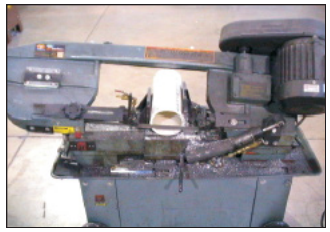
Product Information Report

Hardflex® Band Saw Blades

Overview

Hardflex® Band Saw Blades are great all-purpose blades for cutting almost any metal. Cuts tough material like stainless steel. Works equally well on solids, tubing and structural shapes.



Features/Benefits

Bi-Metal Construction

Hardflex® blades are built with the best grades of saw steel and the most exacting engineering standards in the industry. The 8% cobalt tooth edge stands up to high temperatures, allowing faster cutting and reduced edge wear. The alloy back absorbs shock for a longer life. This combination results in a safer cutting tool that is virtually shatterproof.

Variable Tooth Pitch

We vary the size of the teeth and the depth of the gullets over the length of the blade. This variation brings teeth into the work at constantly changing angles, breaking up the harmonics encountered in sawing. This lets you cut faster and produce a smoother finish than you can with conventional blades. With less harmonic buildup you also cut quieter which lowers operator fatigue – a major cause of accidents. The varying gullets also give added protection against tooth stripping.

Decreasing Blade Failure

Three significant ways to decrease blade failure

- Use a good quality cutting fluid
- Break in blade properly
- Run the machine at faster band speeds

Applications

- Low speed – Stainless steel and other tough steels, electric cable and plastics
- High speed – Brass, aluminum, mild steel, angle iron, galvanized pipe, copper, bronze and magnesium

PIR

Speed Chart

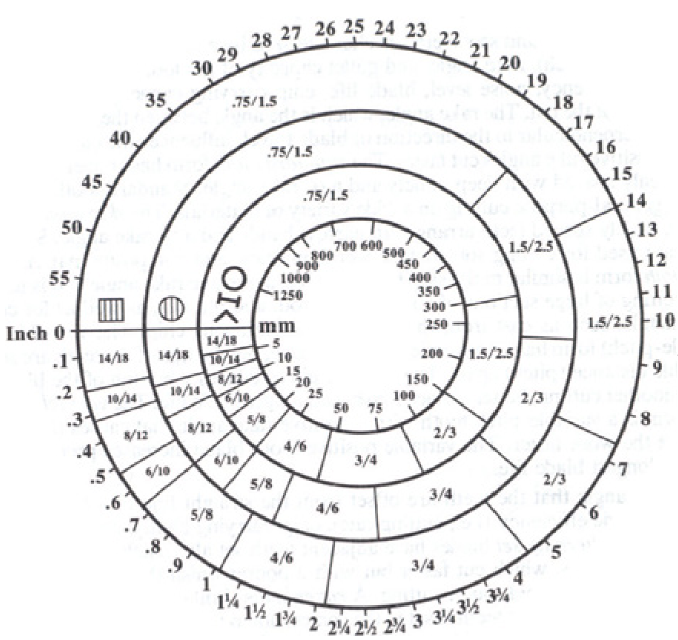
Material	Type	Speed (fpm)
Carbon Steel	1008-1035	300
	1040-1095	200
Free Machine Steels	1108-1132	340
	1212-1213	340
	1137-1151	275
Manganese Steel	1320-1345	220
Nickel Steel	2317	260
	2330-2345	200
	2512-2517	190
Nickel Chrome Steel	3115-3130	250
	3135-3150	250
	3310-3315	190
Molybdenum Steel	4017-4042	270
	4047-4068	220
Chrome Moly Steel	4130-4140	250
	4142-4150	210
Nickel Chrome Moly Steel	4317-4340	220
	8615-8645	220
	8715-8750	220
	9437-9445	230
	9747-9763	230
	9840-9850	230
Nickel Moly Steel	4608-4640	220
	4812-4820	190
Chrome Steel	5045-5046	250
	5120-5135	250
	5140-5160	230
	50100-52100	170

Material	Type	Speed (fpm)
Chrome Vanadium Steel	6117-6120	230
	6145-6152	200
Silicon Steel	9255-9260	190
	9261-9262	175
High-Speed Tool Steel	T1, T2	130
	T4, T5, T6, T8	100
	T15	75
	M1	150
	M2, M3	100
	M4, M10, M15	85
	M42, M43	85
Die Steels	A2	190
	D2, D3	110
	D7	80
	01, 02, 06	200
Carbon Tool Steel	W1	220
Hot Work Steel	H-12, H-21	180
	H-22, H-25	160
Shock Resisting Tool Steel	S-1	190
	S-2, S-5	145
Special Purpose Tool Steel	L-6, L-7	160

Material	Type	Speed (fpm)
Stainless Steel	201, 202, 302	115
	304, 321, 347	115
	303, 303F, 440F	125
	443	125
	308-310	80
	314-317, 330	80
	410, 420, 420F	145
	416, 430F	175
	430, 446	90
	440 A, B, C	105
	17-4PH, 17-7PH	75
Copper Base Alloys	Aluminum Bronze 70-90 BHN	400
	Alum Bronze 190-220 BHN	170
	Phosphur Bronze 5-8%, 60-100 BHN	400
	Phosphur Bronze 5-8%, 180-210 BHN	170
	Manganese Bronze 90-120 BHN	
	Silicone Bronze 70-100 BHN	325
	Silicone Bronze 180-210 BHN	170
	Beryllium Copper #25, 100-120 BHN	275
	Beryllium Copper #25, 220-250 BHN	225
	Beryllium Copper #25, 310-340 BHN	140

Material	Type	Speed (fpm)
Nickel Base Alloys	Monel 125-200 BHN	100
	R Monel 145-180 BHN	140
	K Monel 100-210 BHN	80
	K R Monel Inconel	95
	Inconel X	80
	Hastelloy A 210-260 BHN	110
	Hastelloy B 230-270 BHN	100
	185-250 BHN	90
Titanium Alloys	Mst 6al-4V 310-360 BHN	100
	RC 130 B 290-330 BHN	100
	Ti-140A 300-330 BHN	90
	T 150A 325-350 BHN	90
	99% Pure Titanium 270-315 BHN	90

Wheel

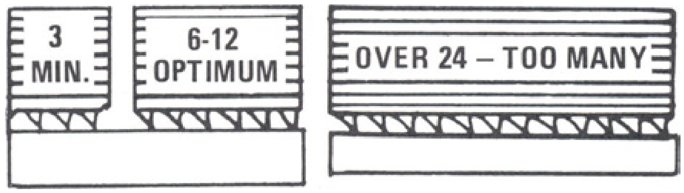


How to use this chart:

1. Locate the length of cut in inches on the outside circle (for millimeters use the inside circle).
   A. The length of the cut is the distance that any tooth of the blade is in contact with the work as it passes once through the cut.
   B. For solid round stock, the diameter is the length of the cut
   C. For angles, channels, I-beams, tubular pieces, pipe, and hollow or irregular shapes, the length of cut is found by dividing the cross-sectional area of the cut by the distance the blade needs to travel to finish the cut.
2. Find the tooth specification that aligns with the length, on the ring corresponding with the material shape.

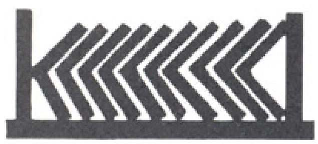
Tooth Selection

For best results, the correct number of teeth on the workpiece is of utmost importance. For mild materials, the 3–6–12–24 rule applies. For hard materials, the 6–12–24–48 rule applies.

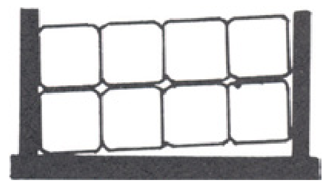


Vise Loading and Work-Holding Positions

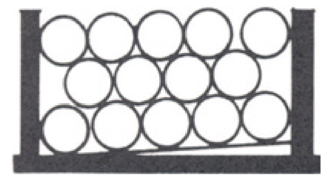
Always tip angles so blade cuts largest cross section.



Angle Iron (Multiples)



Square Tube

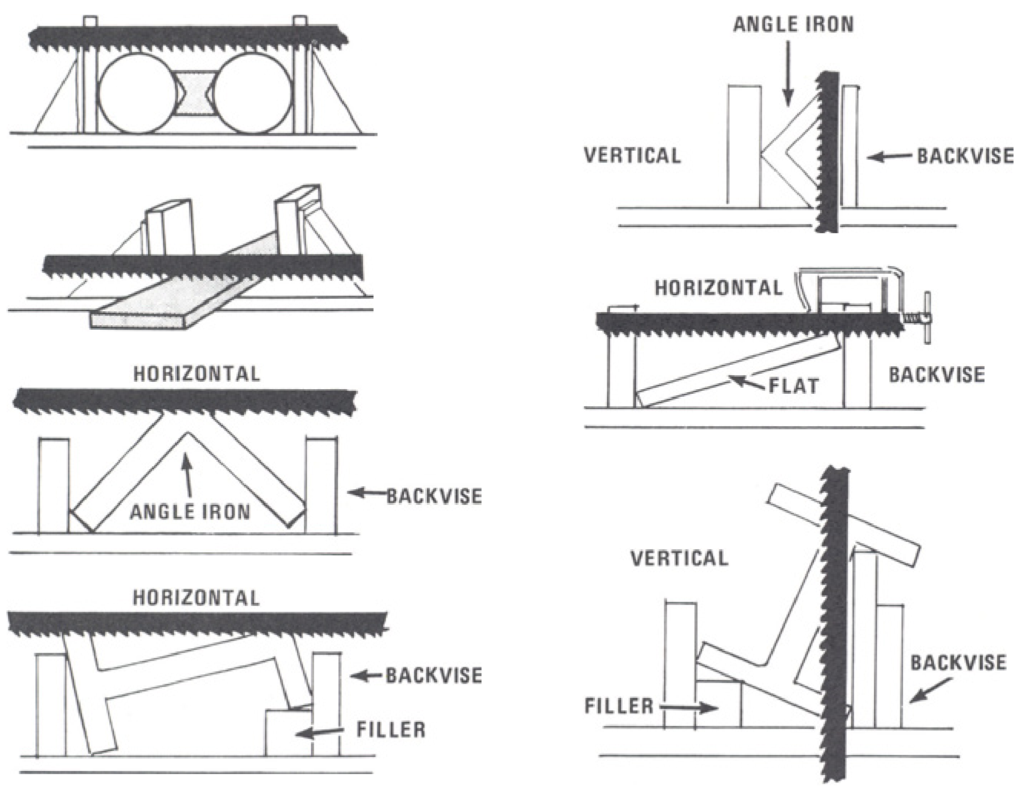


Nesting

More efficient than stacking

(when cutting rounds, tack-weld end together to prevent rolling)

Proper Clamping



Break-In Procedures

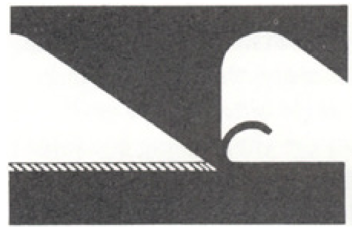
Proper break-in of a saw blade is the single most important step in sawing. A saw blade that is not broken in will not last as long, cut as fast or as straight as one which has been properly broken in. The term break-in might be more correctly called tooth sharpening.

The process of break-in removes the dead sharp point and feather edge and places a fine radius on the tooth tip which allows the chip to shear away from the workpiece more readily and gives the required support to the tooth tip, which undergoes extreme forces in the cutting process.

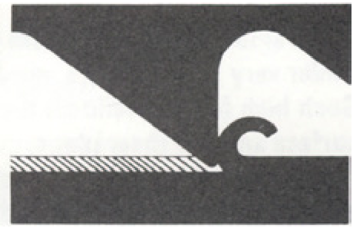
New Blade

Broken In

Not Broken In



Light Chip Load



Normal Chip Load

Recommended Method

1. Set band speed at normal fpm for material being cut.
2. Reduce feed force as low as possible while still pulling a chip.
3. Gradually increase feed force over 50-100 square inches until normal feed is reached. (50 square inches – difficult-to-cut material, 100 square inches – easy-to-cut material.)

If the material is difficult to cut, begin break-in with a heavier feed so the material does not work-harden and damage the tooth.

Operational Cutting Note

Break-in is just as important for operational blades as it is for production blades. The key technique is No. 2 above. The material should be fed against the blade manually with just enough force to pull chips for the first couple of cuts. After that, a gradual build-up of force should do the trick.

Causes of Failure

Band saw blades are subject to several types of stress. Operators can reduce blade changes by properly tensioning the blade, and adjusting and running the band saw machine to keep the blade within its designated stress limits.

Some good rules that always apply:

- Maintain proper tightening stress of about 30,000 psi. That will make straight cutting easier.
- Keep guide arms as close together as possible. (For example, doubling the distance between them will double the bending stress on the blade.)
- Use only enough feed force to do the job consistent with other goals, such as cutting rate.
- Keep the machine in good condition and in proper adjustment.

Over-tightening

- Higher tightening stress provides straighter cutting. A good rule of thumb for good blade life is to keep the stress less than 50% of the tensile strength of the blade's backing steel.
- Maximum stress occurs either at the front guide or where the band comes onto the drive wheel.
- By limiting the tightening stress to about 30,000 psi, ample margin remains to take care of these maximum stress points.

Other Causes of Failure

- A fine tooth band will have a lower maximum stress than a coarse tooth band.
- Tensile strength can be altered significantly by damage to the band such as nicks or scratches, work-hardening or other conditions which introduce stress concentrating factors as large as 2 or 3.
- Normal fatigue failures begin at the gullet. Failures starting at the back edge or in the middle of the band indicate that some abnormal condition has influenced the failure.
- Minimize band breakage by selecting a wider band saw blade even if it is thicker. Using a thicker band will, however, reduce cutting rate. Increasing the feed force to maintain the cutting rate is self-defeating as far as breakage is concerned.