freer cutting. Recommended for deep sawing applications and heavier feeds in a wide variety of materials.

STANDARD PACKAGE All sizes — 1 each

List No. 1843

DIA.	WIDTH	ARBOR HOLE	NO. TEETH	EDP NO.	LIST PRICE
2½	3/32	1	28	41204*	$155.00
3	1/16	1	28	41206	177.33
3	5/64	1¼	28	41209*	182.95
3	3/32	1	28	41210*	146.04
3	3/32	1¼	28	41211*	146.04
3	7/64	1	28	41212*	175.71
3	7/64	1¼	28	41213*	175.71
3	1/8	1	28	41214	147.38
3	1/8	1¼	28	41215*	147.38
3	9/64	1	28	41216	179.87
3	9/64	1¼	28	41217*	179.87
3	11/64	1	28	41220*	161.80
3	11/64	1¼	28	41221*	161.80
3	3/16	1	28	40376	109.93
3	7/32	1¼	28	41224*	161.00
4	1/16	1	32	41226	220.85
4	5/64	1¼	32	41229*	226.81
4	3/32	1	32	41230	186.41
4	7/64	1	32	41232*	223.13
4	7/64	1¼	32	41233*	223.13
4	1/8	1	32	41234	186.41
4	9/64	1¼	32	41237*	229.48
4	5/32	1	32	41238	198.45
4	11/64	1	32	41240*	232.68
4	3/16	1	32	40377	149.49
4	11/64	1¼	32	41241*	232.68
4	7/32	1	32	41243*	$232.42
5	1/8	1	36	41247	277.88
5	9/64	1	36	41249*	278.15
5	9/64	1¼	36	41250*	278.15
5	5/32	1¼	36	41252	289.10
5	11/64	1	36	41253*	313.98
5	11/64	1¼	36	41254*	313.98
5	3/16	1	36	40378	204.05
5	1/4	1	36	40379	205.65
6	1/8	1	40	41257	340.20
6	9/64	1	40	41259*	328.98
6	9/64	1¼	40	41260*	292.70
6	5/32	1¼	40	41262*	371.76
6	11/64	1	40	41263	373.29
6	11/64	1¼	40	41264*	373.29
6	3/16	1	40	40380	249.54
7	5/32	1	44	41266*	249.54
7	7/32	1	44	41269*	249.54
7	5/16	1	44	41272*	249.54
8	3/16	1	48	41277*	496.11
8	7/32	1	48	41278*	496.11
8	1/4	1	48	41279*	496.11
8	1/4	1¼	48	40385*	504.67
9	7/32	1	52	41282*	505.00
10	1/8	1½	60	41285*	535.00

*Available While Supplies Last

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To expedite your quote please provide the following information:

TAP SIZE _____ CLASS of FIT or H LIMIT _____ # of FLUTES _____
TYPE of TAP _____ SURFACE TREATMENT _____
MATERIAL to be THREADED _____ HARDNESS _____
BLIND or THROUGH HOLE _____ LENGTH of THREAD _____
# of HOLES to TAP _____ TAPPING EQUIPMENT USED _____
CURRENT TAP USED _____ TAPPING PROBLEM _____

Staggered Tooth Side Milling Cutters

High Speed Steel

Side Milling Cutters are designed for slotting and straddle milling in a wide variety of materials. **Staggered Tooth** cutters offer higher speeds and feeds, greater chip capacity and less chatter than straight tooth cutters. Recommended for deeper straddle milling and slotting applications.

STANDARD PACKAGE All sizes — 1 each

List No. 1809

DIA.	WIDTH	ARBOR HOLE	NO. TEETH	EDP NO.	LIST PRICE
2 1/8	3/16	3/4	14	40665*	$96.28
2 1/8	1/4	3/4	14	40666*	97.46
2 1/8	5/16	3/4	14	40667	104.11
2 1/8	3/8	3/4	14	40668	108.44
2 1/2	1/4	7/8	16	40061	99.63
2 1/2	5/16	7/8	16	40669*	99.10
2 1/2	3/8	7/8	16	40670	115.54
2 1/2	1/2	7/8	16	40671	121.15
2 3/4	1/4	1	16	40672*	127.50
2 3/4	5/16	1	16	40673	142.19
2 3/4	1/2	1	16	40676	153.25
3	3/16	1	18	40065	97.87
3	7/32	1	18	40677	136.84
3	1/4	1	18	40066	104.84
3	9/32	1	18	40678*	136.13
3	5/16	1	18	40067	116.34
3	11/32	1	18	40679*	141.59
3	3/8	1	18	40068	119.03
3	13/32	1	18	40680*	150.29
3	7/16	1	18	40681	147.38
3	9/16	1 1/4	18	40682*	158.86
3	5/8	1 1/4	18	40070*	147.38
3	11/16	1 1/4	18	40683*	181.32
3	3/4	1 1/4	18	40071*	164.49
3	13/16	1 1/4	18	40684*	192.83
3	7/8	1 1/4	18	40685*	198.45
3	15/16	1 1/4	18	40686*	212.64
3	1	1 1/4	18	40687*	209.67
3	1 1/4	1 1/4	18	40688*	278.15
4	1/4	1	18	40689	158.86
4	1/4	1 1/4	18	40072	158.86
4	9/32	1	18	40690*	187.20
4	9/32	1 1/4	18	40691*	187.20
4	5/16	1 1/4	18	40073	158.86
4	11/32	1	18	40693*	212.21
4	11/32	1 1/4	18	40694*	212.21
4	3/8	1	18	40695	$158.86
4	3/8	1 1/4	18	40074	158.86
4	13/32	1 1/4	18	40697*	209.67
4	7/16	1 1/4	18	40075*	170.10
4	1/2	1	18	40699	181.32
4	1/2	1 1/4	18	40076	181.32
4	9/16	1	18	40700*	232.42
4	11/16	1 1/4	18	40704*	258.08
4	3/4	1	18	40705	220.50
4	3/4	1 1/4	18	40078	222.56
4	13/16	1	18	40706*	277.88
4	13/16	1 1/4	18	40707*	277.88
4	7/8	1 1/4	18	40079	232.42
4	15/16	1	18	40709*	311.84
4	15/16	1 1/4	18	40710*	311.84
4	1	1 1/4	18	40712*	326.01
4	1 1/8	1 1/4	18	40713*	354.37
4	1 1/4	1 1/4	18	40714	362.91
4	1 3/8	1 1/4	18	40715*	402.52
4	1 1/2	1 1/4	18	40716*	414.01
4 1/2	1/4	1	18	40717	215.57
4 1/2	1/4	1 1/4	18	40718*	215.57
4 1/2	5/16	1	18	40719*	226.81
4 1/2	5/16	1 1/4	18	40720*	226.81
4 1/2	1/2	1	18	40723*	269.30
4 1/2	5/8	1	18	40725*	312.01
4 1/2	3/4	1	18	40727*	326.01
4 1/2	3/4	1 1/4	18	40728*	326.01
4 1/2	1	1	18	40729*	447.96
4 1/2	1	1 1/4	18	40730*	447.96
5	1/4	1	24	40731*	249.54
5	1/4	1 1/4	24	40732	249.54
5	9/32	1	24	40733*	277.88
5	5/16	1 1/4	24	40735*	266.38
5	11/32	1	24	40736*	294.72
5	11/32	1 1/4	24	40737*	294.72
5	3/8	1	24	40738	289.11

* Available While Supplies Last

(continued)

Staggered Tooth Side Milling Cutters (continued)

List No. 1809

DIA.	WIDTH	ARBOR HOLE	NO. TEETH	EDP NO.	LIST PRICE
5	3/8	1 1/4	24	40739	$289.11
5	7/16	1	24	40742*	311.84
5	7/16	1 1/4	24	40743*	311.84
5	15/32	1	24	40744*	326.01
5	15/32	1 1/4	24	40745*	326.01
5	1/2	1 1/4	24	40080	243.91
5	17/32	1 1/4	24	40747*	339.08
5	9/16	1 1/4	24	40748*	326.01
5	19/32	1 1/4	24	40749*	326.01
5	5/8	1 1/4	24	40081	277.88
5	11/16	1 1/4	24	40750*	340.20
5	3/4	1 1/4	24	40082*	306.23
5	13/16	1 1/4	24	40751*	385.67
5	7/8	1 1/4	24	40752*	402.52
5	15/16	1 1/4	24	40753*	451.82
5	1	1 1/4	24	40754*	414.55
6	1/4	1	24	40755	334.60
6	9/32	1	24	40757*	382.75
6	9/32	1 1/4	24	40758*	382.75
6	11/32	1	24	40761*	396.74
6	11/32	1 1/4	24	40762*	396.74
6	3/8	1 1/4	24	40083	283.49
6	13/32	1	24	40764*	402.52
6	13/32	1 1/4	24	40765*	402.67
6	7/16	1	24	40766*	382.71
6	15/32	1	24	40768*	419.62
6	1/2	1	24	40770	317.47
6	1/2	1 1/4	24	40084	317.47
6	13/16	1 1/4	24	40774*	515.92
6	15/16	1 1/4	24	40775*	376.44
6	1	1 1/4	24	40088*	515.91
6	1 1/16	1 1/4	24	40776*	637.74
6	1 3/16	1 1/4	24	40778*	685.99
7	1/4	1 1/4	24	40780	500.29
7	5/16	1 1/4	24	40781*	530.02
7	3/8	1 1/4	24	40782*	544.45
7	13/16	1 1/4	24	40789*	738.30
7	7/8	1 1/4	24	40790*	766.90
7	15/16	1 1/4	24	40791*	787.83
8	1/4	1 1/4	28	40793*	609.52
8	1/4	1 1/2	28	40794	609.52
8	9/32	1 1/4	28	40795*	609.52
8	9/32	1 1/2	28	40796*	609.52
8	5/16	1 1/4	28	40797*	$674.77
8	5/16	1 1/2	28	40798*	674.77
8	11/32	1 1/2	28	40800*	674.77
8	3/8	1 1/4	28	40801*	680.40
8	3/8	1 1/2	28	40089*	680.40
8	7/16	1 1/4	28	40804*	746.13
8	7/16	1 1/2	28	40805*	684.98
8	15/32	1 1/4	28	40806*	674.77
8	15/32	1 1/2	28	40807*	674.77
8	1/2	1 1/4	28	40808*	703.13
8	17/32	1 1/4	28	40809*	680.40
8	17/32	1 1/2	28	40810*	680.40
8	1/2	1 1/2	28	40090*	703.13
8	9/16	1 1/4	28	40811*	825.51
8	9/16	1 1/2	28	40812*	825.51
8	19/32	1 1/4	28	40813*	746.13
8	19/32	1 1/2	28	40814*	746.13
8	11/16	1 1/4	28	40816*	871.22
8	11/16	1 1/2	28	40817*	871.22
8	3/4	1 1/2	28	40092*	816.53
8	13/16	1 1/4	28	40819*	958.29
8	13/16	1 1/2	28	40820*	958.29
8	7/8	1 1/4	28	40821*	928.32
8	15/16	1 1/4	28	40822*	1003.57
8	15/16	1 1/2	28	40823*	1004.23
8	1	1 1/4	28	40824*	921.36
9	1/4	1 1/2	28	40825*	771.71
9	5/16	1 1/2	28	40826*	849.76
9	3/8	1 1/2	28	40827*	871.01
9	7/16	1 1/2	28	40828*	984.00
9	9/16	1 1/2	28	40830*	1088.91
9	11/16	1 1/2	28	40832*	1148.02
9	13/16	1 1/2	28	40834*	1258.96
9	7/8	1 1/2	28	40835*	1260.80
9	15/16	1 1/2	28	40836*	1303.21
9	1	1 1/2	28	40837*	1324.48
10	1/4	1 1/2	32	40838*	929.66
10	5/16	1 1/2	32	40840*	929.66
10	11/32	1 1/2	32	40841*	1107.08
10	3/8	1 1/2	32	40842*	1111.38
10	13/32	1 1/2	32	40843*	1196.06
10	7/16	1 1/2	32	40844*	1200.62
10	15/32	1 1/2	32	40845*	1247.60
10	17/32	1 1/2	32	40847*	1295.65

*Available While Supplies Last

(continued)

Staggered Tooth Side Milling Cutters (continued)

List No. 1809

DIA.	WIDTH	ARBOR HOLE	NO. TEETH	EDP NO.	LIST PRICE
10	5/8	1½	32	40849*	$1348.23
10	11/16	1½	32	40850*	1389.91
10	7/8	1½	32	40853*	1542.31
10	15/16	1½	32	40854*	1779.00
10	1	1½	32	40855*	1652.26
12	5/16	1½	36	40856*	1378.33
12	13/32	1½	36	40859*	1488.98
12	7/16	1½	36	40860*	1517.05
12	15/32	1½	36	40861*	$1544.13
12	½	1½	36	40862*	1494.30
12	17/32	1½	36	40863*	1494.30
12	9/16	1½	36	40864*	1620.93
12	5/8	1½	36	40865*	1656.59
12	11/16	1½	36	40866*	1668.22
12	¾	1½	36	40867*	1725.08
12	13/16	1½	36	40868*	1861.82
12	15/16	1½	36	40870*	1943.47

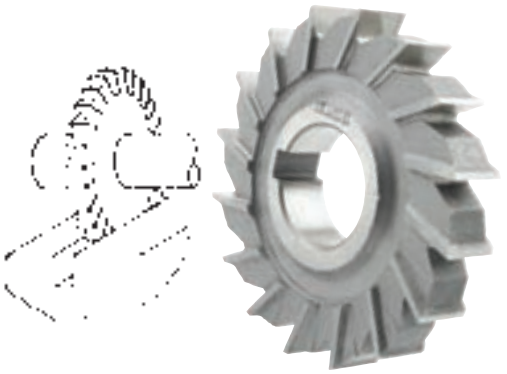
*Available While Supplies Last

Straight Tooth Side Milling Cutters

High Speed Steel

Side Milling Cutters are designed for slotting and straddle milling in a wide variety of materials. **Straight Tooth** cutters are recommended for shallower straddle milling and slotting applications.

STANDARD PACKAGE All sizes — 1 each



List No. 1833

DIA.	WIDTH	ARBOR HOLE	NO. TEETH	EDP NO.	LIST PRICE
2	3/16	5/8	14	40201	$69.57
2	1/4	5/8	14	40202	75.16
2	3/8	5/8	14	40203	78.63
2½	5/16	7/8	18	40885*	89.35
2½	3/8	7/8	18	40206*	94.89
3	1/4	1	20	40208	94.27
3	5/16	1	20	40209	96.27
3	11/32	1	20	40887*	139.60
3	3/8	1	20	40210	104.33
3	13/32	1	20	40888*	140.95
3	7/16	1	20	40211*	110.45
3	½	1	20	40212	105.62
3	9/16	1	20	40889*	142.55
3	5/8	1	20	40890	143.07
3	11/16	1	20	40891*	145.80
3	13/16	1	20	40893*	164.49
3	7/8	1	20	40894*	179.19
3	15/16	1	20	40895*	188.56
3	1	1	20	40896	188.56
4	1/4	1	24	40213	116.34
4	9/32	1¼	24	40899*	161.54
4	5/16	1	24	40900	154.58
4	5/16	1¼	24	40901	154.58
4	11/32	1	24	40902*	$164.75
4	11/32	1¼	24	40903*	164.75
4	3/8	1	24	40214	132.65
4	13/32	1¼	24	40906*	179.19
4	7/16	1¼	24	40908*	173.31
4	½	1	24	40215	149.49
4	½	1¼	24	40216	149.49
4	9/16	1¼	24	40910*	187.48
4	5/8	1	24	40217	169.30
4	5/8	1¼	24	40218*	169.30
4	11/16	1	24	40911*	204.05
4	11/16	1¼	24	40912*	204.05
4	¾	1	24	40219	184.56
4	¾	1¼	24	40220*	184.56
4	13/16	1	24	40913	216.09
4	7/8	1¼	24	40222*	201.92
4	15/16	1	24	40915*	252.20
4	15/16	1¼	24	40916*	252.20
4	1	1	24	40917*	264.24
4	1	1¼	24	40918*	264.24
5	1/4	1	24	40919	193.10
5	9/32	1	24	40921*	216.09
5	9/32	1¼	24	40922*	216.09

*Available While Supplies Last

(continued)

Straight Tooth Side Milling Cutters (continued)

List No. 1833

DIA.	WIDTH	ARBOR HOLE	NO. TEETH	EDP NO.	LIST PRICE
5	5/16	1	24	40923*	$204.32
5	5/16	1 1/4	24	40924*	204.32
5	11/32	1	24	40925*	217.68
5	11/32	1 1/4	24	40926*	217.68
5	3/8	1	24	40927*	219.04
5	3/8	1 1/4	24	40928*	219.04
5	13/32	1	24	40929	232.42
5	13/32	1 1/4	24	40930*	232.42
5	7/16	1 1/4	24	40932*	235.63
5	1/2	1 1/4	24	40224	202.72
5	9/16	1	24	40933*	261.57
5	9/16	1 1/4	24	40934*	261.57
5	5/8	1	24	40225	224.67
5	11/16	1	24	40935*	277.07
5	11/16	1 1/4	24	40936*	253.02
5	3/4	1	24	40227*	255.13
5	13/16	1	24	40937*	295.52
5	13/16	1 1/4	24	40938*	295.52
5	7/8	1	24	40939*	304.89
5	15/16	1	24	40941*	315.33
5	15/16	1 1/4	24	40942*	315.33
5	1	1	24	40943*	331.90
5	1	1 1/4	24	40229*	305.44
6	1/4	1	28	40944	237.51
6	1/4	1 1/4	28	40945*	237.51
6	9/32	1 1/4	28	40946*	263.98
6	5/16	1	28	40947*	261.57
6	5/16	1 1/4	28	40948	261.57
6	11/32	1 1/4	28	40949*	290.70
6	3/8	1	28	40950	280.55
6	3/8	1 1/4	28	40951*	280.55
6	13/32	1 1/4	28	40952*	307.70
6	7/16	1 1/4	28	40953	296.33
6	1/2	1	28	40230	260.76
6	1/2	1 1/4	28	40231	260.76
6	9/16	1 1/4	28	40954*	329.50
6	5/8	1	28	40955*	286.71
6	11/16	1 1/4	28	40956*	360.80
6	3/4	1	28	40233*	337.25
6	3/4	1 1/4	28	40234*	337.25
6	13/16	1 1/4	28	40957*	387.03
6	7/8	1 1/4	28	40958*	400.35
6	15/16	1 1/4	28	40959*	425.23
7	1/4	1 1/4	32	40960*	385.70
7	1/2	1 1/4	32	40965*	498.96
7	9/16	1 1/4	32	40966*	519.16
7	5/8	1 1/4	32	40967*	536.64
7	13/16	1 1/4	32	40969*	$595.00
7	7/8	1 1/4	32	40970*	628.35
7	15/16	1 1/4	32	40971*	649.35
7	1	1 1/4	32	40972*	666.27
8	1/4	1 1/4	34	40973*	520.54
8	3/8	1 1/4	34	40975*	600.44
8	7/16	1 1/4	34	40976*	620.05
8	9/16	1 1/4	34	40978*	661.99
8	11/16	1 1/4	34	40980*	749.69
8	3/4	1 1/4	34	40237*	612.99
8	13/16	1 1/4	34	40981*	783.07
8	7/8	1 1/4	34	40982*	816.67
8	15/16	1 1/4	34	40983*	845.48
8	1	1 1/4	34	40238*	671.65
9	1/4	1 1/4	36	40984*	675.26
9	5/16	1 1/4	36	40985*	561.12
9	3/8	1 1/4	36	40986*	771.16
9	7/16	1 1/4	36	40987*	862.68
9	1/2	1 1/4	36	40988*	887.66
9	9/16	1 1/4	36	40989*	941.05
9	5/8	1 1/4	36	40990*	953.69
9	11/16	1 1/4	36	40991*	986.78
9	3/4	1 1/4	36	40992*	1019.63
9	13/16	1 1/4	36	40993*	1043.13
9	7/8	1 1/4	36	40994*	1053.52
9	15/16	1 1/4	36	40995*	1106.32
9	1	1 1/4	36	40996*	1072.19
10	1/4	1 1/2	38	40997*	861.67
10	5/16	1 1/2	38	40998*	941.05
10	7/16	1 1/2	38	41000*	954.12
10	1/2	1 1/2	38	41001*	1122.74
10	9/16	1 1/2	38	41002*	1163.49
10	5/8	1 1/2	38	41003*	1203.63
10	11/16	1 1/2	38	41004*	1257.19
10	3/4	1 1/2	38	41005*	1280.73
10	13/16	1 1/2	38	41006*	1316.39
10	7/8	1 1/2	38	41007*	1356.06
10	15/16	1 1/2	38	41008*	1483.56
10	1	1 1/2	38	41009*	1450.34
12	5/16	1 1/2	42	41011*	1208.67
12	3/8	1 1/2	42	41012*	1285.77
12	7/16	1 1/2	42	41013*	1358.81
12	1/2	1 1/2	42	41014*	1419.48
12	9/16	1 1/2	42	41015*	1484.99
12	11/16	1 1/2	42	41017*	1570.13
12	13/16	1 1/2	42	41019*	1651.50
12	7/8	1 1/2	42	41020*	1680.74
12	15/16	1 1/2	42	41021*	1801.68

* Available While Supplies Last

Shell End Mills

High Speed Steel

Shell End Mills are designed for end milling and face milling in a wide variety of materials.

Left Hand Cut shell end mills feature a left hand helix and left hand cut for use in applications with left hand spindle rotation.

STANDARD PACKAGE All sizes — 1 each.

List No. 1803 — Right Hand Cut
List No. 1803L — Left Hand Cut

DIA.	WIDTH	ARBOR HOLE	NO. TEETH	EDP NO. R HAND	LIST PRICE	EDP NO. L HAND	LIST PRICE
1¼	1	½	8	42901*	$112.09	42955*	$120.63
1½	1⅛	½	8	42902*	117.67	42956*	126.23
1¾	1¼	¾	8	42903*	146.87	42957*	158.08
2	1⅜	¾	10	42904*	164.52	42958*	175.76
2¼	1½	1	10	42905*	195.53	42959*	216.93
2½	1⅝	1	10	42906*	216.93	—	—
2¾	1⅝	1	10	42907*	269.35	42961*	283.49
3	1¾	1¼	12	42908*	$294.72	—	—
3½	1⅞	1¼	12	42909*	411.08	42963*	$439.45
4	2¼	1½	14	42910*	496.13	42964*	524.50
4½	2¼	1½	14	42911*	637.89	42965*	667.10
5	2¼	1½	16	42912*	807.97	42966*	850.48
6	2¼	2	16	42913*	1190.68	42967*	1247.38

* Available While Supplies Last

Shell End Mills For Aluminum

High Speed Steel

Shell End Mills for Aluminum feature fewer flutes, deep gullet space and high rake angles for end milling and face milling in aluminum and other soft non-ferrous materials.

STANDARD PACKAGE All sizes — 1 each.

List No. 1803A

DIA.	WIDTH	ARBOR HOLE	NO. TEETH	EDP NO.	LIST PRICE
1¼	1	½	4	42914*	$123.37
2½	1⅝	1	4	42917*	290.11
4	2¼	1½	6	42924*	524.48
5	2¼	1½	8	42925*	$878.82
6	2¼	2	8	42926*	1289.90

* Available While Supplies Last

TOOL COATING SERVICE

Morse Cutting tools now offers a variety of tool coatings for enhanced cutting performance and increased tool life. Please inquire.

TiN — Titanium Carbide

TiCN — Titanium Carbonitride

TiALN — Titanium Aluminum Nitride

CrN — Chromium Nitride

Single Angle Milling Cutters

High Speed Steel – Right Hand & Left Hand 45° & 60° Included Angle

Single Angle milling cutters are designed for cutting ratchet teeth, dovetails and other similar applications in a wide variety of materials.

STANDARD PACKAGE All sizes — 1 each.

List No. 1850

Right Hand Shown

DIA.	WIDTH	ARBOR HOLE	INCLUDED ANGLE	NO. TEETH	EDP NO. RIGHT HAND	EDP NO. LEFT HAND	LIST PRICE
2¾	½	1	45°	20T	40416*	40426*	$131.09
2¾	½	1	60°	20T	40417*	—	131.09
3	½	1¼	45°	20T	40418*	—	154.45
3	½	1¼	60°	20T	40419*	40429*	154.45

* Available While Supplies Last

Double Angle Milling Cutters

High Speed Steel — 45°, 60° & 90° Included Angle

Double Angle milling cutters are designed for cutting angles, chamfers, v-grooves, notches, threads and other similar applications in a wide variety of materials.

STANDARD PACKAGE All sizes — 1 each.

List No. 1854

DIA.	WIDTH	ARBOR HOLE	INCLUDED ANGLE	NO. TEETH	EDP NO.	LIST PRICE
2¾	½	1	45°	20T	40436*	$131.09
2¾	½	1	60°	20T	40437*	131.09
2¾	½	1	90°	20T	40438*	131.09

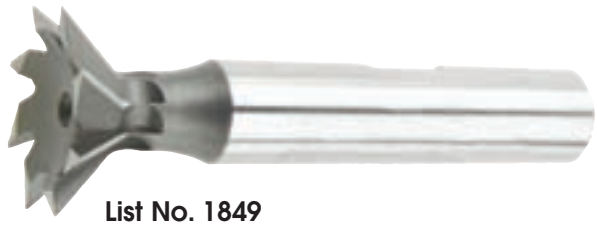
* Available While Supplies Last

Dovetail Milling Cutters

High Speed Steel — 45° & 60° Angle

Dovetail milling cutters are designed for cutting dovetails in a wide variety of materials.

STANDARD PACKAGE All sizes — 1 each



List No. 1849

DIA.	CUTTER WIDTH 45°	CUTTER WIDTH 60°	SHANK DIA.	OAL	EDP NO. 45°	EDP NO. 60°	LIST PRICE
¾	3/16	5/16	⅜	2⅛	40411	40401	$105.43
1⅜	⅜	9/16	⅝	2⅞	40412	40402	176.06
1⅞	½	13/16	⅞	3¼	40413	40403	299.68
2¼	11/16	1 1/16	1	3¾	40414	40404	391.12

Convex and Concave Milling Cutters

High Speed Steel

List No. 1865 – Convex

Convex milling cutters are designed for cutting female half circles in a wide variety of materials.

List No. 1866 – Concave

Concave milling cutters are designed for cutting male half circles in a wide variety of materials.

STANDARD PACKAGE All sizes — 1 each

CIRCLE DIA.	CUTTER DIA.	ARBOR HOLE	NO. TEETH	1865 EDP NO.	1865 LIST PRICE	1866 EDP NO.	1866 LIST PRICE
3/16	2 1/4	1	16T	40452*	$129.49	40477*	$142.68
1/4	2 1/2	1	14T	40453*	144.04	40478*	159.63
3/8	2 3/4	1	12T	40455*	168.69	40480*	195.37
7/16	3	1	12T	40456*	189.86	40481*	234.36
1/2	3	1	12T	40457*	219.29	40482*	251.14
5/8	3 1/2	1 1/4	12T	40458*	278.29	40483*	299.55
3/4	3 3/4	1 1/4	12T	40459*	318.95	40484*	396.14
7/8	4	1 1/4	12T	—	—	40485*	482.65
1	4 1/4	1 1/4	10T	40461*	437.22	—	—

*** Available While Supplies Last**

T-Slot Milling Cutters

High Speed Steel

List No. 1929

T-Slot milling cutters are designed for cutting t-slots in machine tool tables and other work holding fixtures.

STANDARD PACKAGE All sizes — 1 each

BOLT SIZE	CUTTER DIA.	WIDTH	SHANK DIA.	NECK DIA.	OAL	EDP NO.	LIST PRICE
1/4	9/16	15/64	1/2	17/64	2 19/32	40576	$129.18
5/16	21/32	17/64	1/2	21/64	2 11/16	40577	132.47
3/8	25/32	21/64	3/4	13/32	3 1/4	40578	150.29
1/2	31/32	25/64	3/4	17/32	3 7/16	40579	170.10
5/8	1 1/4	31/64	1	21/32	3 15/16	40580	231.91
3/4	1 15/32	5/8	1	25/32	4 7/16	40581	270.97
1	1 27/32	53/64	1 1/4	1 1/32	4 13/16	40582	436.38

Corner Rounding Milling Cutters

High Speed Steel – Right Hand & Left Hand

Corner Rounding milling cutters are designed for radius cutting in a wide variety of materials.

STANDARD PACKAGE All sizes — 1 each

Right Hand Shown

List No. 1864

CIRCLE RADIUS	CUTTER DIA.	ARBOR HOLE	EDP NO. RIGHT HAND	EDP NO. LEFT HAND	LIST PRICE
1/8	2 1/2	1	40444*	—	$144.85
1/4	3	1	40445*	—	189.86
3/8	3 3/4	1 1/4	40446*	40441*	274.49
1/2	4 1/4	1 1/4	—	40442*	371.96
5/8	4 1/4	1 1/4	40448*	40443*	418.37

* Available While Supplies Last

Corner Rounding End Mills

High Speed Steel

Corner Rounding end mills are designed for radius cutting in a wide variety of materials.

STANDARD PACKAGE All sizes — 1 each

List No. 1869

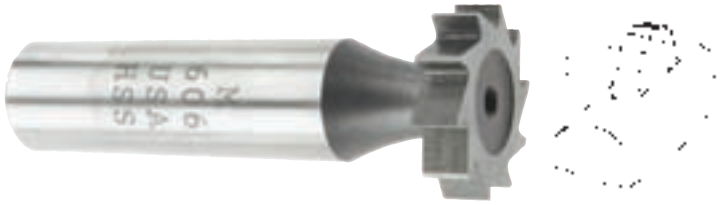
CIRCLE RADIUS	CUTTER BODY DIA.	CUTTER END DIA.	SHANK DIA.	OAL	EDP NO.	LIST PRICE
1/16	7/16	1/4	3/8	2 1/2	40501	$47.01
3/32	1/2	1/4	3/8	2 1/2	40502	50.13
1/8	5/8	1/4	1/2	3	40503	61.66
5/32	3/4	5/16	1/2	3	40504	67.05
3/16	7/8	5/16	3/4	3 1/8	40505	76.52
1/4	1	3/8	3/4	3 1/4	40506	85.33
5/16	1 1/8	3/8	7/8	3 1/2	40507	109.60
3/8	1 1/4	3/8	7/8	3 3/4	40508	118.97
7/16	1 3/8	3/8	1	4	40509	137.38
1/2	1 1/2	3/8	1	4 1/8	40510	139.33

Woodruff Keyseat Cutters

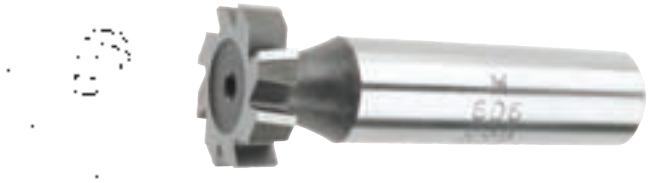
High Speed Steel — ½" Dia. Shank

Woodruff Keyseat cutters are designed for cutting keyways and keyseats in a wide variety of materials. **Straight Tooth** cutters produce a better surface finish than staggered tooth cutters. Staggered tooth cutters are freer cutting, have greater chip capacity and are less prone to chatter. **Staggered Tooth** cutters are recommended for deeper and longer keyway applications.

STANDARD PACKAGE All sizes — 1 each.



List No. 1917 — Straight Tooth



List No. 1917S — Staggered Tooth

AMERICAN STANDARD NO.	DIA.	WIDTH	OAL	1917 EDP NO.	1917 LIST PRICE	1917S EDP NO.	1917S LIST PRICE
202	1/4	1/16	2 1/16	40526	$31.00	—	—
202½	5/16	1/16	2 1/16	40527	31.00	41425*	$36.12
302½	5/16	3/32	2 3/32	40528	31.00	41426*	36.12
203	3/8	1/16	2 1/16	40529	31.00	—	—
303	3/8	3/32	2 3/32	40530	31.00	41428*	36.12
403	3/8	1/8	2 1/8	40531	31.00	41429*	36.12
204	1/2	1/16	2 1/16	40532	31.00	41430*	35.48
304	1/2	3/32	2 3/32	40533	31.00	41431*	35.48
305	5/8	3/32	2 3/32	40534	31.00	41432*	35.48
404	1/2	1/8	2 1/8	40535	31.00	41433*	35.48
405	5/8	1/8	2 1/8	40536	31.00	41434*	35.48
406	3/4	1/8	2 1/8	40537	31.00	41435*	54.46
505	5/8	5/32	2 5/32	40538	31.00	41436*	35.48
605	5/8	3/16	2 3/16	40539	31.00	41437*	35.48
506	3/4	5/32	2 5/32	40540	32.54	—	—
806	3/4	1/4	2 1/4	40541	32.54	41439*	37.43
507	7/8	5/32	2 5/32	40542	36.36	41440*	41.62
606	3/4	3/16	2 3/16	40543	36.36	41441*	37.43
607	7/8	3/16	2 3/16	40544	36.36	41442*	41.62
707	7/8	7/32	2 7/32	40545	36.36	—	—
608	1	3/16	2 3/16	40546	41.50	41444*	47.48
708	1	7/32	2 7/32	40547	41.50	41445*	47.48
1208	1	3/8	2 3/8	40548	41.50	41446*	47.48
609	1 1/8	3/16	2 3/16	40549	45.61	41447*	53.29
807	7/8	1/4	2 1/4	40550	45.61	41448*	41.61
808	1	1/4	2 1/4	40551	41.50	41449*	47.48
709	1 1/8	7/32	2 7/32	40552	45.61	41450*	53.29
809	1 1/8	1/4	2 1/4	40553	45.61	41451*	53.29
610	1 1/4	3/16	2 3/16	40554	50.37	41452*	57.80
710	1 1/4	7/32	2 7/32	40555	50.37	41453*	57.80
810	1 1/4	1/4	2 1/4	40556	50.37	—	—
811	1 3/8	1/4	2 1/4	40557	54.88	41455*	66.48
812	1 1/2	1/4	2 1/4	40558	59.84	41456*	69.60
1008	1	5/16	2 5/16	40559	41.50	—	—
1009	1 1/8	5/16	2 5/16	40560*	48.85	—	—
1010	1 1/4	5/16	2 5/16	40561	53.29	41459*	61.20
1011	1 3/8	5/16	2 5/16	40562*	59.16	—	—
1012	1 1/2	5/16	2 5/16	40563	61.05	41461*	70.30
1210	1 1/4	3/8	2 3/8	40564	53.29	41462*	61.20
1211	1 3/8	3/8	2 3/8	40565	59.16	—	—
1212	1 1/2	3/8	2 3/8	40566	62.21	41464*	73.57

* Available While Supplies Last

Carbide Tipped Shell End Mills

Carbide Tipped cutting tools offer excellent heat and wear resistance, increased speeds and feeds and enhanced tool life.

STANDARD PACKAGE All sizes — 1 each

List No. 5858 for Non-Ferrous Materials
Right hand helix flutes. Large open flutes for increased chip capacity in non-ferrous materials.

List No. 5859 for Cast Iron
Straight flutes for cast irons.

List No. 5860 for Steel
Left hand helix flutes absorb the impact shock when entering steel.

DIA.	NO. OF TEETH	OAL	ARBOR HOLE	5858 EDP NO.	5858 LIST PRICE	5859 EDP NO.	5859 LIST PRICE	5860 EDP NO.	5860 LIST PRICE
1¼	4	1	½	56701*	$208.53	56721*	$208.55	56741*	$208.53
1½	4	1⅛	½	56702*	217.15	56722*	217.15	—	—
1¾	4	1¼	¾	56703*	270.52	56723*	270.52	56743*	270.52
2	4	1⅜	¾	56704*	278.85	56724*	302.25	—	—
2¼	6	1½	1	56705*	294.62	56725*	327.34	56745*	327.34
2½	6	1⅝	1	56706*	310.35	56726*	343.12	56746*	343.12
2¾	6	1⅝	1	56707*	327.34	56727*	359.93	56747*	359.93
3	6	1¾	1¼	56708*	358.79	56728*	391.52	56748*	391.52
3½	8	1¾	1¼	56709*	439.27	—	—	56749*	486.79
4	8	2¼	1½	—	—	56730*	569.67	56750*	604.59

* Available While Supplies Last

Carbide Tipped Side Milling Cutters for Steel

Straight Tooth

Recommended for production milling in steel

Carbide Tipped cutting tools offer excellent heat and wear resistance, increased speeds and feeds and enhanced tool life.

List No. 5863

DIA.	WIDTH	ARBOR HOLE	NO. TEETH	EDP NO.	LIST PRICE
3	¼	1	6	57001*	$214.95
3	5/16	1	6	57002*	217.81
3	⅜	1	6	57003*	220.57
3	½	1	6	57005*	249.30
4	¼	1	8	57006*	282.80
4	5/16	1	8	57007*	300.47
4	⅜	1	8	57008*	300.47
4	⅜	1¼	8	57009*	305.92
4	½	1	8	57011*	320.12

DIA.	WIDTH	ARBOR HOLE	NO. TEETH	EDP NO.	LIST PRICE
4	⅝	1	8	57014*	$392.74
4	⅝	1¼	8	57015*	392.74
5	½	1	10	57017*	403.90
5	½	1¼	10	57018*	403.90
5	⅝	1¼	10	57020*	434.86
6	½	1	12	57021*	503.92
6	½	1¼	12	57022*	509.99
6	⅝	1¼	12	57023*	554.64
8	¾	1¼	12	57024*	635.09

* Available While Supplies Last

Carbide Tipped Metal Slitting Saws

Straight Tooth

Carbide Tipped cutting tools offer excellent heat and wear resistance, increased speeds and feeds and enhanced tool life.

STANDARD PACKAGE All sizes — 1 each

List No. 5846
For Non-Ferrous Materials

Recommended for aluminum, magnesium, zinc, brass, bronze, plastics and other non-ferrous materials.

List No. 5847 For Cast Iron

List No. 5848 For Steel

List No. 5846 For Non-Ferrous Materials

DIA.	WIDTH	ARBOR HOLE	NO. TEETH	EDP NO.	LIST PRICE
4	3/32	1	6	56501*	$267.88
4	1/8	1	6	56502*	280.80
4	3/16	1	6	56503*	280.01
6	1/8	1 1/4	8	56504*	394.73
6	3/16	1 1/4	8	56506*	$600.40
6	1/4	1 1/4	8	56508*	538.84
8	1/8	1 1/4	8	56505*	529.67

* Available While Supplies Last

List No. 5847 For Cast Iron

DIA.	WIDTH	ARBOR HOLE	NO. TEETH	EDP NO.	LIST PRICE
4	1/8	1	8	56526*	$326.21
4	3/16	1	8	56527*	351.74
6	1/8	1 1/4	12	56528*	567.57
6	3/16	1 1/4	12	56529*	586.13
6	1/4	1 1/4	12	56530*	598.42
8	3/16	1 1/4	16	56531*	806.73
8	1/4	1 1/4	16	56532*	837.88

List No. 5848 For Steel

DIA.	WIDTH	ARBOR HOLE	NO. TEETH	EDP NO.	LIST PRICE
4	1/8	1	8	56546*	$326.21
4	3/16	1	8	56547*	351.74
6	3/16	1 1/4	12	56549*	584.07
6	1/4	1 1/4	12	56550*	598.42
8	3/16	1 1/4	16	56551*	806.70
8	1/4	1 1/4	16	56552*	835.87

* Available While Supplies Last

Carbide Tipped Side Milling Cutters for Stainless Steel & High Temp Alloys

Carbide Tipped cutting tools offer excellent heat and wear resistance, increased speeds and feeds and enhanced tool life.

STANDARD PACKAGE All sizes — 1 each

List No. 5849

Straight Tooth

Recommended for stainless steel and high temperature alloys.

DIA.	WIDTH	ARBOR HOLE	NO. TEETH	EDP NO.	LIST PRICE
3	1/4	1	8	56601*	$273.18
3	5/16	1	8	56602*	286.23
3	3/8	1	8	56603*	290.43
3	1/2	1	8	56604*	324.45
4	1/4	1	10	56605*	341.48
4	5/16	1	10	56606*	358.71
4	3/8	1	10	56607*	366.88
4	3/8	1 1/4	10	56608*	405.69
4	1/2	1	10	56609*	401.36
4	1/2	1 1/4	10	56610*	401.80
4	5/8	1	10	56611*	422.79
4	5/8	1 1/4	10	56612*	423.23
4	3/4	1	10	56613*	$435.40
4	3/4	1 1/4	10	56614*	435.40
5	1/2	1 1/4	12	56616*	461.27
5	5/8	1 1/4	12	56617*	503.72
5	3/4	1 1/4	12	56619*	530.66
6	1/2	1	14	56620*	604.12
6	1/2	1 1/4	14	56621*	604.12
6	5/8	1 1/4	14	56622*	604.12
6	3/4	1 1/4	14	56624*	606.25
8	3/4	1 1/2	14	56627*	652.01

* Available While Supplies Last

Carbide Tipped Metal Slitting Saws for Stainless Steel & High Temp Alloys

List No. 5850

STANDARD PACKAGE All sizes — 1 each

Straight Tooth

Recommended for stainless steel and high temperature alloys.

Carbide Tipped cutting tools offer excellent heat and wear resistance, increased speeds and feeds and enhanced tool life.

DIA.	WIDTH	ARBOR HOLE	NO. TEETH	EDP NO.	LIST PRICE
3	3/32	1	8	56671	$233.10
3	1/8	1	8	56672	242.15
3	3/16	1	8	56673	251.40
4	3/32	1	10	56674	335.73
4	1/8	1	10	56675	335.97
4	3/16	1	10	56676	344.66
5	3/32	1	12	56677	$456.39
5	1/8	1	12	56678	465.79
5	3/16	1	12	56679	484.59
6	1/8	1 1/4	14	56680	544.93
6	3/16	1 1/4	14	56681	558.95
6	1/4	1 1/4	14	56682	568.26

Carbide Tipped Side Milling Cutters for Cast Iron & Non-Ferrous Materials

STANDARD PACKAGE
All sizes — 1 each

Straight Tooth

Carbide Tipped cutting tools offer excellent heat and wear resistance, increased speeds and feeds and enhanced tool life.

List No. 5861 for Non-Ferrous Materials

Recommended for aluminum, magnesium, zinc, brass, bronze, plastics and other non-ferrous materials.

List No. 5862 or Cast Iron

DIA.	WIDTH	ARBOR HOLE	5861 EDP NO.	NO. OF TEETH	5861 LIST PRICE	5862 EDP NO.	NO. OF TEETH	5862 LIST PRICE
3	1/4	1	56801*	4	$167.38	56901	6	$217.41
3	5/16	1	56802*	4	175.92	—	—	—
3	3/8	1	56803*	4	182.45	56903	6	222.82
3	1/2	1	56805*	4	199.02	56905	6	250.75
4	1/4	1	56806*	4	218.37	56906	8	280.90
4	5/16	1	56807*	4	224.88	56907	8	290.39
4	3/8	1	56808*	4	230.41	56908	8	305.19
4	3/8	1 1/4	56809*	4	230.41	56909*	8	305.19
4	1/2	1	—	—	—	56911	8	321.67
4	1/2	1 1/4	56812*	4	246.44	—	—	—
4	5/8	1	56814*	4	270.08	56914	8	358.31
4	5/8	1 1/4	56815*	4	270.08	56915	8	358.31
4	3/4	1	56816*	4	301.85	56916	8	358.31
4	3/4	1 1/4	56817*	4	301.85	56917*	8	358.31
5	1/2	1	56819*	6	321.14	56919	10	406.55
5	1/2	1 1/4	56820*	6	321.14	56920	10	406.55
5	5/8	1 1/4	56822*	6	348.77	56922	10	440.13
5	3/4	1 1/4	—	—	—	56924*	10	476.92
6	1/2	1	56825*	6	358.61	56925	12	497.21
6	1/2	1 1/4	56826*	6	358.61	56926*	12	497.21
6	5/8	1 1/4	56827*	6	392.96	56927	12	543.36
6	3/4	1 1/4	56829*	6	453.37	56929*	12	572.51
8	3/4	1 1/2	56831*	8	561.85	—	—	—

*Available While Supplies Last

TOOL BITS & CUT-OFF BLADES

Tool Bits & Cut-Off Blades

Precision Ground

Morse OR-BIT Series Tool Bits are manufactured from the finest tool steels available. In addition to proven superiority for everyday production demands and general purpose applications, their outstanding wear resistance characteristics and long life makes Morse OR-BIT the tool for real difficult jobs.

There's a Morse OR-BIT suited for every job in your plant…OR-BIT II for most jobs…OR-BIT VIII for many exotic metals and stainless steels…and OR-BIT XV for machining the real tough ones, such as high strength steels, or highly abrasive hard cast iron and cast steel.

M2 High Speed Steel
M42 Cobalt Steel
T15 Cobalt Steel

Square
Rectangular
Round
Cut-Off Blades

OR-BIT II
M2 Square Tool Bits

For General Purpose Applications
High Speed Steel — M2

The high speed steel properties of OR-BIT II Tool Bits provide for excellent strength and toughness which makes them ideally suited for a wide variety of applications in ferrous and non-ferrous alloys.

STANDARD PACKAGE 3/16 thru 3/8 — 10 per package
7/16 thru 1/2 — 5 per package
5/8 thru 1 — 1 per package

List No. 4202S

SIZE	OAL	EDP NO.	LIST PRICE
3/16	2½	28014	$6.05
¼	2½	28015	6.20
5/16	2½	28017	7.13
5/16	4	28018	6.58
⅜	3	28019	9.45
7/16	3½	28021	13.91
½	4	28022	19.98
⅝	4½	28024	29.57
¾	5	28025	46.77
1	7	28026	112.32

OR-BIT XV
T15 Square Tool Bits

For Toughest Applications
Premium Cobalt Steel — T15

OR-BIT XV Tool Bits are especially well suited for machining high-tensile-strength materials such as heat treated steels and for resisting the abrasion encountered in cutting hard cast iron, cast steel, aluminum, brass and plastics.

STANDARD PACKAGE 3/16 thru 3/8 — 10 per package
1/2 — 5 per package
5/8 thru 1 — 1 per package

List No. 4215S

SIZE	OAL	EDP NO.	LIST PRICE
3/16	2½	28101	$10.76
¼	2½	28102	12.15
5/16	2½	28103	13.95
⅜	3	28104	19.03
½	4	28106	35.11
⅝	4½	28108	55.35
¾	5	28109	87.25
1	7	28111	206.74

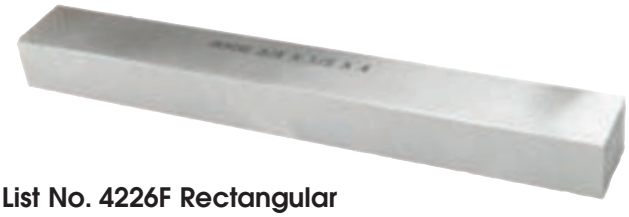
OR-BIT VIII M42 Tool Bits

For Heavy Duty Applications
Premium Cobalt Steel – M-42

STANDARD PACKAGE 3/16″ thru 3/8″ — 10 each
7/16″ thru 1/2″ — 5 each
5/8″ thru 1″ — 1 each

The steel grade composition of OR-BIT VIII combines good wear resistance with high red hardness values and is especially useful for difficult machining operations. The increase in red hardness permits higher cutting speeds on general work materials and allows cutting of harder and tougher work materials which generate more heat at the tools cutting edges.

STANDARD PACKAGE 3/16″ thru 1/4″ — 10 each
3/8″ thru 5/8″ — 5 each
3/4″ — 1 each



List No. 4226S Square

SIZE	OAL	EDP NO.	LIST PRICE
3/16	2½	28301	$8.21
1/4	2½	28302	9.20
5/16	2½	28303	10.80
5/16	4	28313*	17.10
3/8	3	28304	14.53
7/16	3½	28305	20.60
1/2	4	28306	26.43
5/8	4½	28308	42.64
3/4	5	28309	64.08
7/8	6	28310	104.59
1	7	28311	150.36

*Available While Supplies Last

List No. 4226F Rectangular

SIZE WIDTH	SIZE HEIGHT	OAL	EDP NO.	LIST PRICE
1/4	1/2	4	28352	$21.47
3/8	1/2	4	28356	29.79
3/8	5/8	4	28375	32.10
3/8	5/8	6	28376	49.18
3/8	3/4	6	28377	59.16
1/2	3/4	6	28379	66.23
1/2	1	8	28361	80.68
3/4	1	6	28380	137.63

List No. 4226R Round

STANDARD PACKAGE 1/8″ thru 3/8″ — 10 each
1/2″ — 5 each
5/8″ & 3/4″ — 1 each.

SIZE	OAL	EDP NO.	LIST PRICE
1/4	3	28214*	$7.66
1/4	4	28215*	10.10
5/16	3	28216*	9.80
5/16	4	28217*	11.27
3/8	4	28218*	14.71
1/2	4	28219*	18.11
5/8	4	28220*	28.21
3/4	6	28221*	56.39

*Available While Supplies Last

Ground Cut-off Blades

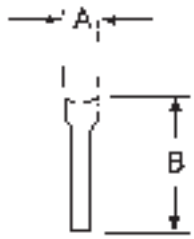
OR-BIT XV Cobalt Beveled Cut-Off Blades

List No. 4230

SIZE A	SIZE B	EDP NO.	LIST PRICE
3/32	1	28417*	$97.96

*Available While Supplies Last

OR-BIT VIII Cobalt T-Shaped Cut-Off Blades



List No. 4232

SIZE A	SIZE B	EDP NO.	LIST PRICE	SIZE A	SIZE B	EDP NO.	LIST PRICE
.040	1/2	28425*	$48.70	1/8	1 1/8	28438*	$111.64
5/64	1/2	28427*	52.29	5/32	1 1/8	28439*	107.99
1/8	1/2	28429*	51.47	3/16	1 1/8	28440*	115.74
3/16	1 1/16	28433*	62.29	1/4	1 1/8	28441*	125.21
1/4	7/8	28437*	79.76				

*Available While Supplies Last

Styles AR & AL 0° Lead Angle Turning Tools

Premium Carbide Tipped

For turning to a square shoulder

STANDARD PACKAGE A4-A10 — 10 each; A12 — 5 each; A16-A20 — 1 each; A44 — 5 each

List No. 4110

Grade 883 = C2
For use in cast iron and non-ferrous materials

Grade 370 = C5
For use in steel and steel alloys

Style AR – Right Hand

TOOL NO.	SHANK SIZE W	SHANK SIZE H	L	NOSE RAD.	GRADE 883 EDP NO.	GRADE 883 LIST PRICE	GRADE 370 EDP NO.	GRADE 370 LIST PRICE
AR-4	¼	¼	2	1/64	70102	$6.32	70103	$6.43
AR-5	5/16	5/16	2¼	1/64	70108	7.00	70109	7.18
AR-6	⅜	⅜	2½	1/64	70114	7.14	70115	7.32
AR-7	7/16	7/16	3	1/32	70120	7.39	70121	7.61
AR-8	½	½	3½	1/32	70126	9.11	70127	9.57
AR-10	⅝	⅝	4	1/32	70132	12.96	70133	13.71
AR-12	¾	¾	4½	1/32	70138	16.14	70139	17.07
AR-16	1	1	7	1/32	70144	29.11	70145	30.00
AR-20	1¼	1¼	8	1/32	70150*	35.57	—	—
AR-44	½	1	7	1/32	70162*	13.07	70163*	13.07

Style AL – Left Hand

TOOL NO.	SHANK SIZE W	SHANK SIZE H	L	NOSE RAD.	GRADE 883 EDP NO.	GRADE 883 LIST PRICE	GRADE 370 EDP NO.	GRADE 370 LIST PRICE
AL-4	¼	¼	2	1/64	70202	$6.32	70203	$6.43
AL-5	5/16	5/16	2¼	1/64	70208	7.00	70209	7.18
AL-6	⅜	⅜	2½	1/64	70214	7.14	70215	7.32
AL-7	7/16	7/16	3	1/32	70220	7.39	70221	7.61
AL-8	½	½	3½	1/32	70226	9.11	70227	9.57
AL-10	⅝	⅝	4	1/32	70232	12.96	70233	13.71
AL-12	¾	¾	4½	1/32	70238	16.14	70239	17.07
AL-16	1	1	7	1/32	70244	29.11	70245	30.00
AL-20	1¼	1¼	8	1/32	—	—	70251*	39.71

*Available While Supplies Last

Styles BR & BL 15° Lead Angle Turning Tools

Premium Carbide Tipped

For turning when a square shoulder is not required and for interrupted cuts.

STANDARD PACKAGE B4-B10 — 10 each; B12 — 5 each; B16-B20 — 1 each

List No. 4120

Grade 883 = C2
For use in cast iron and non-ferrous materials

Grade 370 = C5
For use in steel and steel alloys

Style BR – Right Hand

TOOL NO.	SHANK SIZE W	SHANK SIZE H	L	NOSE RAD.	GRADE 883 EDP NO.	GRADE 883 LIST PRICE	GRADE 370 EDP NO.	GRADE 370 LIST PRICE
BR-4	¼	¼	2	1/64	70302	$6.32	—	—
BR-5	5/16	5/16	2¼	1/64	70308	7.00	70309	$7.18
BR-6	⅜	⅜	2½	1/64	70314	7.14	70315	7.32
BR-7	7/16	7/16	3	1/32	70320	7.39	—	—
BR-8	½	½	3½	1/32	70326	9.11	70327	9.57
BR-10	⅝	⅝	4	1/32	70332	12.96	70333	13.71
BR-12	¾	¾	4½	1/32	70338	16.14	70339	17.07
BR-16	1	1	7	1/32	70344	29.11	70345	30.00
BR-20	1¼	1¼	8	1/32	70350*	35.57	70351*	39.71

Style BL – Left Hand

TOOL NO.	SHANK SIZE W	SHANK SIZE H	L	NOSE RAD.	GRADE 883 EDP NO.	GRADE 883 LIST PRICE	GRADE 370 EDP NO.	GRADE 370 LIST PRICE
BL-4	¼	¼	2	1/64	70402	$6.32	—	—
BL-5	5/16	5/16	2¼	1/64	70408	7.00	70409	$7.18
BL-6	⅜	⅜	2½	1/64	70414	7.14	70415	7.32
BL-7	7/16	7/16	3	1/32	70420	7.39	—	—
BL-8	½	½	3½	1/32	70426	9.11	70427	9.57
BL-10	⅝	⅝	4	1/32	70432	12.96	70433	13.71
BL-12	¾	¾	4½	1/32	70438	16.14	70439	17.07
BL-16	1	1	7	1/32	70444	29.11	70445	30.00
BL-20	1¼	1¼	8	1/32	70450*	35.57	70451*	39.71

*Available While Supplies Last

Style C Square Nose Tools

Premium Carbide Tipped

For chamfering, facing, turning and for making special tool forms

STANDARD PACKAGE C4-C10 — 10 each; C12 — 5 each; C16-C20 — 1 each; C44 — 5 each

List No. 4130

TOOL NO.	SHANK SIZE W	H	L	GRADE 883 EDP NO.	GRADE 883 LIST PRICE	GRADE 370 EDP NO.	GRADE 370 LIST PRICE
C-4	¼	¼	2	70502	$6.39	70503	$6.46
C-5	5⁄16	5⁄16	2¼	70508	7.04	70509	7.29
C-6	⅜	⅜	2½	70514	7.57	70515	7.68
C-7	7⁄16	7⁄16	3	70520	8.36	70521	8.57
C-8	½	½	3½	70526	9.75	70527	10.18
C-10	⅝	⅝	4	70532	14.54	70533	15.39
C-12	¾	¾	4½	70538	19.82	70539	21.25
C-16	1	1	7	70544	32.18	70545	34.61
C-20	1¼	1¼	8	70550*	43.39	70551*	46.07
C-44	½	1	7	70556*	13.89	70557*	14.25

*** Available while supplies last**

Grade 883 = C2
For use in cast iron and non-ferrous materials

Grade 370 = C5
For use in steel and steel alloys

Style D 80° Included Angle Tools

Premium Carbide Tipped

For under cutting and for ID and OD chamfering

STANDARD PACKAGE D4-D10 — 10 each; D12 — 5 each; D16 — 1 each

List No. 4140

TOOL NO.	SHANK SIZE W	H	L	NOSE RAD.	GRADE 883 EDP NO.	GRADE 883 LIST PRICE	GRADE 370 EDP NO.	GRADE 370 LIST PRICE
D-4	¼	¼	2	1⁄64	70602	$5.93	70603	$5.96
D-5	5⁄16	5⁄16	2¼	1⁄64	70608	6.39	70609	6.46
D-6	⅜	⅜	2½	1⁄64	70614	6.86	70615	7.11
D-7	7⁄16	7⁄16	3	1⁄32	70620	7.00	70621	7.39
D-8	½	½	3½	1⁄32	70626	8.75	70627	9.14
D-10	⅝	⅝	4	1⁄32	70632	13.14	70633	13.68
D-12	¾	¾	4½	1⁄32	70638	17.18	70639	18.18
D-16	1	1	7	1⁄32	70644	27.32	70645	28.36

Grade 883 = C2
For use in cast iron and non-ferrous materials

Grade 370 = C5
For use in steel and steel alloys

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Style E
60° Included Angle Threading Tools

Premium Carbide Tipped

For standard 60° threading, boring, V-grooving and other applications

STANDARD PACKAGE E4-E10 — 10 each
E12 — 5 each

List No. 4150

Grade 883 = C2
For use in cast iron and non-ferrous materials

Grade 370 = C5
For use in steel and steel alloys

TOOL NO.	SHANK SIZE W	SHANK SIZE H	L	GRADE 883 EDP NO.	GRADE 883 LIST PRICE	GRADE 370 EDP NO.	GRADE 370 LIST PRICE
E-4	¼	¼	2	70701	$5.93	70702	$5.96
E-5	5⁄16	5⁄16	2¼	70705	6.39	70706	6.46
E-6	⅜	⅜	2½	70709	6.86	70710	7.11
E-8	½	½	3½	70713	8.75	70714	9.14
E-10	⅝	⅝	4	70717	13.14	70718	13.68
E-12	¾	¾	4½	70721	17.18	70722	18.18

Styles ER & EL
60° Included Angle Offset Threading Tools

Premium Carbide Tipped

Offset for standard 60° threading, boring, V-grooving and other applications

STANDARD PACKAGE E4-E8 — 10 each
E10 — 5 each

List No. 4160

Grade 883 = C2
For use in cast iron and non-ferrous materials

Grade 370 = C5
For use in steel and steel alloys

Style ER – Right Hand

TOOL NO.	SHANK SIZE W	SHANK SIZE H	L	GRADE 883 EDP NO.	GRADE 883 LIST PRICE	GRADE 370 EDP NO.	GRADE 370 LIST PRICE
ER-4	¼	¼	2	70801	$7.18	—	—
ER-5	5⁄16	5⁄16	2¼	70804	7.21	70805	$7.39
ER-6	⅜	⅜	2½	70807	7.54	70808	7.82
ER-8	½	½	3½	70810	9.86	70811	10.39
ER-10	⅝	⅝	4	70813	14.46	70814	15.18

Style EL – Left Hand

TOOL NO.	SHANK SIZE W	SHANK SIZE H	L	GRADE 883 EDP NO.	GRADE 883 LIST PRICE	GRADE 370 EDP NO.	GRADE 370 LIST PRICE
EL-6	⅜	⅜	2½	70857	$7.54	70858	$7.82
EL-8	½	½	3½	70860	9.86	70861	10.39
EL-10	⅝	⅝	4	70863	14.46	70864	15.18

Styles FR & FL End Cutting Offset Tools

Premium Carbide Tipped

Offset for facing to a square shoulder

STANDARD PACKAGE F8 — F10 — 10 each
F12 — 5 each
F16 — 1 each

List No. 4170

Grade 883 = C2
For use in cast iron and non-ferrous materials

Grade 370 = C5
For use in steel and steel alloys

Style FR – Right Hand

TOOL NO.	SHANK SIZE W	SHANK SIZE H	L	NOSE RAD.	GRADE 883 EDP NO.	GRADE 883 LIST PRICE	GRADE 370 EDP NO.	GRADE 370 LIST PRICE
FR-8	½	½	3½	1/32	70902*	$10.21	70903*	$10.49
FR-10	5/8	5/8	4	1/32	70907*	12.56	70908*	13.27
FR-12	¾	¾	4½	1/32	70912*	15.75	70913*	16.74
FR-16	1	1	7	1/32	70917*	29.23	70918*	29.23

Style FL – Left Hand

TOOL NO.	SHANK SIZE W	SHANK SIZE H	L	NOSE RAD.	GRADE 883 EDP NO.	GRADE 883 LIST PRICE	GRADE 370 EDP NO.	GRADE 370 LIST PRICE
FL-8	½	½	3½	1/32	70954*	$10.21	70953*	$10.49
FL-10	5/8	5/8	4	1/32	70957*	12.56	70958*	13.27
FL-12	¾	¾	4½	1/32	70962*	15.75	70963*	16.74
FL-16	1	1	7	1/32	70967*	29.23	70968*	29.23

*Available While Supplies Last

Styles GR & GL Side Cutting Offset Tools

Premium Carbide Tipped

Offset for turning or facing to a square shoulder

STANDARD PACKAGE G8-G12 — 5 each
G16-G20 — 1 each

List No. 4180

Grade 883 = C2
For use in cast iron and non-ferrous materials

Grade 370 = C5
For use in steel and steel alloys

Style GR – Right Hand

TOOL NO.	SHANK SIZE W	SHANK SIZE H	L	NOSE RAD.	GRADE 883 EDP NO.	GRADE 883 LIST PRICE	GRADE 370 EDP NO.	GRADE 370 LIST PRICE
GR-8	½	½	3½	1/32	71002*	$10.21	71003*	$10.49
GR-10	5/8	5/8	4	1/32	71007*	12.56	71008*	13.27
GR-12	¾	¾	4½	1/32	71012*	15.75	71013*	16.74
GR-16	1	1	7	1/32	71017*	29.23	71018*	29.23
GR-20	1¼	1¼	8	1/32	—	—	71023*	43.47

Style GL – Left Hand

TOOL NO.	SHANK SIZE W	SHANK SIZE H	L	NOSE RAD.	GRADE 883 EDP NO.	GRADE 883 LIST PRICE	GRADE 370 EDP NO.	GRADE 370 LIST PRICE
GL-8	½	½	3½	1/32	71052*	$10.21	71053*	$10.49
GL-10	5/8	5/8	4	1/32	71057*	12.56	71058*	13.27
GL-12	¾	¾	4½	1/32	71062*	15.75	71063*	16.74
GL-16	1	1	7	1/32	—	—	71068*	30.69

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*Available While Supplies Last

Styles CTR & CTL Cut-Off Tools

Premium Carbide Tipped

For bar stock cut-off applications

Style CTR – Right Hand
Style CTL – Left Hand

List No. 4190

Grade 883 = C2
For use in cast iron and non-ferrous materials

Grade 370 = C5
For use in steel and steel alloys

TOOL NO.	INDUSTRY NO.	SHANK SIZE W	SHANK SIZE H	SHANK SIZE L	STD PKG. QTY.	TIP WIDTH	GRADE 883 EDP NO.	GRADE 883 LIST PRICE	GRADE 370 EDP NO.	GRADE 370 LIST PRICE
CTR-11	CTR-111	½	1	5	5	⅛	71101	$17.11	71102	$17.71
CTR-22	CTR-122	½	1	5	5	3⁄16	71104	17.54	71105	18.07
CTR-33	CTR-121	½	1	5	5	¼	71107	18.46	71108	18.96
CTR-44	CTR-120	½	1	5	5	5⁄16	71110	18.50	71111	19.00
CTR-55	CTR-130	⅝	1¼	5	2	⅜	71113	21.75	71114	22.39
CTL-11	CTL-111	½	1	5	5	⅛	71151	17.11	71152	17.71
CTL-22	CTL-122	½	1	5	5	3⁄16	71154	17.54	71155	18.07
CTL-33	CTL-121	½	1	5	5	¼	71157	18.46	71158	18.96
CTL-44	CTL-120	½	1	5	5	5⁄16	71160*	18.50	71161*	19.00
CTL-55	CTL-130	⅝	1¼	5	2	⅜	71163	21.75	71164	22.39

*Available While Supplies Last

883 & 370 are Trademarks of Carboloy, Inc.

Types T & C S.A. Series Swiss Automatic Tools

Carbide Tipped
Grade C2 Carbide
Left Hand

List No. 4100 — Type T
For Turning

Grade C2
For use in cast iron and non-ferrous materials.

List No. 4100 — Type C
For Cut-Off and Forming

SHANK SIZE SQ.	SHANK SIZE L	STD. PKG. QTY.	TYPE T TOOL NO.	TYPE T CARBIDE SIZE T	TYPE T CARBIDE SIZE W	TYPE T CARBIDE SIZE L	TYPE T EDP NO.	TYPE T LIST PRICE	TYPE C TOOL NO.	TYPE C CARBIDE SIZE T	TYPE C CARBIDE SIZE W	TYPE C CARBIDE SIZE L	TYPE C EDP NO.	TYPE C LIST PRICE
¼	6	10	SA6T	3⁄32	⅛	1¼	70001	$15.73	SA6C	⅛	3⁄32	1¼	70021	$15.73
9⁄32	6	10	SA7T	3⁄32	⅛	1¼	70002	16.76	SA7C	⅛	3⁄32	1¼	70022	16.76
5⁄16	6	10	SA8T	3⁄32	3⁄16	1¼	70003	18.32	SA8C	⅛	3⁄32	1¼	70023	18.32
⅜	6	10	SA9T	3⁄32	3⁄16	1¼	70004	19.43	SA9C	⅛	3⁄32	1¼	70024	19.43
13⁄32	6	10	SA10T	3⁄32	3⁄16	1¼	70005	20.99	SA10C	⅛	3⁄32	1¼	70025	20.99
7⁄16	6	10	SA11T	⅛	¼	1	70006	21.83	SA11C	3⁄32	⅛	1¼	70026	21.83
15⁄32	6	10	SA11.5T	⅛	¼	1	70007	21.90	SA11.5C	3⁄32	⅛	1¼	70027	21.90
½	6	10	SA12T	⅛	¼	1	70008	23.28	SA12C	3⁄32	⅛	1¼	70028	23.28

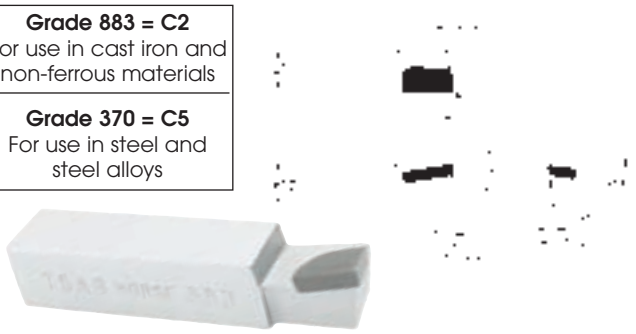
Types TSA, TSC & TSE Square Shank Boring Tools

Premium Carbide Tipped

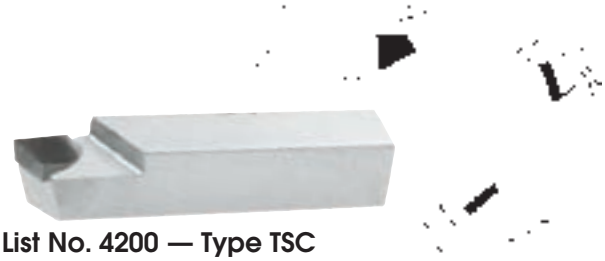
STANDARD PACKAGE
TSA-5-TSC-8 — 10 each
TSC-10-TSC-12 — 5 each
TSE-5-TSE-8 — 10 each
TSE-10 — 5 each

Grade 883 = C2
For use in cast iron and non-ferrous materials

Grade 370 = C5
For use in steel and steel alloys



List No. 4200 — Type TSA



List No. 4200 — Type TSC

List No. 4200 — Type TSE

TOOL NO.	SHANK SIZE W	SHANK SIZE H	L	NOSE RAD.	GRADE 883 EDP NO.	GRADE 883 LIST PRICE	GRADE 370 EDP NO.	GRADE 370 LIST PRICE
TSA-5	5/16	5/16	1½	1/64	72081	$7.39	—	—
TSA-6	3/8	3/8	1¾	1/64	72085	7.71	—	—
TSA-8	½	½	2½	1/32	72089	10.18	—	—
TSC-5	5/16	5/16	1½	1/64	72101	7.39	72102	$7.61
TSC-6	3/8	3/8	1¾	1/64	72105	7.71	72106	7.82
TSC-8	½	½	2½	1/32	72109	10.18	72110	10.57
TSC-10	5/8	5/8	3	1/32	72113	13.39	72114	14.07
TSC-12	¾	¾	3½	1/32	72117	15.25	72118	16.57
TSE-5	5/16	5/16	1½	1/64	72121	7.39	72122	7.61
TSE-6	3/8	3/8	1¾	1/64	72125	7.71	72126	7.82
TSE-8	½	½	2½	1/32	72129	10.18	72130	10.57
TSE-10	5/8	5/8	3	1/32	72133	13.39	72134	14.07

Types TRG, TRC & TRE Round Shank Boring Tools

Premium Carbide Tipped

Grade 883 Carbide

Grade 883 = C2
For use in cast iron and non-ferrous materials.

List No. 4200
Type TRG

List No. 4200
Types TRC & TRE

TOOL NO.	SHANK SIZE A DIA.	SHANK SIZE C LENGTH	D TIP	STD. PKG. QTY.	EDP NO.	LIST PRICE
TRG-6	3/8	1¾	¼	10	72004	$10.57
TRG-8	½	2½	3/8	10	72007	12.89

TOOL NO.	SHANK SIZE A DIA.	SHANK SIZE C LENGTH	STD. PKG. QTY	EDP NO.	LIST PRICE
TRC-5	.312	1½	10	72041	$9.86
TRC-6	.3745	1¾	10	72045	10.57
TRC-8	.4995	2½	10	72049	12.89
TRE-5	.312	1½	10	72061	9.86
TRE-6	.3745	1¾	10	72065	10.57
TRE-8	.4995	2½	10	72069	12.89

883 & 370 are Trademarks of Carboloy, Inc.

Standard Grade Carbide Tipped Tool Bits

Styles AR & AL 0° Lead Angle Turning Tools

Carbide Tipped

For turning to a square shoulder

List No. 4111

Grade C2
For use in cast iron and non-ferrous materials

Grade C5
For roughing cuts in steel and steel alloys

Grade C6
For general purpose use in steel and steel alloys

Style AR – Right Hand

TOOL NO.	STD. PKG. QTY	GRADE C2	LIST PRICE	GRADE C5	GRADE C6	LIST PRICE
AR4	10	73102	$5.37	73103	73104	$5.37
AR5	10	73107	6.02	73108	73109	6.02
AR6	10	73112	6.17	73113	73114	6.17
AR7	10	73117	6.40	73118	73119	6.40
AR8	10	73122	7.85	73123	73124	7.89
AR10	10	73127	10.63	73128	73129	10.82
AR12	5	73130	12.95	73131	73132	13.30
AR16	1	73133	23.12	73134	73135	24.19
AR20	1	73136*	25.71	73137*	73138*	27.20

*Available While Supplies Last

Style AL – Left Hand

TOOL NO.	STD. PKG. QTY	GRADE C2	LIST PRICE	GRADE C5	GRADE C6	LIST PRICE
AL4	10	73202	$5.37	73203	73204	$5.37
AL5	10	73207	6.02	73208	73209	6.02
AL6	10	73212	6.17	73213	73214	6.17
AL7	10	73217	6.40	73218	73219	6.40
AL8	10	73222	7.85	73223	73224	7.89
AL10	10	73227	10.63	73228	73229	10.82
AL12	5	73230	12.95	73231	73232	13.30
AL16	1	73233	23.12	73234	73235	24.19
AL20	1	73236*	25.71	73237*	73238*	27.20

Styles BR & BL 15° Lead Angle Turning Tools

Carbide Tipped

For turning when a square shoulder is not required and for interrupted cuts.

List No. 4121

Grade C2
For use in cast iron and non-ferrous materials

Grade C5
For roughing cuts in steel and steel alloys

Grade C6
For general purpose use in steel and steel alloys

Style BR – Right Hand

TOOL NO.	STD. PKG. QTY	GRADE C2	LIST PRICE	GRADE C5	GRADE C6	LIST PRICE
BR4	10	73302	$5.37	73303	73304	$5.37
BR5	10	73307	6.02	73308	73309	6.02
BR6	10	73312	6.17	73313	73314	6.17
BR7	10	73317	6.40	73318	73319	6.40
BR8	10	73322	7.85	73323	73324	7.89
BR10	10	73327	10.63	73328	73329	10.82
BR12	5	73330	12.95	73331	73332	13.30
BR16	1	73333	23.12	73334	73335	24.19
BR20	1	73336*	25.71	73337*	73338*	27.20

*Available While Supplies Last

Style BL – Left Hand

TOOL NO.	STD. PKG. QTY	GRADE C2	LIST PRICE	GRADE C5	GRADE C6	LIST PRICE
BL4	10	73402	$5.37	73403	73404	$5.37
BL5	10	73407	6.02	73408	73409	6.02
BL6	10	73412	6.17	73413	73414	6.17
BL7	10	73417	6.40	73418	73419	6.40
BL8	10	73422	7.85	73423	73424	7.89
BL10	10	73427	10.63	73428	73429	10.82
BL12	5	73430	12.95	73431	73432	13.30
BL16	1	73433	23.12	73434	73435	24.19
BL20	1	73436*	25.71	73437*	73438*	27.20

See Premium Grade Series For Complete Dimensions.

Standard Grade Carbide Tipped Tool Bits

Grade C2
For use in cast iron and non-ferrous materials

Grade C5
For roughing cuts in steel and steel alloys

Grade C6
For general purpose use in steel and steel alloys

Style C Square Nose Tools

Carbide Tipped

For chamfering, facing, turning and for making special tool forms

List No. 4131

TOOL NO.	STD. PKG. QTY	GRADE C2	LIST PRICE	GRADE C5	GRADE C6	LIST PRICE
C4	10	73502	$5.37	73503	73504	$5.37
C5	10	73507	5.90	73508	73509	5.90
C6	10	73512	6.48	73513	73514	6.48
C7	10	73517	7.12	73518	73519	7.16
C8	10	73522	8.30	73523	73524	8.46

TOOL NO.	STD. PKG. QTY	GRADE C2	LIST PRICE	GRADE C5	GRADE C6	LIST PRICE
C10	10	73527	$11.89	73528	73529	$12.34
C12	5	73531	16.34	73532	73533	17.10
C16	1	73534	26.74	73535	73536	28.34
C44	1	73537*	9.98	73538*	73539*	10.17

*** Available while supplies last**

Style D 80° Included Angle Tools

Carbide Tipped

For under cutting and for ID and OD chamfering

List No. 4141

TOOL NO.	STD. PKG. QTY	GRADE C2	LIST PRICE	GRADE C5	GRADE C6	LIST PRICE
D4	10	73602	$4.91	73603	73604	$4.91
D5	10	73607	5.30	73608	73609	5.30
D6	10	73612	5.79	73613	73614	5.79
D7	10	73617	5.90	73618	73619	6.02

TOOL NO.	STD. PKG. QTY	GRADE C2	LIST PRICE	GRADE C5	GRADE C6	LIST PRICE
D8	10	73622	$7.31	73623	73624	$7.50
D10	10	73626	10.55	73627	73628	10.78
D12	5	73629	13.75	73630	73631	14.25
D16	1	73632	22.63	73633	73634	23.39

Style E 60° Included Angle Threading Tools

Carbide Tipped

For standard 60° threading, boring, V-grooving and other applications

List No. 4151

TOOL NO.	STD. PKG. QTY	GRADE C2	LIST PRICE	GRADE C5	GRADE C6	LIST PRICE
E4	10	73702	$4.91	73703	73704	$4.91
E5	10	73707	5.30	73708	73709	5.30
E6	10	73712	5.79	73713	73714	5.79

TOOL NO.	STD. PKG. QTY	GRADE C2	LIST PRICE	GRADE C5	GRADE C6	LIST PRICE
E8	10	73717	$7.31	73718	73719	$7.50
E10	10	73722	10.55	73723	73724	10.78
E12	10	73725	13.75	73726	73727	14.25

See Premium Grade Series For Complete Dimensions.

Standard Grade Carbide Tipped Tool Bits

Grade C2
For use in cast iron and non-ferrous materials

Grade C5
For roughing cuts in steel and steel alloys

Grade C6
For general purpose use in steel and steel alloys

Styles FR & FL End Cutting Offset Tools

Carbide Tipped

Offset for facing to a square shoulder

List No. 4171

Style FR – Right Hand

TOOL NO.	STD. PKG. QTY	GRADE C2	LIST PRICE	GRADE C5	GRADE C6	LIST PRICE
FR8	5	73902*	$9.67	73903*	73904*	$9.67
FR10	5	73907*	11.79	73908*	73909*	11.79
FR12	5	73912*	14.49	73913*	73914*	14.76
FR16	1	73917*	24.32	73918*	73919*	24.32

Style FL – Left Hand

TOOL NO.	STD. PKG. QTY	GRADE C2	LIST PRICE	GRADE C5	GRADE C6	LIST PRICE
FL8	5	73952*	$9.67	73953*	73954*	$9.67
FL10	5	73957*	11.79	73958*	73959*	11.79
FL12	5	73962*	14.49	73963*	73964*	14.76
FL16	1	73967*	24.32	73968*	73969*	26.75

*Available While Supplies Last

Styles GR & GL Side Cutting Offset Tools

See Premium Grade Series For Complete Dimensions

Carbide Tipped

Offset for turning or facing to a square shoulder

List No. 4181

Style GR – Right Hand

TOOL NO.	STD. PKG. QTY	GRADE C2	LIST PRICE	GRADE C5	GRADE C6	LIST PRICE
GR8	5	74002*	$9.67	74003*	74004*	$9.67
GR10	5	74007*	11.79	74008*	74009*	11.79
GR12	5	74012*	14.49	74013*	74014*	14.76
GR16	1	74017*	24.32	74018*	74019*	24.32

Style GL – Left Hand

TOOL NO.	STD. PKG. QTY	GRADE C2	LIST PRICE	GRADE C5	GRADE C6	LIST PRICE
GL8	5	74052*	$9.67	74053*	74054*	$9.67
GL10	5	74055*	11.79	74056*	74057*	11.79
GL12	5	74062*	14.49	74063*	74064*	14.49
GL16	1	74067*	24.32	74068*	74069*	24.32

*Available While Supplies Last

See Premium Grade Series For Complete Dimensions

Styles CTR & CTL Cut-Off Tools

Carbide Tipped

For bar stock cut-off applications

List No. 4191

Style CTR – Right Hand

TOOL NO.	STD. PKG. QTY	GRADE C2	GRADE C5	LIST PRICE
CTR11	5	74102	74103	$15.05
CTR22	5	74107	74108	15.39
CTR33	5	74112	74113	16.23
CTR44	5	74114	74115	16.23
CTR55	2	74116	74117	19.31

Style CTL – Left Hand

TOOL NO.	STD. PKG. QTY	GRADE C2	GRADE C5	LIST PRICE
CTL11	5	74152	74153	$15.05
CTL22	5	74157	74158	15.39
CTL33	5	74162	74163	16.23
CTL44	5	74164	74165	16.23
CTL55	2	74166	74167	19.31

MISCELLANEOUS

PAGE NO.

Technical Publications

Machinist's Practical Guide

The original concept of a pocket size manual covering a wide range of practical information for the machinist, tool maker, engineer and student. End mills, cutters, drills, reamers, taps and tool bits are some of the cutting tool areas covered. Tool steels, tapers, speeds, feeds, cutting fluids, and a wealth of additional useful information is found in this complete 108-page handbook. Fits handily into shop coats, tool boxes, desk drawers, etc.

Machinist's Guide for Taps

Taps and screw threads play a very important part in "holding the world together by a thread." This booklet contains all the needed information for correct tapping work. Included are thread forms and dimensions, fits and limits, hole preparation and size, type of taps, speeds and lubricants, tap sharpening and troubleshooting hints.

Machinist's Guide for Carbide Tooling

Carbide and its many applications is fully explained in this handy booklet. Complete coverage is given from the introduction and manufacture of carbide to its present major position in the cutting tools field. Included are design, application, geometrics, troubleshooting, speeds and feeds.

GUIDES	LIST NO.	DISPLAY BOX OF 50 (1 BOX) EDP. NO.	LIST PRICE	INDIVIDUAL COPIES EDP NO.	LIST PRICE
Machinist's Practical Guide	1001	20401	$336.00	20402	$7.20
Machinist's Guide for Taps	1002	20403	336.00	20404	7.20
Machinist's Guide for Carbide Tooling	1004	20407	336.00	20408	7.20

Morse® Plastic Wall Chart

NEW LOOK! LARGER SIZE! Redesigned for enhanced readability. Decimal Equivalents. Tap Drill Sizes for inch, metric and pipe threads. 24" × 36" printed on heavy duty .023" gage plastic with three punched holes across top for wall mounting. Also available Custom Imprinted with your company logo and information.

List No. 1007 **EDP No. 01650** **List Price $7.00**

Decimal Equivalent Pocket Chart

List No. 1005

Front

Back

NEW LOOK! LARGER SIZE! Decimal Equivalents. Tap Drill Sizes for inch, metric and pipe threads. Size: 3⅜" × 7", Printed on plastic

Pack of 50
EDP No. 20412
List Price $51.50

Pack of 100
EDP No. 20413
List Price $96.45

Screw Extractors

For removing broken bolts, screws or studs without damage to the threaded hole.

Furnished with a left-hand spiral. Carbon steel.

List No. 773

STANDARD PACKAGE Sizes 1 thru 3 — 12 each
Sizes 4 & 5 — 6 each
Sizes 6 and over — 1 each

SCREW EXTRACTOR NUMBER	DIAMETER SMALL END	DIAMETER LARGE END	OAL	FOR EXTRACTING DRILL SIZE TO USE	FOR EXTRACTING BOLT AND SCREW SIZE	FOR EXTRACTING STANDARD PIPE SIZE	EDP NO.	LIST PRICE
1	1/16	1/8	2	5/64	3/16 - 1/4		20201	$3.55
2	3/32	13/64	2 3/8	7/64	1/4 - 5/16		20202	3.80
3	1/8	1/4	2 11/16	5/32	5/16 - 7/16		20203	4.53
4	3/16	11/32	3	1/4	7/16 - 9/16		20204	4.82
5	1/4	7/16	3 3/8	17/64	9/16 - 3/4	1/8 - 1/4	20205	6.00
6	3/8	19/32	3 3/4	13/32	3/4 - 1	3/8	20206	13.22
7	1/2	25/32	4 1/8	17/32	1 - 1 3/8	1/2	20207	21.30
8	3/4	1 1/32	4 3/8	13/16	1 3/8 - 1 3/4	3/4	20208	29.00
9	1	1 9/32	4 5/8	1 1/16	1 3/4 - 2 1/8	1	20209	50.39

Screw Extractor Sets

For removing broken bolts, screws or studs without damage to the threaded hole.

Furnished with a left-hand spiral. Carbon steel.

EDP NO.	LIST PRICE	EDP NO.	LIST PRICE
20217	$23.62	20218	$112.54
SET NO. 62		SET NO. 68	
EXTRACTOR NUMBER	SIZE RANGE	EXTRACTOR NUMBER	SIZE RANGE
1	3/16 to 1/4	6	3/4 to 1
2	1/4 to 5/16	7	1 to 1 3/8
3	5/16 to 7/16	8	1 3/8 to 1 3/4
4	7/16 to 9/16	9	1 3/4 to 2 1/8
5	9/16 to 3/4		

List No. 7300

Combination Screw Extractor and Drill Set

In Metal Case – Screw Machine Length Drills

SET NO. 64			
EXTRACTOR NUMBER	DRILL SIZE	EDP NO.	LIST PRICE
1	5/64		
2	7/64		
3	5/32	20219	$34.55
4	1/4		
5	17/64		

List No. 7301

Morse Taper Sleeves

For adapting Morse Taper shank tools to machine spindles having larger Morse Taper holes.

Regularly furnished soft with accurately finished Morse taper hole and shank.

STANDARD PACKAGE All sizes — 1 each

List No. 202 Carbon Steel

SIZE	MORSE TAPER HOLE	MORSE TAPER SHANK	OAL	EDP NO.	LIST PRICE
1 to 2	1	2	3 9/16	20031	$49.47
1 to 3	1	3	3 15/16	20032	54.61
1 to 4	1	4	4 7/8	20033	72.98
1 to 5	1	5	6 1/8	20034	140.82
2 to 3	2	3	4 7/16	20035	54.61
2 to 4	2	4	4 7/8	20036	65.14
2 to 5	2	5	6 1/8	20037	135.43
3 to 4	3	4	5 3/8	20038	85.96
3 to 5	3	5	6 1/8	20039	135.43
4 to 5	4	5	6 5/8	20040	135.43
4 to 6	4	6	8 5/8	20041	265.96
5 to 6	5	6	8 5/8	20042	284.08

Morse Taper Extension Sockets

Use as either an extension socket or to adapt a Morse Taper shank tool to a machine spindle whose Morse Taper hole is smaller than the shank of the tool.

Regularly furnished soft with accurately finished Morse Taper hole and shank.

STANDARD PACKAGE All sizes — 1 each

List No. 201 Carbon Steel

SIZE	MORSE TAPER HOLE	MORSE TAPER SHANK	OAL	EDP NO.	LIST PRICE
1 to 2	1	2	6 3/16	20011	$70.29
1 to 3	1	3	6 15/16	20012	72.98
1 to 4	1	4	7 7/8	20013*	85.96
2 to 2	2	2	6 13/16	20014	72.98
2 to 3	2	3	7 9/16	20015	106.78
2 to 4	2	4	8 9/16	20016	107.18
3 to 2	3	2	7 3/4	20017	91.10
3 to 3	3	3	8 1/2	20018	91.10
3 to 4	3	4	8 1/2	20019	104.33
3 to 5	3	5	10 3/4	20020	153.80
4 to 3	4	3	9 7/16	20021	148.65
4 to 4	4	4	10 7/16	20022	138.12
4 to 5	4	5	11 11/16	20023	195.43
5 to 4	5	4	11 13/16	20024	237.31
5 to 5	5	5	13 1/16	20025	258.12
5 to 6	5	6	15 5/8	20026*	268.41

*** Available While Supplies Last**

Drill Drifts

For removal of sleeves, sockets, or taper shank cutting tools from spindles or tool holders.

Regularly furnished drop-forged and hardened.

STANDARD PACKAGE Sizes 1 thru 3 — 4 each
Size 4 — 1 each

List No. 210

SIZE	FOR USE WITH MORSE TAPER NO.	EDP NO.	LIST PRICE
1	1	20051	$11.33
2	2	20052	13.59
3	3	20053	15.14
4	4, 5, 6	20054	23.31

Centers

High Speed Steel
Morse Taper
Hardened & Ground – 60° Point

STANDARD PACKAGE All sizes — 1 each

List No. 1295

MORSE TAPER NO.	OAL	EDP NO.	LIST PRICE
0	2⅞	21221*	$38.17
1	3⁵⁄₁₆	21222*	44.57
2	4⅜	21223*	47.86
3	5¼	21224*	87.44
4	6¾	21225*	133.41
5	7¾	21226*	218.92

*Available While Supplies Last

Carbide Tipped Centers

Half Centers

List No. 5292 Morse Taper
List No. 5293 Brown & Sharpe Taper
List No. 5294 Jarno Taper

Full Centers

List No. 5295 Morse Taper
List No. 5296 Brown & Sharpe Taper
List No. 5297 Jarno Taper

STANDARD PACKAGE All sizes — 1 each

List No. 5292 & 5295 Morse Taper

MORSE TAPER NO.	OAL	CARBIDE TIP LENGTH 5292	CARBIDE TIP LENGTH 5295	CARBIDE TIP DIA. 5292	CARBIDE TIP DIA. 5295	LIST NO. 5292 - HALF CENTER TOOL NO.	LENGTH OF UNDERCUT	HGT. ABOVE CTR.	EDP NO.	LIST PRICE	LIST NO. 5295 - FULL CTR TOOL NO.	EDP NO.	LIST PRICE
1	3⁵⁄₁₆	7⁄16	7⁄16	¼	¼	MH-1	1	⁹⁄₆₄	50031*	$93.93	M-1	50061*	$50.19
2	4³⁄₁₆	⁹⁄₁₆	⁹⁄₁₆	⁵⁄₁₆	⁵⁄₁₆	MH-2	1⅜	¹¹⁄₆₄	50032*	116.31	M-2	50062*	59.56
3	5¼	¹¹⁄₁₆	⅞	⅜	½	MH-3	1¹¹⁄₁₆	¹³⁄₆₄	50033*	162.96	M-3	50063*	109.42
4	6¾	⅞	⅞	½	½	MH-4	2¼	¹⁷⁄₆₄	50034*	257.04	M-4	50064*	166.23
5	8½	1¹⁄₁₆	1¹⁄₁₆	⅝	⅝	MH-5	2¾	²¹⁄₆₄	50035*	429.50	M-5	50065*	271.94

List No. 5293 & 5296 Brown & Sharpe Taper

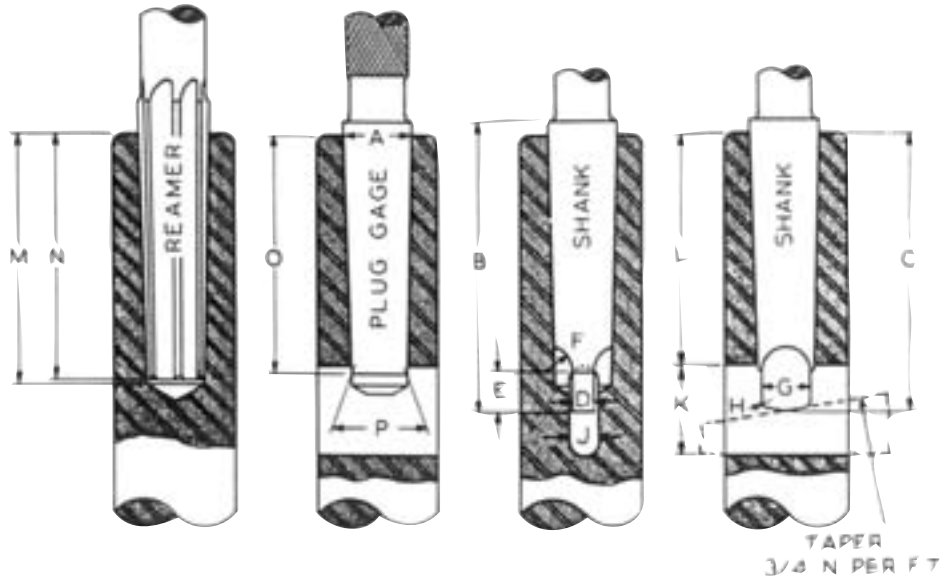
B & S TAPER NO.	OAL	CARBIDE TIP LENGTH 5293	CARBIDE TIP LENGTH 5296	CARBIDE TIP DIA. 5293	CARBIDE TIP DIA. 5296	LIST NO. 5293 - HALF CENTER TOOL NO.	LENGTH OF UNDERCUT	HGT. ABOVE CTR.	EDP NO.	LIST PRICE	LIST NO. 5296 - FULL CTR TOOL NO.	EDP NO.	LIST PRICE
7	4½	⁹⁄₁₆	⁹⁄₁₆	⁵⁄₁₆	⁵⁄₁₆	BH-7	1⅛	¹¹⁄₆₄	50041*	$131.87	B-7	50071*	$76.47
8	5¹¹⁄₃₂	⁹⁄₁₆	¹¹⁄₁₆	⁵⁄₁₆	⅜	BH-8	1⁵⁄₁₆	¹¹⁄₆₄	50042*	173.27	B-8	50072*	107.34
9	6	¹¹⁄₁₆	⅞	⅜	½	BH-9	1½	¹³⁄₆₄	50043*	192.54	B-9	50073*	136.07
10	8¹⁷⁄₃₂	⅞	⅞	½	½	BH-10	2¼	¹⁷⁄₆₄	50044*	288.89	B-10	50074*	194.19
11	10⅛	1¹⁄₁₆	1¹⁄₁₆	⅝	⅝	BH-11	2½	⅜	50045*	396.69	—	—	—

List No. 5294 & 5297 Jarno Taper

JARNO TAPER NO.	OAL	CARBIDE TIP LENGTH	CARBIDE TIP DIA.	LIST NO. 5294 - HALF CENTER TOOL NO.	LENGTH OF UNDERCUT	HGT. ABOVE CTR.	EDP NO.	LIST PRICE	LIST NO. 5297 - FULL CENTER TOOL NO.	EDP NO.	LIST PRICE
4	3	7⁄16	¼	—	—	—	—	—	J-4	50081*	$54.72
5	3⅝	7⁄16	¼	—	—	—	—	—	J-5	50082*	61.67
6	4½	⁹⁄₁₆	⁵⁄₁₆	JH-6	1⅛	¹¹⁄₆₄	50051*	$126.42	J-6	50083*	74.71
7	5¼	¹¹⁄₁₆	⅜	—	—	—	—	—	J-7	50084*	96.71
8	6	⅞	½	JH-8	1⅜	¹⁷⁄₆₄	50053*	204.76	J-8	50085*	125.25
9	6¾	⅞	½	JH-9	1⅝	¹⁷⁄₆₄	50054*	230.58	J-9	50086*	135.95
10	7½	⅞	½	JH-10	2	¹⁷⁄₆₄	50055*	273.16	J-10	50087*	172.65
11	8¼	⅞	½	JH-11	2	¹⁷⁄₆₄	50056*	302.31	J-11	50088*	194.31
12	9	1¹⁄₁₆	⅝	JH-12	2¼	²¹⁄₆₄	50057*	340.54	J-12	50089*	214.81

*Available While Supplies Last

Morse Taper Dimensions



NUMBER OF TAPER	DIA. OF PLUG AT SMALL END	DIA. AT END OF SOCKET	SHANK		DEPTH OF DRILLED HOLE	DEPTH OF REAMED HOLE	STANDARD PLUG DEPTH	TANG			TANG SLOT				END OF SOCKET TO TANG SLOT	TAPER PER INCH	TAPER PER FOOT
			ENTIRE LENGTH	DEPTH				THICKNESS	LENGTH	RADIUS	DIAMETER	RADIUS	WIDTH	LENGTH			
	P	A	B	C	M	N	O	D	E	F	G	H	J	K	L		
0	.25200	.35610	2 11/32	2 7/32	2 1/16	2 1/32	2	0.156	1/4	5/32	15/64	3/64	0.172	9/16	1 15/16	.052050	.62460
1	.36900	.47500	2 9/16	2 7/16	2 3/16	2 5/32	2 1/8	.203	3/8	3/16	11/32	3/64	0.218	3/4	2 1/16	.049882	.59858
2	.57200	.70000	3 1/8	2 15/16	2 21/32	2 39/64	2 9/16	0.250	7/16	1/4	17/32	1/16	0.266	7/8	2 1/2	.049951	.59941
3	.77800	.93800	3 7/8	3 11/16	3 5/16	3 1/4	3 3/16	0.312	9/16	9/32	23/32	5/64	0.328	1 3/16	3 1/16	.050195	.60235
4	1.02000	1.23100	4 7/8	4 5/8	4 3/16	4 1/8	4 1/16	0.469	5/8	5/16	31/32	3/32	0.484	1 1/4	3 7/8	.051938	.62326
4 1/2	1.26600	1.50000	5 3/8	5 1/8	4 5/8	4 9/16	4 1/2	0.562	1 1/16	3/8	1 13/64	1/8	0.578	1 3/8	4 5/16	.052000	.62400
5	1.47500	1.74800	6 1/8	5 7/8	5 5/16	5 1/4	5 3/16	0.625	3/4	3/8	1 13/32	1/8	0.656	1 1/2	4 15/16	.052626	.63151
6	2.11600	2.49400	8 9/16	8 1/4	7 13/32	7 21/64	7 1/4	0.750	1 1/8	1/2	2	5/32	0.781	1 3/4	7	.052138	.62565
7	2.75000	3.27000	11 5/8	11 1/4	10 5/32	10 5/64	10	1.125	1 3/8	3/4	2 5/8	3/16	1.156	2 5/8	9 1/2	.052000	.62400

The undercut shown on the tang having diameter G, and length E, may be eliminated at the option of the manufacturer provided the tang is heat-treated to a minimum Rockwell of C30 with 150Kg load.

TOLERANCES ON RATE OF TAPER, all sizes 0.0002 per foot. This tolerance may be applied on shanks only in the direction which increases the rate of taper and on sockets only in the direction which decreases the rate of taper.

Carbide Grades Applications

Industry Standard Metal Removal Grades

GRADE	GRADE TYPE	GENERAL APPLICATION INFORMATION	GRADE CHARACTERISTICS
C1	Straight Tungsten	Heavy-duty roughing to extremely heavy-duty roughing of cast irons, 200 and 300 series stainless steels, a broad variety of high temperatures, high strength alloys. Intended for severe applications at relatively low cutting speed.	Excellent resistance to mechanical shock. Excellent toughness, with medium to low abrasion resistance and low resistance to cratering.
C2	Straight Tungsten Carbide	Light roughing to heavy-duty roughing on nodular malleable, gray and chilled cast iron, 200 and 300 series stainless steels, a broad variety of high temperatures, high strength alloys. Intended for severe applications at relatively low cutting speed.	Good abrasion resistance and excellent toughness. Low resistance to cratering. Very good resistance to thermal shock
C3	Complex Tungsten Carbide	Finishing to light roughing over a broad variety of cast irons.	Good resistance to abrasion. Medium toughness.
C5 C6	Complex Tungsten Carbide	Medium roughing to extremely heavy-duty roughing over a broad variety of plain carbon steels, alloy steels, tool steels, free machining steels, the 400 and 500 series stainless steels and alloy cast irons.	Excellent resistance to thermo-mechanical shock with medium abrasion resistance.
C7	Complex Tungsten Carbide	Light roughing to medium roughing over a broad variety of plain carbon steels, alloys steels, free machining steels, tool steels, the 400 and 500 series stainless steels and alloy cast irons.	Excellent resistance to both temperature crater and deformation. Medium to low toughness with medium to good abrasion resistance.
C8	Complex Tungsten Carbide	Finishing to light roughing over a broad variety of plain carbon steels, alloys steels, tool steels, free machining steels, and 400 and 500 series stainless steels.	Excellent resistance to abrasion and high temperature crater and deformation. Low toughness and low resistance to thermal shock.

Carbide Grade Reference Chart

INDUSTRY CODE NO.	C-1	C-2	C-3	C-5	C-6	C-7	C-8
CARBOLOY	55A, 101, 258/115, 248/779, 805, 820	44A, 883/905, 875	850, 895	390, 395, 370, 375, 380	78	350	320
ISCAR	IC11, IC12, IC28, IC1	IC14, IC20, IC2	IC35, IC4	IC54 IC50, IC50M	IC24,	IC70, IC78	IC80
KENNAMETAL	K14, K3070 K9, K10, K1/K94 K95	K68, K6, K8735	K313	K82, K400, K21, K2S, K420 K29	K40 K44/K216, KC850	K45	K74
SANDVIK	CG60, CT45, R4, CG40	CG20, HML, HM, RIPH10A	H10, CS10 H13A	S6, S4, SMA, SM S35	SH, S2 SM25 SM30	SIP, HM, S10T	CT25, CT520, FO2, CT515
TELEDYNE FIRTH STERLING	M91, H81, H96, H8, H91	HAR, H6, H21, HTA, H	HA, HE, H36	T04, T14, NTA, T12	T22, TXH, TC+	T25, T76, T24	SD5, WF
VALENITE	VC11, VC152, VC111, VC101	VC1, VCO22, VC2, VC24, V26	VC29	VC52, VC56, VC19, VC5, VC55	VC6, VC27	VC76, VC71, VC7	VC8, VC85
V.R. WESSON	2A1, VR13/14, 2A12, 2A6, 2A3, 2A9	2A68, 2A5, VR54	2A7, VR82 VR82	WS, WM, VR771 VR77, VR79	VR75, VR751	VR73, VR71, WH	VR65

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