

# INDUSTRIAL

## Band Saw Blades



**MORSE**<sup>®</sup>  
THE M. K. MORSE COMPANY

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Visit the Morse BladeWizard on-line to select the right blade for your application:

**bladewizard.com**

**Visit us at [mkmorse.com](http://mkmorse.com)**

# The M. K. Morse Company Overview

At The M. K. Morse Company we've had just one focus for over forty-five years. Make better saw blades and accessories and get them to customers on time. We don't make machinery. We don't make other products. We do one thing and we do it very well.

This single-minded devotion has led to some unique innovations over the years. But, mostly it has led to a relentless march to improve value.

We are constantly looking for ways to build even more durability into our blades while driving production costs down. The result is a line of high value industrial band saw blades that top the charts in performance and quality.

We have accomplished this by totally integrating our manufacturing process. In fact, we do everything but make our own steel ... so far. This unique ability to control our processes makes it easier for us to meet tight production deadlines and control costs. Our customers get the benefits. At M. K. Morse this is the way we operate.



There really was an M. Kenneth Morse. As a manufacturer's rep, he became frustrated when he sold products manufacturers couldn't deliver on time or with the quality his customers demanded. He started manufacturing saw blades to make sure his customers got what they wanted when they needed it. We still do business the same way today, using the talents and resources of people working in manufacturing and warehousing facilities around the world. They are M. K. Morse, today.

We're still headquartered where we started ... in Canton, Ohio, U.S.A. However, today we have warehousing in Los Angeles, California; Vancouver, Canada; Toronto, Canada; West Yorkshire, England; and Helsinki, Finland. The Los Angeles, Toronto, and West Yorkshire warehouses are also weld centers. Our products are available from industrial supply distributors world-wide.

Our reputation for immediate availability at all distribution facilities and timely shipment is based on solid facts. Over 98% of all orders for standard stock products ship complete within 24 hours. Our integrated manufacturing process, dedication to customer service and worldwide distribution make it all possible. Our customers make it all worthwhile.

- **Guaranteed shipping dates**
- **Guaranteed quality**
- **Guaranteed trial blades**

*See page 19 for all Guarantee information.*

# M. K. Morse Band Saw Products Overview

This page provides a general overview of the types of M. K. Morse band saw blades best suited to different cutting applications.

<b>MORSE BI-METAL BAND SAW BLADE APPLICATION OVERVIEW</b>								
Selection Based Upon Target Application								
General Purpose Cutting Machines in Poor Condition	CARBON STEELS	STRUCTURAL STEELS	ALUMINUM & LT. ALLOY STEELS	ALLOY STEELS MOLD STEELS	TOOL STEELS	STAINLESS STEELS	NICKEL BASE ALLOYS	TITANIUM ALLOYS
AISI	1010, 1020, 1045	A36	6061, 2011, 2024, 5052	4140, P20	A2, H13, S7 M-SERIES	316, 304 17-4 PH., 15-5 PH	INCONEL, MONEL, WASPALLOY	Ti-6Al-4V
JIS	S20C, S45C		6061, 2011, 2024, 5052	SCM 440(H), SCM 445(H)	SHD11, SHD12, SKD61, SKS41	SUS316, SUS304	NCUP-O	H4650, H4600
DIN	Ck45, C16.8		AlCuPb, AlCuMg2, AlMg2Mn0.3	41CrMo4	X155CrVMoV51, (G)X40CrMoV51	X5CrNiMo18 10, X5CrNi18 10	NiCr19NbMo, NiCr19Co14Mo4Ti	
<b>MATRIX II</b>			<b>M42</b>			<b>ACHIEVER</b>		<b>INDEPENDENCE II</b>
<b>CHALLENGER</b>				<b>INDEPENDENCE EXS</b>				

<b>MORSE CARBIDE TIPPED BAND SAW BLADE APPLICATIONS</b>												
Selection Based Upon Target Application												
	CARBON STEELS	ALUMINUM & LT. ALLOY STEELS	ALLOY STEELS MOLD STEELS	TOOL STEELS	STAINLESS STEELS	TITANIUM ALLOYS	NICKEL BASE ALLOYS	CASE HARDENED	ALUMINUM CASTINGS	ABRASIVE WOODS	COMPOSITES	GRAPHITE
AISI	1010, 1020, 1045	6061, 2011, 2024, 5052	4140, P20	A2, H13, S7 M-SERIES	316, 304 17-4 PH, 15-5 PH	Ti-6Al-4V	INCONEL, MONEL, WASPALLOY					
JIS	S20C, S45C	6061, 2011, 2024, 5052	SCM 440(H), SCM 445(H)	SHD11, SHD12, SKD61, SKS41	SUS316, SUS304	H4650, H4600	NCUP-O					
DIN	Ck45, C16.8	AlCuPb, AlCuMg2, AlMg2Mn0.3	41CrMo4	X155CrVMoV51, (G)X40CrMoV51	X5CrNiMo18 10, X5CrNi18 10		NiCr19NbMo, NiCr19Co14Mo4Ti					
<b>M-FACTOR – GP</b>								<b>M-FACTOR – FB</b>				
<b>M-FACTOR – CH</b>												

<b>MORSE CARBIDE GRIT BAND SAW BLADE APPLICATIONS</b>							
Selection Based Upon Target Application							
CAST IRON HARDENED STEEL	CERAMICS FOAMED GLASS	FIBERGLASS	CABLE WIRE ROPE	CEMENT CONCRETE	TIRES & WIRE REINFORCED RUBBER	GRAPHITE	COMPOSITES
<b>CARBIDE GRIT</b>							

<b>MORSE CARBON BAND SAW BLADE APPLICATION OVERVIEW</b>					
Selection Based Upon Target Application					
PRODUCTION WOOD CUTTING	WOOD CUTTING	CARBON STEELS	LOW ALLOY STEELS	NON-FERROUS METALS	NON-METALIC MATERIALS/PLASTIC
<b>HARD EDGE HARD BACK / HARD EDGE FLEX BACK</b>					



## M-Factor by Morse® GP (General Purpose)

Sub micron grade carbide tooth tips are precision ground in a triple chip tooth design for maximum cutting performance. Specially designed for alloy steel and stainless steel applications for exceptional long life.

### APPLICATIONS

- Alloy steels
- Stainless steels
- Typical users include:  
Steel service centers  
Forging operations  
General manufacturing



### M-Factor by Morse – GP

General Purpose

Width x Thickness		Teeth Per Inch		
Inches	mm	1.5/2.0	2/3	3/4
1 x .035	27 x 0.90		▼	▼
1-1/4 x .042	34 x 1.07	▼	▼	▼
1-1/2 x .050	41 x 1.30	▼	▼	▼
2 x .063	54 x 1.60	*▼	*▼	

\* Available July, 2010

## M-Factor by Morse® CH (Case Hardened)

Precision ground sub micron grade carbide tooth tips feature triple chip tooth profiles designed for long life and fast, smooth cutting of chrome plated, case hardened hydraulic shaft specifications.

### APPLICATIONS

- Work hardened, chrome plated hydraulic cylinder shafts
- Case hardened shafts & shapes
- Heat treated thick wall tubing
- Typical users include:  
Steel service centers  
Automotive parts makers  
Cylinder Manufacturers  
Bearing Manufacturers



### M-Factor by Morse – CH

Case Hardened

Width x Thickness		Teeth Per Inch		
Inches	mm	2/3	3	3/4
1 x .035	27 x 0.90		▼	▼
1-1/4 x .042	34 x 1.07		▼	▼
1-1/2 x .050	41 x 1.30	▼		▼

## M-Factor by Morse® FB (Foundry Band)

Sub micron grade carbide tooth tips are precision ground in a triple chip tooth profile specially designed for exceptional long life and fast cutting of tough, abrasive and non-ferrous materials.

### APPLICATIONS

- Aluminum castings:  
gates, risers, extrusions
- Abrasive wood & plywood
- Typical users include:  
Aluminum foundries  
Graphite manufacturing  
Composite wood (furniture)



### M-Factor by Morse – FB

Aluminum Foundry

Width x Thickness		Teeth Per Inch
Inches	mm	3
1/2 x .025	12.7 x 0.60	▼
3/4 x .035	19 x 0.90	▼
1 x .035	27 x 0.90	▼
1-1/4 x .042	34 x 1.07	▼



## Independence II® High Production Bi-Metal Blades

Highly fatigue resistant to eliminate premature breakage. Excellent in solid tool steels and small to medium stainless & nickel based alloys.



### BLADE FEATURES

- Special high speed steel tooth edges
- Special alloy steel backer
- Unique tooth geometry
- Superior wear, heat and shock resistance
- Fewer blade changes in a wide range of materials equals less downtime

### APPLICATIONS



- High production cutting Solids of tool steel A2, D2, S7
- Small to medium solids of stainless (304, 316, 17-4)
- Nickel based alloys Inconel, Monel
- All machinable metals in single pieces or bundles

Width x Thickness		Teeth Per Inch			
Inches	mm	2/3	3/4	4/6	5/7
Variable					
1 x .035	27 x .90	▼	▼	▼	▼
1-1/4 x .042	34 x 1.07	▼	▼	▼	▼
1-1/2 x .050	41 x 1.27	▼	▼	▼	▼
2 x .063	54 x 1.60	▼	▼	▼	▼

## Independence EXS® High Production Bi-Metal Blades

Longer lasting than competitive blades and more wear resistant than The Achiever®, and M42, these blades are the best choice for cutting exotics, stainless steels and large solids.

Width x Thickness		Teeth Per Inch			
Inches	mm	1.1/1.5	2/3	3/4	4/6
Variable					
1 x .035	27 x .90		▼	▼	▼
1-1/4 x .042	34 x 1.07		▼	▼	▼
1-1/2 x .050	41 x 1.27	▼	▼	▼	
2 x .063	54 x 1.60	▼	▼	▼	

### APPLICATIONS

- High production cutting
- Large solids
- Stainless steels
- Exotics

### Independence® Wide Bands

Width x Thickness		Teeth Per Inch				
Inches	mm	.75/1.1	1.1/1.5	1.5/2.0	2/3	3/4
Variable						
2-5/8 x .063	67 x 1.60	▼	▼	▼	▼	▼
3 x .063	80 x 1.60	▼	▼			



**APPLICATIONS**

- Production cutting
- Material range from carbon to stainless steel
- Layer & bundle cuts:  
1018, 4140, 4340  
tool steels  
stainless steels
- Large profiles & solids  
carbon steels  
alloy tooth steel  
stainless steel



**The Achiever® Production Bi-Metal Blades**

Consistently reliable with excellent durability in mild to difficult materials – layer and bundle cuts in large profiles and solids.



**BLADE FEATURES**

- Best performance in a wide range of materials
- M. K. Morse proprietary edge wire
- M. K. Morse engineered spring steel backer - additional rigidity
- Consistent reliability / performance from blade to blade
- Exceptional tooth durability and fatigue resistance

*The Achiever®*

Width x Thickness		Teeth Per Inch					
Inches	mm	1.4/2.5	2/3	3/4	4/6	5/7	5/8
		Variable Pitch - 0° Rake					
1 x .035	27 x .90				▼		▼
1-1/4 x .042	34 x 1.07			▼	▼		
1-1/2 x .050	41 x 1.27		▼	▼			
		Variable Pitch - Positive Rake					
1 x .035	27 x .90		▼	▼	▼	▼	
1-1/4 x .042	34 x 1.07	▼	▼	▼	▼▼	▼	
1-1/2 x .050	41 x 1.27	▼	▼▼	▼▼	▼▼		
2 x .063	54 x 1.60	▼	▼▼	▼▼			

▼ Heavy Set

MADE IN U.S.A.



ACHIEVER



MORSE

## Challenger™ Structural Bi-Metal Blades

Long life and straight cuts in structural material cutting applications while reducing noise and vibration.



### BLADE FEATURES

- Special tooth profile for cutting structural materials
- Increased beam strength
- Less noise and vibration
- Less tooth strippage
- Longer life in interrupted cuts
- Straighter interrupted and bundle cuts

### APPLICATIONS

- Specially designed for structural applications
- Bundle cuts
- Interrupted cuts
- I-beams
- Low alloy steels
- Carbon steels  
A36



### Challenger Structural Blades

Width x Thickness		Teeth Per Inch			
Inches	mm	2/3	3/4	4/6	5/7
1 x .035	27 x .90			▼	▼
1-1/4 x .042	32 x 1.1	▼▼	▼▼	▼▼	▼▼
1-1/2 x .050	41 x 1.3	▼▼	▼▼	▼▼	▼▼
2 x .063	54 x 1.6			▼▼	

▼ Heavy Set

**MORSE**

**CHALLENGER**  
MADE IN U.S.A.



## M42 Production Bi-Metal Blades

Durability for higher production speeds on difficult to machine solids and heavy walled structures

### APPLICATIONS

- Solids
- Heavy walled structures
- Carbon steels
- Alloy steels
- Some stainless steels
- Medium to heavy production machines

### Variable Pitch - Positive Rake

Width x Thickness		Teeth Per Inch				
Inches	mm	1.4/2.5	2/3	3/4	4/6	5/7
		Variable				
3/4 x .035	19 x .90				▼	▼
1 x .035	27 x .90		▼	▼▼	▼▼	▼
1-1/4 x .042	34 x 1.07		▼	▼▼	▼▼	▼
1-1/2 x .050	41 x 1.27	▼	▼	▼▼	▼▼	
2 x .050	54 x 1.27		▼	▼		
2 x .063	54 x 1.60	▼	▼	▼		

▼ Available with 6° rake angle

### Variable Pitch - 0° Rake

Width x Thickness		Teeth Per Inch						
Inches	mm	2/3	3/4	4/6	5/8	6/10	8/12	10/14
		Variable						
1/4 x .025	6.4 x .64							▼
1/4 x .035	6.4 x .90							▼
3/8 x .035	9.5 x .90							▼
1/2 x .025	12.7 x .64						▼	
1/2 x .035	12.7 x .90							▼
3/4 x .035	19 x .90			▼	▼	▼	▼	▼
1 x .035	27 x .90	▼	▼	▼	▼	▼	▼	▼
1-1/4 x .042	34 x 1.07	▼	▼	▼	▼		▼	
1-1/2 x .050	41 x 1.27	▼	▼	▼	▼			

### Straight Pitch

Width x Thickness		Teeth Per Inch										
Inches	mm	4	6	8	10	14	10	1	1.14	3	4	6
		Raker					Wavy	Hook				
1/4 x .035	6.4 x .90				▼	▼						
3/8 x .035	9.5 x .90				▼						▼	
1/2 x .025	12.7 x .64											▼
1/2 x .035	12.7 x .90				▼	▼					▼	▼
1 x .035	27 x .90	▼	▼	▼			▼					
1-1/4 x .042	34 x 1.07	▼	▼						▼	▼	▼	
2 x .050	54 x 1.27							▼				
2 x .063	54 x 1.60							▼				

Straight Pitch teeth are most often used when the cross sectional size range is consistent.



M42

MORSE





**APPLICATIONS**

- Tool & die shops
- Die blocks
- Tool steels
- “D” grade steels
- “Super” alloys
- Inconel
- Waspalloy
- Hastelloy
- Tough materials
- Typically used on vertical machines



**Bi-Metal Die Band Blades**

Designed for cutting solids with very low machinability including the toughest machinable materials. Production cutting with less blade changes for tool and die shops.

**BLADE FEATURES**

- Low cost-per-cut
- High heat and wear resistance
- Available in Matrix II and M42 specifications
- Wide selection of blade type and tooth sizes
- Made with either straight pitch or variable pitch teeth
- Matrix II die bands, with high shock resistance, are better suited for thinner sections
- M42 die bands offer high wear and heat resistance and are best suited for cutting difficult-to-machine tool steel and die blocks

*M42 Specifications*

Width x Thickness		Teeth Per Inch					
Inches	mm)	10	14	4	6	8/12	10/14
		Raker		Hook		Variable	
1/4 x .025	6.4 x .64						▼
1/4 x .035	6.4 x .90	▼	▼				▼
3/8 x .035	9.5 x .90	▼		▼			▼
1/2 x .025	12.7 x .64				▼	▼	
1/2 x .035	12.7 x .90	▼	▼	▼	▼		▼

*Matrix II Specifications*

Width x Thickness		Teeth Per Inch											
Inches	mm	6	8	10	14	18	3	4	6	6/10	8/12	10/14	14/18
		Raker				Hook			Variable				
1/4 x .025	6.4 x .64			▼	▼				▼				
3/8 x .025	9.5 x .64		▼	▼	▼			▼				▼	
1/2 x .025	12.7 x .64	▼		▼	▼	▼	▼	▼		▼	▼	▼	▼
1/2 x .035	12.7 x .90						▼	▼		▼	▼	▼	▼

## Pallet Dismantling Blades

Specially designed to withstand the rough service required on dismantling machines while cutting through pallet nails and staples.

### APPLICATIONS

- All types of band saw pallet dismantling machines



### BLADE FEATURES

- Low cost-per-cut
- Rugged durability
- Available in bi-metal Matrix II and M42 specifications as well as a special grade of carbon steel
- Made with either straight pitch or variable pitch teeth

#### M42 Bi-Metal

Width x Thickness		Teeth Per Inch		
Inches	mm	6/10	5/8	6
1-1/4 x .042	32 x 1.1	Variable	▼	Raker ▼

#### Matrix II Bi-Metal

Width x Thickness		Teeth Per Inch		
Inches	mm	6/10	5/8	6
1-1/4 x .042	32 x 1.1	▼	▼	Raker ▼

Lower cost blades are available in a special grade of carbon steel to enhance their durability in a variety of dismantling machines.

#### Carbon Hard Back (HB) Special

Width x Thickness		Teeth Per Inch		
Inches	mm	6/10	5/8	6
1-1/4 x .042	32 x 1.1	Variable	▼	Raker ▼

**APPLICATIONS**

- **Low alloy, easy-to-machine ferrous metals**
- **Non-ferrous metals:**  
 Brass/copper  
 Bronze  
 Aluminum  
 Lead
- **Wood**
- **Plastic**
- **Cork**
- **Composition board**
- **Plywood**



**Carbon General Purpose Blades**

Stiffer blades offer straighter cuts in wood & metal cutting. On metals they are used for short production and maintenance applications

**BLADE FEATURES**

- **Manufactured from a single piece of high carbon steel with individually hardened tooth tips**
- **Low cost-per-blade/low cost-per-cut in wood & similar materials**
- **In metals; low cost-per-blade/higher cost-per-cut than bi-metal**
- **Stiffer than hard edge flex (HEF) blades due to a hardened & tempered backer**
- **Straighter cuts with heavier feed pressure than carbon HEF**
- **Will accept heavier feed pressure than carbon HEF**
- **Good on easy-to-machine metals and other easy-to-cut materials**
- **Not recommended for blade speeds exceeding 4000 sfm**

*Specifications*

Width x Thickness		Teeth Per Inch																				
Inches	mm	6	8	10	14	18	24	8	10	12	14	18	24	32	1.3	2	3	4	6	3	4	6
		Raker				Wavy				Hook				Skip								
3/16 x .025	4.8 x .64																					
1/4 x .025	6.4 x .64			▼	▼	▼	▼							▼				▼	▼			▼
3/8 x .025	9.5 x .64		▼	▼	▼	▼											▼	▼	▼			▼
1/2 x .020	12.7 x .50				▼																	
1/2 x .025	12.7 x .64	▼	▼	▼	▼	▼	▼		▼		▼	▼	▼				▼	▼	▼			▼
5/8 x .032	16 x .80		▼	▼	▼												▼					
3/4 x .032	19 x .80	▼	▼	▼	▼	▼			▼	▼	▼	▼				▼	▼	▼			▼	
1 x .035	27 x .90	▼	▼	▼	▼									▼		▼	▼					
1 x .042	27 x 1.1													▼								
1 1/4 x .035	32 x .90													▼								
1 1/4 x .042	32 x 1.1	▼												▼								

▼ Standard Set ▼ Heavy Set ▼ D-Double Set Raker

## Carbon Wood Production Blades

Ideal for wood production cutting and short production/maintenance/general purpose applications using low alloy steel & non-ferrous metals

### BLADE FEATURES

- Manufactured from a single piece of high carbon steel with individually hardened tooth tips
- More fatigue resistant than Carbon hard back
- Low cost-per-blade/low cost-per-cut in wood
- Low cost-per-blade/higher cost-per-cut in tougher materials
- Can be run at speeds up to 15,000 sfm

### APPLICATIONS

- Wood
- Plastic
- Cork
- Composition board
- Plywood
- Aluminum
- Non-ferrous metals
- Low alloy steel



### Specifications

Width x Thickness		Teeth Per Inch																						
Inches	mm	4	6	8	10	14	18	24	10	12	14	18	24	32	1	1.14	1.3	2	3	4	6	3	4	6
		Raker						Wavy						Hook						Skip				
1/8 x .025	3 x .64					▼	▼																	
3/16 x .025	4.8 x .64				▼	▼																		▼
1/4 x .014	6.4 x .30					▼	▼						▼	▼										▼
1/4 x .020	6.4 x .50																							▼
1/4 x .025	6.4 x .64			▼	▼	▼	▼	▼													▼	▼		▼
3/8 x .014	9.5 x .30																							▼
3/8 x .025	9.5 x .64			▼	▼	▼	▼	▼																▼
3/8 x .032	9.5 x .80																		▼	▼				
1/2 x .020	12.7 x .50		▼		▼				▼			▼	▼	▼										
1/2 x .025	12.7 x .64	▼	▼	▼	▼	▼	▼	▼				▼	▼	▼	▼					▼	▼	▼	▼	▼
5/8 x .032	16 x .80																							
3/4 x .032	19 x .80		▼	▼	▼	▼	▼					▼												▼
3/4 x .050	19 x 1.30																							
1 x .035	27 x .90		▼	▼	▼	▼																		
1 x .035 *Bright	27 x .90																							
1 x .042	27 x 1.07																							
1 x .042 *Bright	27 x 1.07																							
1 1/4 x .035	32 x .90																							
1 1/4 x .042	32 x 1.07																							
1 1/4 x .042 *Bright	32 x 1.07																							
1 1/2 x .045	38.1 x 1.14																							
2 x .035	50.8 x .90																							
2 x .042	50.8 x 1.07																							

▼ Standard Set ▼ Heavy Set ▼ D-Double Set Raker  
\* "Bright" specifications have an unblued, silver surface finish.

## Carbon Furniture Production Blades

Ideal for use on large, high-speed vertical cutting band machines used in the furniture industry. Blades offer faster cutting while maintaining precision required in the furniture industry.

### APPLICATIONS

- Wood
- Chip board
- Plywood
- Cardboard
- Used on large, vertical, high-speed wood cutting machines



### BLADE FEATURES

- Special ETS (every tooth set) pattern and aggressive 10° hook tooth design for faster cutting with longer tooth tip life
- Flexible backer resists fatigue but allows contour control required in furniture manufacturing
- Manufactured from a single piece of high carbon steel with individually hardened tooth tips
- Thicker blade is stiffer for more control
- Low cost-per-blade/low cost-per-cut
- Can be resharpened for longer tooth life

Carbon Furniture Production Blades

Width x Thickness		Teeth Per Inch						
Inches	mm	3	4	6	2	3	4	6
		Hook ETS			Hook Raker Set			
1/4 x .025	6.4 x .64		▼	▼			▼	▼
1/4 x .032	6.4 x .80		▼					
3/8 x .025	9.5 x .64	▼				▼	▼	▼
3/8 x .032	9.5 x .80	▼	▼		▼			
1/2 x .025	12.7 x .64	▼	▼			▼	▼	▼
1/2 x .032	12.7 x .80	▼	▼					
5/8 x .032	16.0 x .80					▼	▼	▼
3/4 x .032	19.0 x .80	▼	▼		▼	▼	▼	▼

▼ Standard Set   ▼ ETS Set   ▼ Heavy Set  
▼ D-Double Set Raker   ▼ Special Extra Heavy Set Hard Back

## Carbon Wood Mill/Resaw Blades

Versatile blades offer high value in a variety of wood cutting applications. Blades are manufactured from a single piece of high carbon steel with individually hardened tooth tips.

### BLADE FEATURES

- Available in both flex back & hard back
- Flex back blades are more fatigue resistant
- Hard back blades offer straighter cuts
- Low cost-per-blade/low cost-per-cut
- Can be resharpened for longer tooth life
- Some flex back specifications are available with a bright finish

### APPLICATIONS

- Portable and stationary wood mills
- Single head and multi-head resaw systems
- Scragg mills



### Hard Edge Flex Back - (HEF)

Width x Thickness		Teeth Per Inch			
Inches	mm	1	1.14	1.3	2
Hook					
1 x .035	27.5 x .9			▼▲	▼
1 x .042	27.5 x 1.1			▼	▼
1-1/4 x .035	32.0 x .9		▼	▼	▼
1-1/4 x .042	32.0 x 1.1	▼	▼▲	▲▼	
1-1/2 x .045	38.1 x 1.1		▼		
2 x .035	50.8 x .9		▼	▼	
2 x .042	50.8 x 1.1		▼		

▼ Heavy Set ▲ Bright Finish

### Hard Edge Hard Back - (HB)

Width x Thickness		Teeth Per Inch
Inches	mm	1.3
Hook		
1 x .035	27.5 x .9	▼
1-1/4 x .035	32.0 x .9	▼
1-1/4 x .042	32.0 x 1.1	▼

## Quik Silver® Blades

Ideal for wood cutting applications where blade fatigue problems are an increased concern.



### APPLICATIONS

- Wood cutting with increased fatigue resistance

### Quik Silver Flex Back (RSF) & Hard Back (RSH)

Width x Thickness		Teeth Per Inch			
Inches	mm	1	1.14	1.3	2
Hook					
1 x .035	27.5 x .9			▼▼	▼▼
1-1/4 x .042	32 x 1.1	▼	▼▼	▼▼	
1-1/2 x .045	38 x 1.1	▼	▼	▼	
2 x .035	51 x .9	▼	▼	▼	
2 x .042	51 x 1.1	▼	▼	▼	

▼ RSF flexback ▼ RSH hardback

### BLADE FEATURES

- Made from a single piece of Quik Silver alloy steel with individually hardened tooth tips
- Available in both flex back & hard back
- Flex back blades are fatigue resistant
- Hard back blades offer straighter cuts
- Low cost-per-blade/low cost-per-cut
- Can be resharpened for longer tooth life

**APPLICATIONS**

- Fiberglass
- Ceramics
- Cast iron
- Graphite
- Tires & wire reinforced rubber
- Cable & wire rope
- Brittle materials or surfaces that chip



**Tungsten Carbide Grit Blades**

Ideal for cutting ceramics and other materials that are too hard or abrasive for standard bi-metal blades, tungsten carbide grit blades provide superior wear resistance.

**BLADE FEATURES**

- Very smooth finish
- Reversible to extend service life
- Available in continuous and gulleted cutting edges
- Continuous grit for brittle materials, or materials thinner than 1/4" (6.4mm) with surfaces that chip
- Gulleted grit for 1/4" and larger wall thickness
- Available in medium to coarse grit
- Medium grit for thin materials or fine finishes
- Coarse grit for cutting thick materials

*Carbide Grit (Continuous)*

Width x Thickness		Grit Size	
Inches	mm	Medium	Coarse
1/4 x .020	6.4 x .50	▼	
1/2 x .025	12.7 x .64	▼	
1 x .035	27 x .90	▼	▼

*Carbide Grit (Gulleted)*

Width x Thickness		Grit Size		
Inches	mm	Medium	Medium Coarse	Coarse
3/8 x .025	9.5 x .64	▼	▼	
1/2 x .025	12.7 x .64	▼	▼	
3/4 x .032	19 x .80		▼	▼
1 x .035	27 x .90		▼	▼
1-1/4 x .042	34 x 1.07			▼



## Morse Band Saw Tension Gauge

Allows you to quickly check for under-tensioned or over-tensioned blade conditions while the blade is on the machine.

### TENSION GAUGE FEATURES

- Durable cast/powder coated body
- Calibrated gauge measures in lbs/in<sup>2</sup> as well as kg's/cm<sup>2</sup>
- Quality storage box with protective foam inserts



Model number: TENSIONGAUGE  
Part number: 005005



### BENEFITS OF PROPER BLADE TENSION:

- Optimal blade life
- Precise cutting results
- Reduces the occurrence of machine damage due to blade over-tensioning



## Blade Break-In: Extremely Important

The extremely sharp tooth points and edges of new blades must be broken-in before applying full feed pressure to the blade. A good analogy is that of writing with a freshly sharpened wooden pencil.

### RECOMMENDED BREAK-IN PROCEDURE

- Maintain proper blade speed for the material to be cut.
- Reduce blade feed pressure or feed rate by 50% for the first 50 to 100 square inches of material cut.
- Gradually increase feed pressure or feed rate after break-in to full pressure or rate.

## Warning About Blade Usage

**CUTTING TOOLS CAN SHATTER AND/OR BREAK UNDER IMPROPER OR SEVERE USE. WEAR SAFETY EQUIPMENT, AND PARTICULARLY GOGGLES, GLOVES AND HEARING PROTECTION, AT ALL TIMES IN THE VICINITY OF THEIR USE. ALWAYS FOLLOW BAND SAW MACHINE MANUFACTURERS' RECOMMENDATIONS.**

# A Change to M. K. Morse Band Saw Part Numbers

The M. K. Morse Company has begun using 10-digit numeric band saw blade part numbers rather than alpha-numeric part numbers.

The first 6-digits of the part number identifies the material and size specifications. The last 4-digits identifies the length of the blade for both weld-to-length bands and coil stock.

The following band saw blade part number reference chart provides the same details we have in-house to configure the new part numbers. Customer Service at M. K. Morse will be able to assist all band saw blade distributors with any cross referencing needed. We are providing this information so that our distributors are informed and have all available information. If you have any questions, please contact your M. K. Morse Customer Service Representative.

1st & 2nd Digits		MATERIAL / TOOTH SET STYLE	3rd & 4th Digits	BLADE WIDTH	5th & 6th Digits	TOOTH COUNT
Part #	Material Type	Set Style	Part #	Width & Thickness	Part #	TPI
00	M42	Positive, 6° Rake	10	.25 x .014	00	Carbide Grit
10	HEF	Hook Raker Set - Special Extra Heavy Set	11	.375 x .014	01	1
11	HEF	Hook - Heavy Set	20	.25 x .020	02	2
13	HEF	Hook - Double Set Raker	21	.50 x .020	03	3
14	HEF	Wavy	30	.125 x .025	04	4
15	HEF	Skip	31	.1875 x .025	06	6
16	HEF	Raker or Variable Pitch	32	.25 x .025	08	8
17	HEF	Quik Silver	33	.375 x .025	10	10
18	HEF	Hook	34	.50 x .025	12	12
19	HEF	Hook ETS	40	.25 x .032	13	10 / 14
20	HEF	Bright	41	.375 x .032	14	14
30	Matrix II	Positive Rake	42	.50 x .032	16	14 / 18
31	Matrix II	Positive Rake - Heavy Set	43	.625 x .032	18	18
33	Matrix II	0° Rake - Heavy Set	44	.75 x .032	22	20 / 24
34	Matrix II	Wavy	50	.25 x .035	23	2 / 3
36	Matrix II	Raker or Variable Pitch	51	.375 x .035	24	24
38	Matrix II	Hook	52	.50 x .035	32	32
39	Matrix II	0° Rake	53	.625 x .035	34	3 / 4
40	M42	Positive Rake	54	.75 x .035	46	4 / 6
41	Achiever	10° Positive Rake	55	1 x .035	57	5 / 7
42	M42	0° Rake	56	1.25 x .035	58	5 / 8
43	Achiever	0° Rake	57	2 x .035	68	6 / 10
44	M42	Wavy	60	1 x .042	81	8 / 12
45	M42	Straight Pitch - Heavy Set	61	1.25 x .042	91	.75 / 1.10
46	M42	Raker or Variable Pitch	62	2 x .042	92	1.4 / 2.5
47	Achiever	Variable, 6° Rake	70	1.25 x .045	93	1.3
48	M42	Hook	71	1.5 x .045	94	1.14
49	Achiever	Heavy Set	80	.75 x .050	95	1.15
50	Independence	Variable	81	1.5 x .050	96	1.1 / 1.5
51	Independence II	Heavy Set	82	2 x .050	97	1 / 1.5
55	Independence II	Variable	90	2 x .063	98	1.5 / 2.0
57	Independence EXS	Variable	91	2.625 x .063		
60	Hard Back Carbon	Hook Raker Set - Special Extra Heavy Set	92	3 x .063		
61	Hard Back Carbon	Hook - Heavy Set				
63	Hard Back Carbon	Hook - Double Set Raker				
64	Hard Back Carbon	Wavy				
65	Hard Back Carbon	Skip				
66	Hard Back Carbon	Raker or Variable Pitch				
67	Hard Back Carbon	Quik Silver				
68	Hard Back Carbon	Hook				
70	Tun. Carbide Grit - Continuous	Medium				
71	Tun. Carbide Grit - Continuous	Medium Coarse				
72	Tun. Carbide Grit - Continuous	Coarse				
73	Tun. Carbide Grit - Gulleted	Medium				
74	Tun. Carbide Grit - Gulleted	Medium Coarse				
75	Tun. Carbide Grit - Gulleted	Coarse				
80	M-FACTOR - Carbide Tipped	Aluminum Foundry				
81	M-FACTOR - Carbide Tipped	Case Hardened				
82	M-FACTOR - Carbide Tipped	General Purpose				
91	Challenger Structural	Positive Rake				
92	Challenger Structural	Heavy Set				

7th, 8th & 9th Digits		BAND LENGTH
Number of feet multiplied by 12 plus additional inches. (Unless using Coil Stock. <b>Coil Length</b> (in feet) + C)		
10th Digit	FRACTION OF INCH / MILLIMETER	
Part #	Inch Length	Part # Millimeter Length
0	Even Length	0 Even Length
1	1/8"	1 3
2	1/4"	2 6.4
3	3/8"	3 9.5
4	1/2"	4 12.7
5	5/8"	5 16
6	3/4"	6 19
7	7/8"	7 22
C	Coil Stock	C Coil Stock
7th, 8th & 9th Digit	METRIC BAND LENGTH	
Number of millimeters multiplied by .03937 equals total number of inches. (Unless using Coil Stock. <b>Coil Length</b> (in feet) + C)		

<b>EXAMPLE 1</b>	<b>PREVIOUS PART #ZWEN635C23HP</b>
<b>Therefore:</b> Independence	2.625 x .063 2/3 100' Coil
<b>Is shown as:</b>	50 91 23 100C
<b>NEW PART #</b>	509123100C
<b>EXAMPLE 2</b>	<b>PREVIOUS PART #ZWEFH02M42HS</b>
<b>Therefore:</b> M42 Straight Pitch Heavy Set	3/4 x .035 2 35' 8-1/2" For 1/2" aka 4/8", thus 4
<b>Is shown as:</b>	45 54 02 428
<b>NEW PART #</b>	4554024284

## The M. K. Morse Company Warranty

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The M. K. Morse Company warrants each new product manufactured and sold by it or one of its authorized distributors only against defects in workmanship and/or materials under normal service, proper installation and use. THIS WARRANTY IS LIMITED TO REPAIR OR REPLACEMENT OF VERIFIED DEFECTIVE PRODUCTS AND EXCLUDES ANY AND ALL IMPLIED WARRANTY OF MERCHANTABILITY AND ALL RISK AND LIABILITY WHATSOEVER RESULTING FROM ANY USE OF SAID PRODUCTS, INCLUDING INCIDENTAL AND CONSEQUENTIAL DAMAGES. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE THEREOF. The provisions of this warranty and limitation of liability shall not be modified in any respect except by written document signed by an officer of The M. K. Morse Company.

## Trial Band Saw Blades From M. K. Morse

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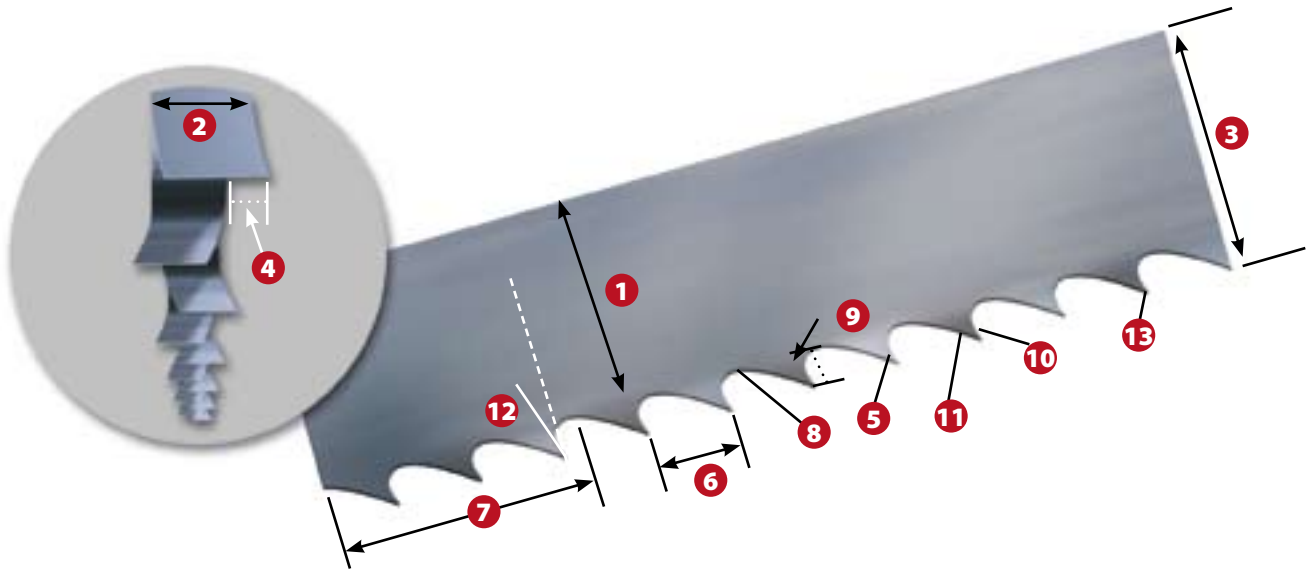
The M. K. Morse Company will provide bi-metal and carbon weld-to-length blades on a "Guaranteed Billed Trial Blade Basis" for the purpose of user evaluation of performance. If the blade recommended by Morse or approved by Morse for the particular application, fails to perform satisfactorily for the user, Morse will issue a full credit for the invoice value of the blade upon the return of the blade to Morse.

In all instances where Morse provides bi-metal and carbon welded-to-length band saw blades for trial and evaluation, the Morse sales representative will provide follow-up.

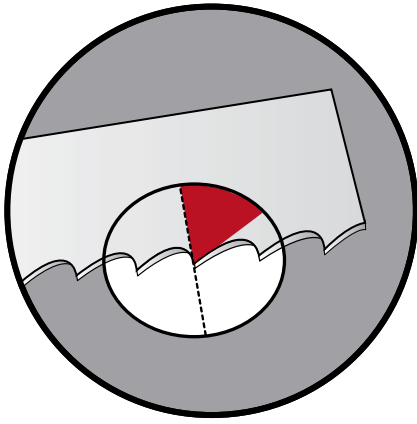
Morse is confident in the ability of our blades to meet the end users expectations for performance.

## **Anatomy of a Saw Blade**

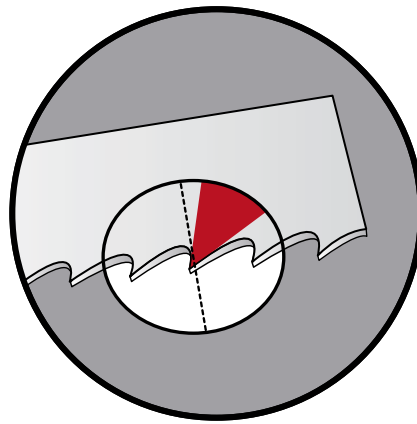
Although it looks like a flat piece of metal with teeth, a quality industrial band saw blade is actually a sophisticated cutting tool. Its ability to efficiently cut through tough metals, composite materials, plastics, and woods depends on a variety of interrelated factors such as the design, spacing and set of the teeth; the design and capacity of the gullets to make sure chips are efficiently removed; the composition of the backer strip; and the gage of the metal. These considerations must be taken into account when selecting the right blade for your application. The following Technical Pages will help you arrive at the perfect Morse solution to your particular cutting problem.



- 1 Blade Back** .....The body of the blade not including tooth portion
- 2 Gage** .....The thickness of the blade
- 3 Width** .....The tip of tooth to back of blade
- 4 Set** .....The bending of teeth right or left
- 5 Tooth**.....The cutting portion of the saw blade
- 6 Tooth Pitch** .....The distance from one tooth tip to the next
- 7 T.P.I.**.....The number of teeth per inch measured gullet to gullet
- 8 Gullet** .....The curved area between the tooth points
- 9 Gullet Depth** .....The distance from the tooth tip to the bottom of the gullet
- 10 Tooth Face** .....The surface of the tooth on which the chip is formed
- 11 Tooth Flank**.....The angled back surface of the tooth opposite the tooth face
- 12 Tooth Rake Angle** ....The angle of the tooth face measured with respect to a line perpendicular to the cutting direction of the saw
- 13 Tooth Tip**.....The cutting edge of the saw tooth



**Standard (0° Rake)**



**Hook (Positive Rake)**

Here's where the blade makes the cut. The tooth design variables include shape, position, set, type and spacing. The combination of these variables will determine whether the blade can move easily through your material without binding or becoming clogged with chips.

**Raker**



Recurring sequence of teeth - one set right, one set left, and one unset.

**Modified Raker (double set raker)**



Recurring sequence set left, right, left, right, straight tooth pattern.

**Variable Pitch Modified Raker (D-Double set raker)**



Set sequence depends on the number of teeth in the variable pitch tooth pattern.  
Recurring sequence with more than two set teeth before an unset tooth.

**Wavy**



Groups of teeth, usually 3 or 4, set to each side in a controlled pattern with an unset tooth between groups.

**Alternate (ETS)**



Every tooth set alternately to the left and right.

## Band Saw Tooth Pitches

### Variable Pitch

- Varying gullet depth
- 0° Rake angle
- Variable tooth spacing

#### Advantages

- Excellent chip carrying capacity
- Reduces harmonic vibration

#### Benefits

- Improves blade life
- Reduces noise
- Cuts smoother & more efficiently



### Variable Pitch Positive Rake

- Varying gullet depth
- Variable tooth spacing
- Positive rake angle

#### Advantages

- Better chip formation
- Excellent chip carrying capacity
- Reduces harmonic vibration
- More aggressive cutting

#### Benefits

- Cuts smoother, cuts faster
- Wide range of applications
- Reduces noise
- Easier chip generation



### Standard Raker

- Equally spaced teeth
- 0° Rake angle

#### Advantages

- Excellent chip carrying capacity

#### Benefits

- General purpose



### Skip

- Wide flat gullets
- 0° Rake angle
- Equally spaced teeth

#### Advantages

- Excellent chip carrying capacity
- Provide coarse pitch on narrow bands
- Flat gullets

#### Benefits

- Excellent cutting for non-metallic & non-ferrous applications, (wood, plastic, brass, copper, bronze & aluminum)
- Help break "stringy" chips



### Hook

- Wide rounded gullets
- Equally spaced teeth
- Positive rake angle

#### Advantages

- Excellent chip carrying in non-metallic applications
- Positive rake provides better tip penetration with less feed pressure

#### Benefits


- Good cutting performance in discontinuous chip forming materials (cast iron)
- Fast cutting with good surface finish




# Tooth Selection Guide (teeth per inch)

Band saw tooth size (Teeth Per Inch) is determined by the size and type of material to be cut and the desired finish. To select T.P.I. using this chart, find the colored chart for the type of material you wish to cut. Move up to the correct material size next to the chart. Follow across to the chart for the appropriate T.P.I. for your blade.

Material Size (Inches)	Teeth Per Inch	Material Size (Metric)	Wall Thickness (Inches)	Teeth Per Inch	Wall Thickness (Metric)
0		0	1/16	10/14	1.8
.1	14/18	2.5	1/8	8/12	3.2
.2	10/14	5.1	3/16	6/10	4.8
.3	8/12	7.6	1/4	5/8	6.3
.4	8/12	10.2	5/16	5/8	7.9
.5	6/10	12.7	3/8	4/6	9.5
.6	6/10	15.0	7/16	4/6	11.0
.7	5/8	17.8	1/2	4/6	12.7
.8	5/8	20.0	9/16	4/6	14.3
.9	5/8	22.9	5/8	3/4	15.8
1	5/8	25.4	11/16	3/4	17.5
1-1/4	4/6	31.8	3/4	3/4	19.0
1-1/2	4/6	38.1	13/16	3/4	20.6
1-3/4	4/6	44.5	7/8	2/3	22.0
2	4/6	50.8	15/16	2/3	23.8
2-1/4	3/4	57.2	1	2/3	25.4
2-1/2	3/4	63.5	1-1/8	2/3	28.6
2-3/4	3/4	69.9	1-1/4	2/3	32.0
3	3/4	76.2	1-3/8	2/3	35.0
3-1/4	3/4	82.6	1-1/2	2/3	38.0
3-1/2	3/4	88.9			
3-3/4	3/4	95.3			
4	3/4	101.6			
5	2/3	127.0			
6	2/3	152.4			
7	2/3	177.8			
8	2/3	203.0			
9	1.4/2.5	228.6			
10	1.4/2.5	254.0			
15	1/1.5	381.0			
30	1/1.5	762			

 **Rectangular Solids:**  
(Use Width)

 **Round Solids:**  
(Use Diameter)

  
**Pipe Tubing Structurals**  
(Use Wall Thickness)

**Cutting speed - structurals rule of thumb:**  
When cutting structurals use a cutting speed of  
250-325 S.F.M. Wet • 200-250 S.F.M. Dry

**For use with Bi-Metal Blades\***

TYPE OF MATERIAL	UNDER 1"		1" TO 3"		3" TO 6"		6" - OVER	
	Blade Speed (SFM)	Removal Rate (in <sup>2</sup> /min.)	Blade Speed (SFM)	Removal Rate (in <sup>2</sup> /min.)	Blade Speed (SFM)	Removal Rate (in <sup>2</sup> /min.)	Blade Speed (SFM)	Removal Rate (in <sup>2</sup> /min.)
<b>STRUCTURAL STEEL SHAPES</b>								
A36, A242, A662	300		280		260		240	
<b>CARBON STEEL</b>								
1005 - 1013	310	8 - 12	290	10 - 15	270	13 - 18	250	11 - 16
1015 - 1035	300	9 - 13	280	13 - 17	260	15 - 20	250	11 - 17
1040 - 1059	240	5 - 7	230	6 - 8	205	8 - 11	190	7 - 10
1060 - 1080	220	4 - 7	205	7 - 8	195	8 - 11	160	7 - 9
1084 - 1095	200	3 - 6	190	5 - 7	180	6 - 8	130	5 - 8
<b>FREE MACHINING STEEL</b>								
1110	310	9 - 12	280	11 - 15	280	15 - 18	240	12 - 15
1117 - 1118	300	9 - 13	270	11 - 16	270	14 - 19	230	12 - 17
1137 - 1151	260	6 - 8	230	7 - 10	220	10 - 13	190	8 - 12
1211 - 1215	310	9 - 12	290	11 - 15	270	14 - 19	250	13 - 17
<b>MANGANESE STEEL</b>								
1330 - 1345	260	4 - 7	240	6 - 8	215	8 - 11	195	6 - 9
1513 - 1536	300	11 - 13	280	14 - 15	260	16 - 18	240	12 - 17
1541 - 1572	245	4 - 7	230	6 - 8	200	9 - 11	175	8 - 10
<b>MOLYBDENUM STEEL</b>								
4012 - 4024	250	4 - 7	230	6 - 8	200	8 - 11	175	6 - 10
4027 - 4037	240	4 - 7	230	6 - 9	190	8 - 11	170	6 - 10
4042 - 4047	220	4 - 6	210	5 - 7	170	6 - 9	150	5 - 8
<b>CHROME MOLY STEEL</b>								
4118 - 4130	230	5 - 9	220	7 - 11	200	9 - 13	180	8 - 12
4135 - 4142	220	4 - 7	210	6 - 9	190	9 - 13	170	8 - 12
4145 - 4161	200	2 - 6	180	5 - 8	180	6 - 10	160	5 - 8
<b>NICKEL CHROME MOLY STEEL</b>								
4317 - 4320	210	4 - 6	190	5 - 8	170	6 - 9	150	5 - 8
4337 - 4340	200	4 - 6	180	4 - 7	160	5 - 8	140	4 - 7
4718 - 4720	275	4 - 7	270	6 - 8	245	7 - 10	220	5 - 8
8615 - 8627	210	4 - 6	190	5 - 7	170	6 - 8	150	4 - 7
8630 - 8645	210	3 - 5	190	4 - 6	170	5 - 7	150	4 - 6
8647 - 8660	210	2 - 4	190	3 - 5	170	4 - 6	150	3 - 5
8715 - 8750	210	3 - 6	190	5 - 8	170	6 - 8	150	4 - 7
9310 - 9317	190	2 - 4	160	3 - 5	150	3 - 5	130	2 - 4
9437 - 9445	210	4 - 6	190	5 - 7	170	5 - 8	150	4 - 7
9747 - 9763	210	3 - 5	190	4 - 6	170	4 - 7	150	3 - 6
9840 - 9850	210	4 - 7	190	5 - 8	170	6 - 9	150	4 - 8
<b>NICKEL MOLY STEEL</b>								
4615 - 4626	220	4 - 7	200	5 - 8	180	6 - 9	160	5 - 8
4815 - 4820	210	3 - 6	190	3 - 6	170	4 - 6	140	4 - 6
<b>CHROMIUM STEEL</b>								
5045 - 5046	210	5 - 8	190	6 - 9	170	8 - 11	150	7 - 10
5120 - 5135	230	4 - 6	210	6 - 8	180	7 - 10	160	5 - 9
5140 - 5160	210	4 - 6	190	4 - 6	170	5 - 7	150	4 - 6
50100 - 52100	175	3 - 5	140	4 - 6	130	5 - 7	110	4 - 6
<b>CHROME VANADIUM STEEL</b>								
6118	230	4 - 6	210	5 - 8	190	6 - 9	170	5 - 8
6150	210	3 - 5	190	4 - 7	170	5 - 8	150	4 - 7
<b>SILICON STEEL</b>								
9254 - 9260	210	3 - 5	190	4 - 6	190	4 - 8	160	3 - 7
<b>COLD WORK DIE STEEL</b>								
A2, A3, A6	210	2 - 4	190	3 - 5	190	3 - 6	160	2 - 4
A7	170	2 - 4	160	4 - 5	150	3 - 6	125	2 - 4
D2, D3, D4	135	1 - 3	115	2 - 4	120	2 - 4	80	2 - 3
D7	110	1 - 3	90	1 - 3	80	2 - 3	60	1 - 3
O1, O2	240	3 - 6	230	4 - 7	200	5 - 8	180	4 - 7
O6, O7	230	4 - 7	220	5 - 8	200	6 - 9	160	5 - 8
<b>HOT WORK STEEL</b>								
H12, H13, H21	235	3 - 6	200	4 - 6	190	4 - 7	170	3 - 6
H22, H24, H25	190	2 - 4	175	2 - 5	160	3 - 6	135	2 - 4
<b>SHOCK RESISTANT STEEL</b>								
S1	230	3 - 6	210	4 - 6	200	4 - 7	160	3 - 6
S2, S5	180	2 - 4	165	3 - 5	150	3 - 6	120	2 - 4



For use with Bi-Metal Blades*								
TYPE OF MATERIAL	UNDER 1"		1" TO 3"		3" TO 6"		6" - OVER	
	Blade Speed (SFM)	Removal Rate (in <sup>2</sup> /min.)	Blade Speed (SFM)	Removal Rate (in <sup>2</sup> /min.)	Blade Speed (SFM)	Removal Rate (in <sup>2</sup> /min.)	Blade Speed (SFM)	Removal Rate (in <sup>2</sup> /min.)
<b>SPECIAL PURPOSE STEEL</b>								
L2, L6	210	3 - 5	210	4 - 7	190	5 - 8	175	4 - 7
L7	200	3 - 5	190	4 - 6	180	4 - 7	130	3 - 6
<b>WATER HARDENING STEEL</b>								
W1	265	3 - 6	240	5 - 7	220	5 - 7	180	3 - 5
<b>HIGH SPEED STEEL</b>								
M1, M2, M7	165	2 - 4	150	2 - 5	145	3 - 6	100	3 - 5
M3, M4, M10	125	2 - 4	100	2 - 5	100	3 - 5	80	3 - 4
M30, M33	100	1 - 3	90	2 - 3	75	2 - 3	70	1 - 3
M41, M42, M43	100	1 - 3	90	1 - 3	75	1 - 4	70	1 - 3
T1, T2	150	2 - 4	135	2 - 4	120	2 - 5	100	2 - 4
T4, T5, T6	125	1 - 3	110	1 - 4	100	2 - 4	85	1 - 3
T15, M15	90	1 - 3	70	1 - 3	60	1 - 3	50	1 - 2
<b>AUSTENITIC STAINLESS STEEL</b>								
201, 202, 301 - 304	135	3 - 4	120	2 - 5	120	3 - 6	85	2 - 4
303, 303F, 303Se	160	3 - 6	140	3 - 6	135	4 - 6	90	3 - 5
305, 308 - 314	100	1 - 2	85	1 - 2	75	1 - 3	65	1 - 2
316, 317, 329	100	1 - 2	90	1 - 2	80	1 - 3	60	1 - 2
321, 347, 348	140	2 - 4	125	2 - 5	120	3 - 6	90	2 - 4
330	85	1 - 2	65	1 - 3	55	1 - 4	45	1 - 2
<b>FERRITIC STAINLESS STEEL</b>								
429, 430	120	2 - 4	100	3 - 4	90	3 - 6	75	2 - 4
430F, 430FSe	130	3 - 5	115	5 - 6	100	5 - 7	90	4 - 6
434, 436	100	2 - 4	80	3 - 4	75	3 - 5	55	3 - 4
442	110	2 - 4	85	3 - 5	75	3 - 6	60	3 - 5
446	90	2 - 4	70	3 - 4	60	2 - 5	50	1 - 3
<b>MARTENSITIC STAINLESS</b>								
403, 410, 420	170	2 - 5	155	3 - 6	145	3 - 7	100	2 - 4
414, 416Se	235	5 - 9	210	6 - 9	195	7 - 11	170	5 - 9
420F, 416	220	3 - 8	200	5 - 9	190	6 - 10	150	4 - 8
440A, B, C	130	2 - 4	120	2 - 6	110	3 - 7	70	1 - 4
501, 502	135	1 - 2	120	2 - 4	100	3 - 4	80	2 - 3
<b>NICKEL BASED ALLOYS</b>								
Monel	100	1 - 4	90	1 - 4	85	2 - 4	65	1 - 3
K-Monel	115	1 - 4	90	1 - 4	70	2 - 4	50	1 - 2
R-Monel	130	2 - 4	100	2 - 5	90	3 - 5	60	1 - 4
K-R Monel	115	1 - 4	100	1 - 4	100	2 - 5	65	1 - 3
Inconel	105	2 - 4	90	2 - 4	75	2 - 3	50	1 - 2
Inconel 625-x-750	95	1 - 2	80	1 - 2	70	1 - 2	40	1
Inconel 718	95	1 - 2	80	1 - 2	70	1 - 2	40	1
Incoloy 800 - 802	95	1 - 2	75	1 - 2	60	1 - 2	35	1
Incoloy 804 - 825	60	1	40	1 - 2	40	1 - 2	30	1
Waspalloy	100	1	90	1 - 2	70	1 - 2	50	1
Hastelloy A	130	2 - 3	110	3 - 4	100	4 - 6	70	1 - 3
Hastelloy B	110	1 - 2	80	1 - 3	75	1 - 4	60	1 - 2
Hastelloy C	100	1 - 2	90	1 - 2	80	1 - 2	65	1
Rene 41	90	1	80	1 - 2	60	1 - 2	50	1
Udimet 500	95	1	80	1 - 2	70	1 - 2	60	1
<b>TITANIUM</b>								
6AL 4V	65	.5-1	50	1 - 2	50	1 - 2	40	.5 - 1
<b>MARAGING STEEL</b>								
Most	190	3 - 4	145	4 - 6	110	6 - 7	90	4 - 6
<b>BRONZE</b>								
Most	230	6 - 9	205	10 - 12	180	10 - 12	140	7 - 9
Aluminum Bronze	100	2 - 4	95	3 - 4	85	3 - 5	70	3 - 4
<b>ALUMINUM</b>								
Most	800		700		600		500	
<b>CAST IRON</b>								
Class 20	210	9 - 12	200	11 - 15	180	11 - 15	160	10 - 14
Class 40	170	7 - 9	160	7 - 10	140	8 - 12	120	7 - 11
Ductile 60-40-18, 150 HB	240	6 - 8	230	8 - 10	230	8 - 10	220	6 - 7
Ductile 80-55-06, 225 HB	140	3 - 4	130	4 - 5	120	5 - 7	110	3 - 5

\*Reduce speeds by 50% for carbon blades. For carbide tipped blades, ask your Morse sales contact.

# Cut Time Calculator

The following chart will help you determine how long a cut will take by cross referencing the bar size to be cut with the removal rate being used.

Removal Rate - Square Inches Per Minute																			
Bar Dia.	Bar Area, In <sup>2</sup>	1 in <sup>2</sup> /min	2 in <sup>2</sup> /min	3 in <sup>2</sup> /min	4 in <sup>2</sup> /min	5 in <sup>2</sup> /min	6 in <sup>2</sup> /min	7 in <sup>2</sup> /min	8 in <sup>2</sup> /min	9 in <sup>2</sup> /min	10 in <sup>2</sup> /min	11 in <sup>2</sup> /min	12 in <sup>2</sup> /min	13 in <sup>2</sup> /min	14 in <sup>2</sup> /min	15 in <sup>2</sup> /min	16 in <sup>2</sup> /min	17 in <sup>2</sup> /min	18 in <sup>2</sup> /min
Minutes Per Cut																			
1.00	0.79	.79	.39	.26	.20	.16	.13	.11	.10	.09	.08	.07	.07	.06	.06	.05	.05	.05	.04
1.25	1.23	1.2	.61	.41	.31	.25	.20	.18	.15	.14	.12	.11	.10	.09	.09	.08	.08	.07	.07
1.50	1.77	1.8	.88	.59	.44	.35	.29	.25	.22	.20	.18	.16	.15	.14	.13	.12	.11	.10	.10
1.75	2.41	2.4	1.2	.80	.60	.48	.40	.34	.30	.27	.24	.22	.20	.19	.17	.16	.15	.14	.13
2.00	3.14	3.1	1.6	1.0	.79	.63	.52	.45	.39	.35	.31	.29	.26	.24	.22	.21	.20	.18	.17
2.25	3.98	4.0	2.0	1.3	1.0	.80	.66	.57	.50	.44	.40	.36	.33	.31	.28	.27	.25	.23	.22
2.50	4.91	4.9	2.5	1.6	1.2	1.0	.82	.70	.61	.55	.49	.45	.41	.38	.35	.33	.31	.29	.27
2.75	5.94	5.9	3.0	2.0	1.5	1.2	1.0	.85	.74	.66	.59	.54	.49	.46	.42	.40	.37	.35	.33
3.00	7.07	7.1	3.5	2.4	1.8	1.4	1.2	1.0	.88	.79	.71	.64	.59	.54	.50	.47	.44	.42	.39
3.25	8.30	8.3	4.1	2.8	2.1	1.7	1.4	1.2	1.0	.92	.83	.75	.69	.64	.59	.55	.52	.49	.46
3.50	9.62	9.6	4.8	3.2	2.4	1.9	1.6	1.4	1.2	1.1	1.0	.87	.80	.74	.69	.64	.60	.57	.53
3.75	11.04	11.0	5.5	3.7	2.8	2.2	1.8	1.6	1.4	1.2	1.1	1.0	.92	.85	.79	.74	.69	.65	.61
4.00	12.57	12.6	6.3	4.2	3.1	2.5	2.1	1.8	1.6	1.4	1.3	1.1	1.0	1.0	.90	.84	.79	.74	.70
4.25	14.19	14.2	7.1	4.7	3.5	2.8	2.4	2.0	1.8	1.6	1.4	1.3	1.2	1.1	1.0	.95	.89	.83	.79
4.50	15.90	15.9	8.0	5.3	4.0	3.2	2.7	2.3	2.0	1.8	1.6	1.4	1.3	1.2	1.1	1.1	1.0	.94	.88
4.75	17.72	17.7	8.9	5.9	4.4	3.5	3.0	2.5	2.2	2.0	1.8	1.6	1.5	1.4	1.3	1.2	1.1	1.0	1.0
5.00	19.64	19.6	9.8	6.5	4.9	3.9	3.3	2.8	2.5	2.2	2.0	1.8	1.6	1.5	1.4	1.3	1.2	1.2	1.1
5.25	21.65	21.6	10.8	7.2	5.4	4.3	3.6	3.1	2.7	2.4	2.2	2.0	1.8	1.7	1.5	1.4	1.4	1.3	1.2
5.50	23.76	23.8	11.9	7.9	5.9	4.8	4.0	3.4	3.0	2.6	2.4	2.2	2.0	1.8	1.7	1.6	1.5	1.4	1.3
5.75	25.97	26.0	13.0	8.7	6.5	5.2	4.3	3.7	3.2	2.9	2.6	2.4	2.2	2.0	1.9	1.7	1.6	1.5	1.4
6.00	28.27	28.3	14.1	9.4	7.1	5.7	4.7	4.0	3.5	3.1	2.8	2.6	2.4	2.2	2.0	1.9	1.8	1.7	1.6
6.25	30.68	30.7	15.3	10.2	7.7	6.1	5.1	4.4	3.8	3.4	3.1	2.8	2.6	2.4	2.2	2.0	1.9	1.8	1.7
6.50	33.18	33.2	16.6	11.1	8.3	6.6	5.5	4.7	4.1	3.7	3.3	3.0	2.8	2.6	2.4	2.2	2.1	2.0	1.8
6.75	35.78	35.8	17.9	11.9	8.9	7.2	6.0	5.1	4.5	4.0	3.6	3.3	3.0	2.8	2.6	2.4	2.2	2.1	2.0
7.00	38.48	38.5	19.2	12.8	9.6	7.7	6.4	5.5	4.8	4.3	3.8	3.5	3.2	3.0	2.7	2.6	2.4	2.3	2.1
7.25	41.28	41.3	20.6	13.8	10.3	8.3	6.9	5.9	5.2	4.6	4.1	3.8	3.4	3.2	2.9	2.8	2.6	2.4	2.3
7.50	44.18	44.2	22.1	14.7	11.0	8.8	7.4	6.3	5.5	4.9	4.4	4.0	3.7	3.4	3.2	2.9	2.8	2.6	2.5
7.75	47.17	47.2	23.6	15.7	11.8	9.4	7.9	6.7	5.9	5.2	4.7	4.3	3.9	3.6	3.4	3.1	2.9	2.8	2.6
8.00	50.27	50.3	25.1	16.8	12.6	10.1	8.4	7.2	6.3	5.6	5.0	4.6	4.2	3.9	3.6	3.4	3.1	3.0	2.8
8.25	53.46	53.5	26.7	17.8	13.4	10.7	8.9	7.6	6.7	5.9	5.3	4.9	4.5	4.1	3.8	3.6	3.3	3.1	3.0
8.50	56.75	56.7	28.4	18.9	14.2	11.3	9.5	8.1	7.1	6.3	5.7	5.2	4.7	4.4	4.1	3.8	3.5	3.3	3.2
8.75	60.13	60.1	30.1	20.0	15.0	12.0	10.0	8.6	7.5	6.7	6.0	5.5	5.0	4.6	4.3	4.0	3.8	3.5	3.3
9.00	63.62	63.6	31.8	21.2	15.9	12.7	10.6	9.1	8.0	7.1	6.4	5.8	5.3	4.9	4.5	4.2	4.0	3.7	3.5
9.25	67.20	67.2	33.6	22.4	16.8	13.4	11.2	9.6	8.4	7.5	6.7	6.1	5.6	5.2	4.8	4.5	4.2	4.0	3.7
9.50	70.88	70.9	35.4	23.6	17.7	14.2	11.8	10.1	8.9	7.9	7.1	6.4	5.9	5.5	5.1	4.7	4.4	4.2	3.9
9.75	74.66	74.7	37.3	24.9	18.7	14.9	12.4	10.7	9.3	8.3	7.5	6.8	6.2	5.7	5.3	5.0	4.7	4.4	4.1
10.00	78.54	78.5	39.3	26.2	19.6	15.7	13.1	11.2	9.8	8.7	7.9	7.1	6.5	6.0	5.6	5.2	4.9	4.6	4.4

## Minimum Cut Radius Per Blade Width

The minimum radius that can be cut with a blade width is most often used for die block cutting and wood cutting.

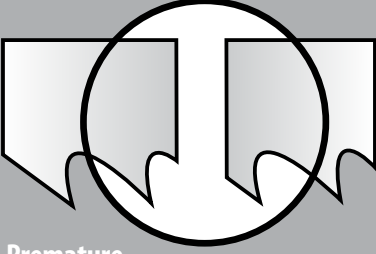
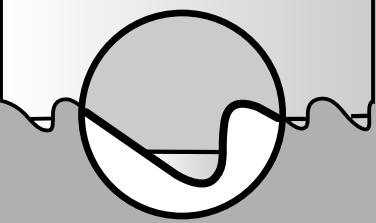
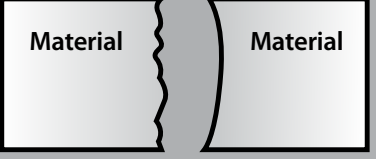
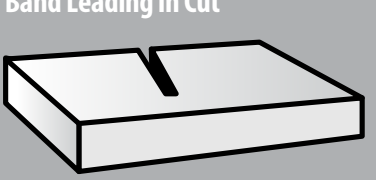



### Minimum radius cut for a given blade width

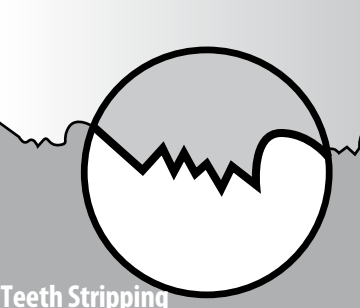
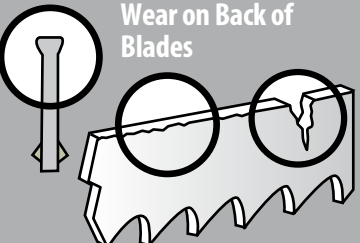
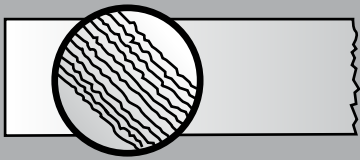
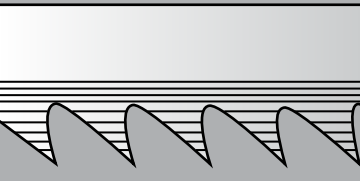

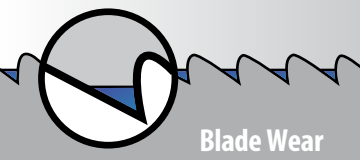
Blade Width	Minimum Radius	Materials Thickness 1"/25mm
1"/25mm	7-1/4"/184mm	
3/4"/19mm	5-7/16"/138mm	
5/8"/16mm	3-3/4"/95mm	
1/2"/13mm	2-1/2"/63mm	
3/8"/10mm	1-1/4"/32mm	
1/4"/6mm	5/8"/16mm	
3/16"/5mm	3/8"/10mm	
1/8"/3mm	7/32"/5.5mm	

## Using Metal Chips to Troubleshoot

You can improve the productivity of your metal cutting operation by paying close attention to the chips made by the blade cutting through metal. This chart shows some of the common problems that can be discovered and solved by paying attention to chips

Chip Form	Chip Condition	Chip Color	Blade Speed	Blade Feed Rate	Other
	Thick, Hard and Short	Blue or Brown	Decrease ↓	Decrease ↓	Check Cutting Fluid & Mix
	Thin and Curled	Silver	Suitable ✓	Suitable ✓	
	Powder	Silver	Decrease ↓	Increase ↑	
	Thin and Tightly Curled	Silver	Suitable ✓	Decrease ↓	Check Tooth Pitch

Problem	Problem Cause	Solution
 <p><b>Premature Blade Breakage</b> Straight Break indicates fatigue</p>	<ul style="list-style-type: none"> <li>• Incorrect blade - teeth too coarse</li> <li>• Blade tension too high</li> <li>• Side guides too tight</li> <li>• Damaged or misadjusted blade guides</li> <li>• Excessive feed</li> <li>• Incorrect cutting fluid</li> <li>• Wheel diameter too small for blade</li> <li>• Blade rubbing on wheel flanges</li> <li>• Teeth in contact with work before starting saw</li> <li>• Incorrect blade speed</li> </ul>	<ul style="list-style-type: none"> <li>• Use finer tooth pitch</li> <li>• Reduce blade tension (see machine manual)</li> <li>• Check side guide clearance (see machine manual)</li> <li>• Check all guides for alignment/damage</li> <li>• Reduce feed pressure</li> <li>• Check coolant</li> <li>• Use thinner blade</li> <li>• Adjust wheel alignment</li> <li>• Allow 1/2" clearance before starting cut</li> <li>• Increase or decrease blade speed</li> </ul>
 <p><b>Premature Dulling of Teeth</b></p>	<ul style="list-style-type: none"> <li>• Teeth pointing in wrong direction / blade mounted backwards</li> <li>• Improper or no blade break-in</li> <li>• Hard spots in material</li> <li>• Material work hardened</li> <li>• Improper coolant</li> <li>• Improper coolant concentration</li> <li>• Speed too high</li> <li>• Feed too light</li> <li>• Teeth too small</li> </ul>	<ul style="list-style-type: none"> <li>• Install blade correctly. If teeth are facing the wrong direction, flip blade inside out</li> <li>• Break in blade properly (Page 17)</li> <li>• Check for hardness or hard spots like scale or flame cut areas</li> <li>• Increase feed pressure</li> <li>• Check coolant type</li> <li>• Check coolant mixture</li> <li>• Check recommended blade speed (Page 24-25)</li> <li>• Increase feed pressure</li> <li>• Increase tooth size</li> </ul>
 <p><b>Inaccurate Cut</b></p>	<ul style="list-style-type: none"> <li>• Tooth set damage</li> <li>• Excessive feed pressure</li> <li>• Improper tooth size</li> <li>• Cutting fluid not applied evenly</li> <li>• Guides worn or loose</li> <li>• Insufficient blade tension</li> </ul>	<ul style="list-style-type: none"> <li>• Check for worn set on one side of blade</li> <li>• Reduce feed pressure</li> <li>• Check tooth size chart (Page 23)</li> <li>• Check coolant nozzles</li> <li>• Tighten or replace guides, check for proper alignment</li> <li>• Adjust to recommended tension</li> </ul>
 <p><b>Band Leading in Cut</b></p>	<ul style="list-style-type: none"> <li>• Over-feed</li> <li>• Insufficient blade tension</li> <li>• Tooth set damage</li> <li>• Guide arms loose or set too far apart</li> <li>• Chips not being cleaned from gullets</li> <li>• Teeth too small</li> </ul>	<ul style="list-style-type: none"> <li>• Reduce feed force</li> <li>• Adjust recommended tension</li> <li>• Check material for hard inclusions</li> <li>• Position arms as close to work as possible. Tighten arms.</li> <li>• Check chip brush</li> <li>• Increase tooth size</li> </ul>
 <p><b>Chip Welding</b></p>	<ul style="list-style-type: none"> <li>• Insufficient coolant flow</li> <li>• Wrong coolant concentration</li> <li>• Excessive speed and/or pressure</li> <li>• Tooth size too small</li> <li>• Chip brush not working</li> </ul>	<ul style="list-style-type: none"> <li>• Check coolant level and flow</li> <li>• Check coolant ratio</li> <li>• Reduce speed and/or pressure</li> <li>• Use coarser tooth pitch</li> <li>• Repair or replace chip brush</li> </ul>
 <p><b>Teeth Fracture</b> Back of tooth indicates work spinning in clamps</p>	<ul style="list-style-type: none"> <li>• Incorrect speed and/or feed</li> <li>• Incorrect blade pitch</li> <li>• Saw guides not adjusted properly</li> <li>• Chip brush not working</li> <li>• Work spinning or moving in vise</li> </ul>	<ul style="list-style-type: none"> <li>• Check cutting chart (Page 24-25)</li> <li>• Check tooth size chart (Page 23)</li> <li>• Adjust or replace saw guides</li> <li>• Repair or replace chip brush</li> <li>• Check bundle configuration/adjust vise pressure</li> </ul>
 <p><b>Irregular Break</b> Indicates material movement</p>	<ul style="list-style-type: none"> <li>• Indexing out of sequence</li> <li>• Material loose in vise</li> </ul>	<ul style="list-style-type: none"> <li>• Check proper machine movement</li> <li>• Check vise or clamp</li> </ul>

<b>Problem</b>	<b>Problem Cause</b>	<b>Solution</b>
 <p><b>Teeth Stripping</b></p>	<ul style="list-style-type: none"> <li>• Feed pressure too high</li> <li>• Tooth stuck in cut</li> <li>• Improper or insufficient coolant</li> <li>• Incorrect tooth size</li> <li>• Hard spots in material</li> <li>• Work spinning in vise - loose nest or bundle</li> <li>• Blade speed too slow</li> <li>• Blade teeth running backwards</li> <li>• Chip brush not working</li> </ul>	<ul style="list-style-type: none"> <li>• Reduce feed pressure</li> <li>• Do not enter old cut with a new blade</li> <li>• Check coolant flow and concentration</li> <li>• Check tooth size chart (Page 23)</li> <li>• Check material for hard inclusions</li> <li>• Check clamping pressure - be sure work is held firmly</li> <li>• Increase blade speed - see cutting chart (Page 24-25)</li> <li>• Reverse blade (turn inside out)</li> <li>• Repair or replace chip brush</li> </ul>
 <p><b>Wear on Back of Blades</b></p>	<ul style="list-style-type: none"> <li>• Excessive feed pressure</li> <li>• Insufficient blade tension</li> <li>• Back-up guide roll frozen, damaged, or worn</li> <li>• Blade rubbing on wheel flange</li> </ul>	<ul style="list-style-type: none"> <li>• Decrease feed pressure</li> <li>• Increase blade tension and readjust guides</li> <li>• Repair or replace back-up roll or guide</li> <li>• Adjust wheel cant</li> </ul>
 <p><b>Rough Cut</b> Washboard surface Vibration and or chatter</p>	<ul style="list-style-type: none"> <li>• Dull or damaged blade</li> <li>• Incorrect speed or feed</li> <li>• Insufficient blade support</li> <li>• Incorrect tooth pitch</li> <li>• Insufficient coolant</li> </ul>	<ul style="list-style-type: none"> <li>• Replace with new blade</li> <li>• Increase speed or decrease feed</li> <li>• Move guide arms as close as possible to the work</li> <li>• Use finer pitch blade</li> <li>• Check coolant flow</li> </ul>
 <p><b>Wear Lines, Loss of Set</b></p>	<ul style="list-style-type: none"> <li>• Saw guide inserts or wheel flange are riding on teeth</li> <li>• Insufficient blade tension</li> <li>• Hard spots in material</li> <li>• Back-up guide worn</li> </ul>	<ul style="list-style-type: none"> <li>• Check machine manual for correct blade width</li> <li>• Tension blade properly</li> <li>• Check material for inclusions</li> <li>• Replace guide</li> </ul>
 <p><b>Twisted Blade Profile</b> Profile sawing</p>	<ul style="list-style-type: none"> <li>• Blade binding in cut</li> <li>• Side guides too tight</li> <li>• Radius too small for blade width</li> <li>• Work not firmly held</li> <li>• Erratic coolant flow</li> <li>• Excessive blade tension</li> </ul>	<ul style="list-style-type: none"> <li>• Decrease feed pressure</li> <li>• Adjust side guide gap</li> <li>• Use narrower blade</li> <li>• Check clamping pressure</li> <li>• Check coolant nozzles</li> <li>• Decrease blade tension</li> </ul>
 <p><b>Blade Wear</b> Teeth blued</p>	<ul style="list-style-type: none"> <li>• Incorrect blade</li> <li>• Incorrect feed or speed</li> <li>• Improper or insufficient coolant</li> </ul>	<ul style="list-style-type: none"> <li>• Use coarser tooth pitch</li> <li>• Increase feed or decrease speed</li> <li>• Check coolant flow</li> </ul>



# Blade Recommendation Checklist

**Contact Morse Technical Assistance**  
 Complete and Fax to: 1-330-453-1111  
 or call 1-330-453-8187  
 or visit www.bladewizard.com

Complete by: \_\_\_\_\_ Date \_\_\_\_\_

## User Information

Company: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 \_\_\_\_\_  
 Contact: \_\_\_\_\_  
 Phone No.: \_\_\_\_\_

## Distributor Information

Company: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 \_\_\_\_\_  
 Contact: \_\_\_\_\_  
 Phone No.: \_\_\_\_\_  
 Fax No.: \_\_\_\_\_  
 e-mail: \_\_\_\_\_

## Blade Information

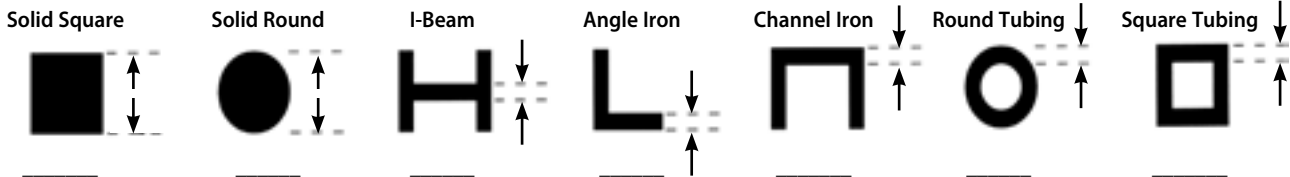
Manufacturer: \_\_\_\_\_  
 Length: \_\_\_\_\_ Width: \_\_\_\_\_  
 Thickness: \_\_\_\_\_ Tooth Pitch: \_\_\_\_\_  
 Type:  Carbon  Matrix  M42  Other \_\_\_\_\_  
 Monthly blade usage: \_\_\_\_\_  
 Current blade distributor: \_\_\_\_\_  
 Current blade cost: \$ \_\_\_\_\_ (ea.)

## Machine Information

Make: \_\_\_\_\_  
 Model: \_\_\_\_\_  
 Vertical  Horizontal  
 Blade Speed (sfm): \_\_\_\_\_  
 Feed Rate: \_\_\_\_\_

## Application Information

On the line provided below each icon, provide **material width** and **wall thickness** (where applicable) for each material type being cut

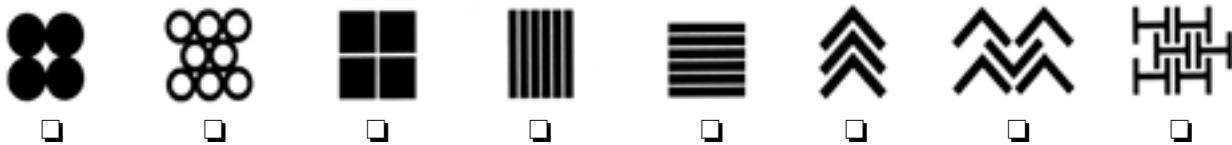


## Types of Cutting

(Check all that apply)

- Single Piece Cut-off
- Bundled Cut-off

1. Number of pieces: \_\_\_\_\_ 2. Check each configuration that applies:



## Materials Being Cut

(Check all that apply)

- | Type  | Grade |
|---|-------|
| <input type="checkbox"/> Non-Ferrous        | _____ |
| <input type="checkbox"/> Mild Carbon Steels | _____ |
| <input type="checkbox"/> Tool Steels        | _____ |
| <input type="checkbox"/> Stainless Steels   | _____ |
| <input type="checkbox"/> Super Alloys       | _____ |
| <input type="checkbox"/> Other              | _____ |

## Production Usage (per day)

- Light (2 hrs. or less)
- Medium (3-6 hrs.)
- Heavy (7 hrs. or more)

## Problems with Present Blade

- Breaking blades
- Tooth strippage
- Cost
- Premature dulling
- Crooked Cut
- No Problems



## Blade Recommendation

**PHONE** (330) 453-8187  
**FAX** (330) 453-1111  
**HOTLINE** (800) 733-3377  
**FAX HOTLINE** (800) 729-1112

**WEBSITES**  
mkmorse.com  
bladewizard.com  
independenceband.com

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P.O. Box 8677  
Canton, Ohio 44711 USA

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1101 - 11th St., S.E.  
Canton, Ohio 44707 USA