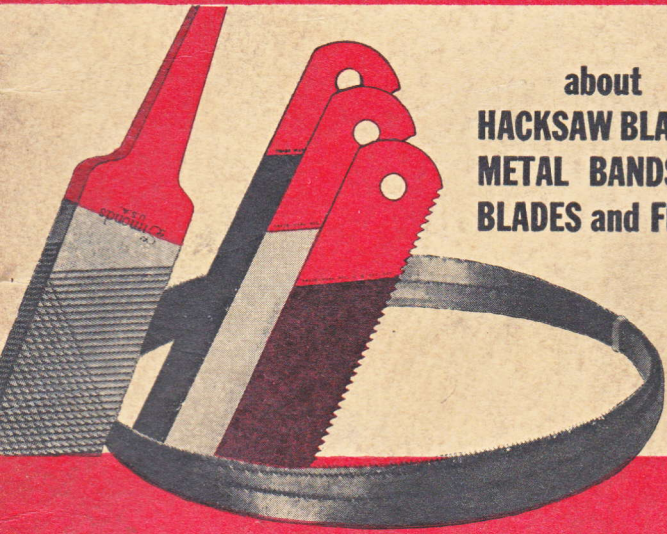
FACTS

For Mechanics



about
HACKSAW BLADES
METAL BANDSAW
BLADES and FILES

SIMONDS

SIMONDS

Facts for Mechanics

How to Get

The Most Production From Hack Saw Blades — Files and Metal Band Saw Blades and the use of Flat Ground Stock

from the experience of

Simonds Saw and Steel Co.

Fitchburg, Massachusetts

Metal Cutting Saw and File Makers

TABLE OF CONTENTS

CHAPTER I

RED END Hack Saw Blades

Classified according to use, Simonds makes two types of Hack Saw Blades; those for hand cutting, and those for power machine cutting.

Standard Steel Blades are made in hand sizes only. High Speed Molybdenum Blades are made in both hand and power sizes. High Speed Tungsten Blades are made only in power sizes.

Hard Edge Standard Steel Hand Blades

High Speed Molybdenum Steel Hand Blades

High Speed Molybdenum Power Blades

Standard Steel and Molybdenum High Speed Hand Blades are now made in both "Hard Edge" and "All Hard" types.

The blades illustrated under the heading "About Hack Saw Teeth for Hand Use" are the "Hard Edge" Standard Steel Hand Blades.

About Hack Saw Teeth for Hand Use

Hand blades are made with varying numbers of teeth per inch. Experience has taught the correct number of teeth to use for different kinds and types of metal. Below we illustrate the number of teeth in Hand Blades and give the material each cuts satisfactorily.

14 teeth to the inch. For cutting soft solid steel, iron, rails, brass, bronze, copper and aluminum.

18 teeth to the inch. For cutting tool steels, iron pipe, hard metals and light angle iron. This blade for general shop use.

24 teeth to the inch. For cutting drill rod, medium sheet metal and tubing.

32 teeth to the inch. For cutting thin sheet metal and tubing.

Hints on Cutting off Stock by Hand

After selecting the proper blade, strain well in frame. The correct strain or tension is important to insure true cutting and to prevent breakage of blades.

Insert saw in frame with teeth pointing away from the operator so that the "Red End" leads into the cut. Be sure that blade is perpendicular and tight. The "Hard Edge" Saw should be strained tighter than the "All Hard". Material to be cut should be rigid and placed so as to engage the maximum number of teeth throughout the cut. This is especially true when cutting structural steel, channel or similar material. ***At least two teeth should always be in contact with the work, so the teeth will not "straddle".***

Have Blade Cut — not Rub Start the cut easily using the same action as in filing. Be sure to put on sufficient pressure to make the teeth cut. If this is not done when starting the job, you will allow the saw to rub rather than cut and the teeth of the blade will soon glaze and become blunt. After the first few strokes retighten the saw in the frame.

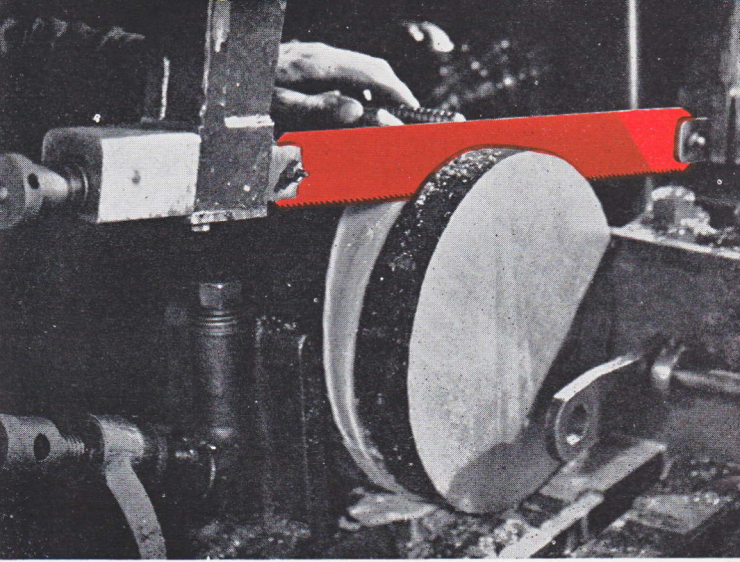
Always Lift Saw on Return Stroke At the end of forward stroke lift the saw slightly, to avoid dragging or rubbing the teeth on the stock during the return stroke. Using pressure on the return stroke will wear off the cutting edge and reduce the efficiency of the saw.

Advantage of Slow Steady Stroke Make 40 to 50 strokes per minute your maximum speed and you will finish the job quicker than at 60—70 strokes, besides prolonging the life of the saw. If you desire fast cutting, operate the blade slowly and use sufficient pressure.

Cutting Thin Stock and Tubing Many Hack Saw troubles come from trying to cut thin metal without the proper saw or proper precautions. For thin metal a saw blade should be selected with teeth fine enough so that ***two or more teeth will engage the work at once;*** for, if the spacing is so coarse

that the metal is allowed to catch between two teeth, the tendency will be to strip the teeth of the blade. When sawing thin stock it should be well supported in the vise; if the work will permit, it should be held between two pieces of wood and the whole sawed together. The additional cutting that the blade must do in working down through the combination protects the teeth and prevents them from catching on the side of the metal, and, as a consequence, stripping the teeth.

Whenever possible, sheet metal should be sawed with the blade at an angle to the work, thus presenting the greatest possible number of teeth to the work at one time.



Suggestions for Machine Use

See that the saw is straight in frame and tight. Teeth should always point in direction the cut is to be made. Majority of machines are draw-cut and teeth should point away from the operator. In push-cut machines the teeth should be reversed and point toward the operator.

Have material firmly clamped in vise. Start a new blade with comparatively light pressure. See that the blade is tightened sufficiently in the machine to give ample support in the cut.

Too much weight put upon a new saw will destroy it quickly, while insufficient pressure will allow saw to slip or slide without cutting and dull the teeth rapidly.

Feed and Speed

The most economical cutting is done with slow speeds and comparatively heavy feeds.

Only by experiment can the exact feed and speed, which will give best results with each type of blade and kind of material, be determined for the individual machine.

It is evident that more pressure should be used when cutting heavy stock than for light stock.

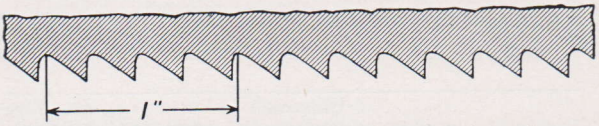
The following will serve as a general guide for the proper operation of power saws:

Machine	With or Without Solution	Unannealed Tool Steel & Hard Metals Strokes Per Minute	Annealed Tool Steel Strokes Per Minute	Machinery Steel and Soft Metal Strokes Per Minute
Light	Without	40	50–60	50–60
Medium	Without	40	50–60	50–60
Medium	With	60	65–90	100–110
Heavy	With	60	90	110–120
Ex. Heavy	With	60	90	110–120

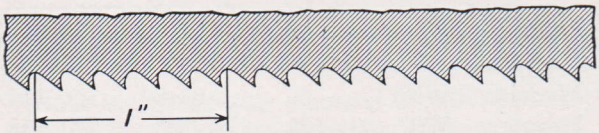
Cooling Compound As its principal action is one of cooling, there is sufficient lubricating effect with even the cheapest cutting compounds, provided the quantity used is great enough to produce the necessary cooling. Deluge the blade and work, as high speed cutting generates heat which draws the temper of the blade.

Always use cutting compound ***except when cutting iron castings*** and the output will be greatly increased.

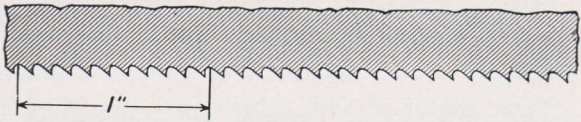
Number of Teeth for General Use In general the number of teeth shown below will be found to satisfactorily cut the material specified. Sketches illustrate the exact size of teeth of a given number per inch.



4 teeth to the inch. Used for cutting large sections of soft stock.



6 teeth to the inch. Used for cutting medium sections of harder stock.



10 teeth to the inch. Used for cutting small sections and very hard stock.

14 teeth to the inch. For general use in medium machines.

Some Suggestions Worth Remembering

Power hack saw machines should be checked frequently to make sure they are in good condition.

Use a blade that is thick enough, wide enough, and with the correct number of teeth.

See that the blade is inserted in the machine so that the teeth point in the direction in which the cutting is done.

Don't operate the machine with a loose blade for it will cut crooked and wear out or break more rapidly than a tight blade. After the first or second cut tighten the blade as it will stretch. However, do not overstrain the blade.

Run your machine at the number of strokes recommended by its maker for the kind of stock being cut.

Start the blade with a light feed and as soon as it has cut through the skin of the stock, put on as heavy a feed as is recommended by the machine manufacturer.

Use a cutting lubricant, except when cutting iron castings, for it will help clean out the chips from the kerf and save the teeth of the blade.

If a blade wears out or breaks in a cut do not put a new blade in the same cut as it will probably wedge or stick since the set on the old blade had worn down.

Some Causes of Blade Failure

Most broken blades may be traced to one of the following causes.

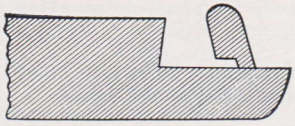
First, too heavy pressure applied in cutting a small surface. The blade gives at the point of the pressure, buckles and consequently breaks.

Second, too weak strain on the blade. When a slight over-pressure is exerted on a weakly strained blade the blade at once buckles and breaks.

Third, cramping or binding. If the sawing is not done evenly there is a side strain on the blade and the result is a broken hack saw blade.

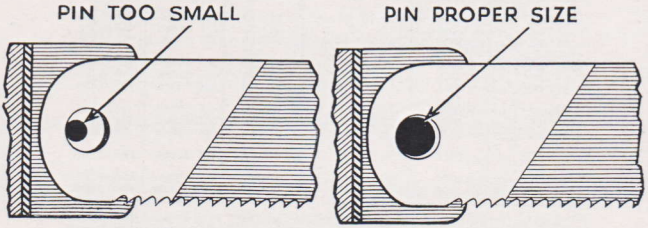
Fourth, work held insecurely. Under the cutting action, such work becomes loose, and the result is another broken blade.

Pulled out ends on Hack Saw Blades is caused in most cases by grooved or worn pins (see sketch A). Of course, the remedy for this is to renew pins.



Sketch A

This same difficulty is also caused by the pin being too small, so that the strain comes on one point rather than on half the circle of the hole (see sketch B). In such cases replace with a larger pin.



Sketch B

SIMONDS
HIGH SPEED MOLYBDENUM

THE RED BLADE

These blades stand heavy feeds and do an exceptionally economical job on production cutting.

High Speed Molybdenum "The Red Blade"
Hard Edge and All Hard Hand Blades

Length and Width	Thickness	Teeth per Inch	List Price per Gross	No. in Box	Weight per Gross
10" x ½"	.025	18–24–32	$40.00	½ gross	5 lbs.
12" x ½"	.025	14–18–24–32	48.00	½ gross	6 ½ lbs.

Power Machine Blades

Length and Width	Thickness	Teeth per Inch	List Price per Gross	No. in Box	Weight per Gross
12" x ⅜"	.032	14–18	$81.00	½ gross	9 ¾ lbs.
12" x 1"	.049	14	120.96	1 dozen	25 lbs.
12" x 1"	.065	10	120.96	1 dozen	31 ¾ lbs.
14" x 1"	.049	10–14	141.12	1 dozen	27 ½ lbs.
14" x 1"	.065	10	141.12	1 dozen	35 ½ lbs.
14" x 1 ¼"	.065	4–6–10	176.40	1 dozen	47 lbs.
17" x 1"	.049	14	171.36	1 dozen	35 lbs.
17" x 1"	.065	10	171.36	1 dozen	44 ½ lbs.
17" x 1 ¼"	.065	4–6–10	214.20	1 dozen	56 lbs.
18" x 1"	.065	10	181.44	1 dozen	47 lbs.
18" x 1 ¼"	.065	4–6–10	226.80	1 dozen	61 lbs.
18" x 1 ½"	.072	4–6	299.52	1 dozen	78 lbs.
21" x 2"	.072	4–6	465.12	1 dozen	120 lbs.
24" x 2"	.072	4–6	532.80	1 dozen	146 lbs.
24" x 2"	.100	4	725.76	1 dozen	198 lbs.

14-inch, 17-inch and 18-inch Power Blades measure 13 ½ inches, 16 ½ inches and 17 ½ inches between centers of holes respectively. All other power blades measure from center to center of holes.

Write for Discounts

SIMONDS
HIGH SPEED TUNGSTEN

THE BRIGHT BLADE

A full high speed blade for low cost production cutting.

High Speed Tungsten — "The Bright Blade"

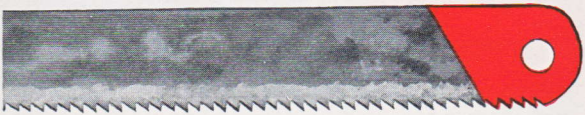
Power Machine Blades

Length and Width	Thickness	Teeth per Inch	List Price per Gross	No. In Box	Weight per Gross
12" x ⅝"	.032	14–18	$108.00	½ gross	10 lbs.
12" x 1"	.049	14	172.80	1 dozen	26 ½ lbs.
12" x 1"	.065	10	172.80	1 dozen	35 lbs.
14" x 1"	.049	10–14	201.60	1 dozen	30 ½ lbs.
14" x 1"	.065	10	201.60	1 dozen	40 ½ lbs.
14" x 1 ¼"	.065	4–6–10	252.00	1 dozen	50 lbs.
17" x 1"	.049	14	244.80	1 dozen	37 lbs.
17" x 1"	.065	10	244.80	1 dozen	48 lbs.
17" x 1 ¼"	.065	4–6–10	306.00	1 dozen	61 ½ lbs.
18" x 1"	.065	10	259.20	1 dozen	50 ½ lbs.
18" x 1 ¼"	.065	4–6–10	324.00	1 dozen	64 lbs
18" x 1 ½"	.072	4–6	427.68	1 dozen	85 lbs.
21" x2 "	.072	4–6	665.28	1 dozen	134 lbs.
24" x 2"	.072	4–6	760.32	1 dozen	159 lbs.
24" x 2"	.100	4	1036.80	1 dozen	213 lbs.

14-inch, 17-inch and 18-inch Power Blades measure 13 ½ inches, 16 ½ inches and 17 ½ inches between centers of holes respectively. All other power blades measure from center to center of holes.

Write for Discounts

SIMONDS
STANDARD STEEL HAND BLADES



THE BLACK BLADE

Hard Edge and All Hard Hand Hack Saw Blades

Length and Width	Thickness	Teeth per Inch	List Price per Gross	No. in Box	Weight per Gross
10" x ½"	.025	18–24–32	$10.00	½ gross	4 ¾ lbs.
12" x ½"	.025	14–18–24–32	12.00	½ gross	5 ¾ lbs.

14 Teeth — for cutting soft steel, iron solids, and rails.
18 Teeth — for cutting tool steel, iron pipe, hard metals, and light angle iron.
24 Teeth — for cutting brass, copper, drill rod, medium tubing, and sheet metals.
32 Teeth — for cutting thin tubing and thin sheet metals.

When ordering specify which

"RED END" Blade

High Speed Molybdenum

High Speed Tungsten

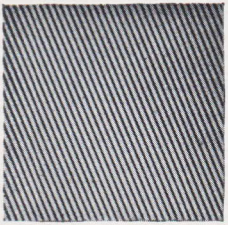
Standard Steel

CHAPTER II

Things to Know About Files

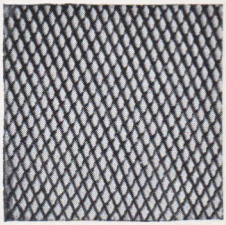
It is well to know the various types of Files and their fitness for certain kinds of work. There are hundreds of shapes and sizes of files. Only those in most general use are described and pictured in the following pages.

There are two classifications by which files are generally known. These refer to the teeth and are known as Single-cut and Double-cut.



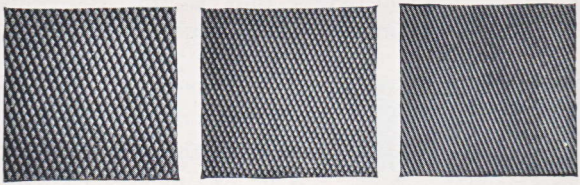
A Single-cut File has single rows of parallel teeth extending the length of the file at an angle across its face. This is clearly shown in the illustration.

A Double-cut File has two parallel rows of teeth crossing each other. The first row is usually coarser and deeper than the second row. The first row of teeth is known as the "over cut," the second as the "up cut."



The teeth of a double-cut file are sharp points as shown here. For this reason they cut faster but not so smoothly as the single-cut. Most of the files used by machinists are double-cut.

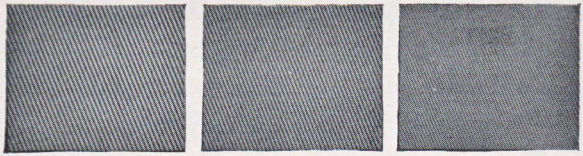
Single and double-cut files in general use are further classified according to the distance between the rows of teeth. Bastard, Second-Cut, and Smooth. Those having the greatest space between the teeth are known as "Bastard" and the least as "Smooth."



Bastard **Second-Cut** **Smooth**

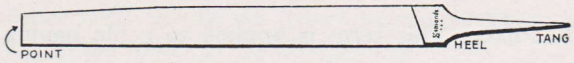
While there are files made with coarser teeth than the "Bastard" cut and some with finer teeth than the "Smooth" cut, these have a very limited use in industry.

The illustrations above show the variation in the cut of the teeth of a ten-inch Flat File (double cut). The illustrations on the next page show the difference in the cut of the teeth of an eight-inch Mill File (single cut).



Bastard **Second-Cut** **Smooth**

File Definitions



The following are the descriptive terms which are most commonly used:

LENGTH. The length of a file is the distance between the point and the heel. The tang is not included in the length.

HEEL. The heel is that end of the file that comes next to the handle.

POINT. The point is the end of the file opposite the tang.

TANG. The tang is the pointed part that is inserted into the file handle.

BACK. The rounded side of the Half-Round, Cabinet, Pit Saw, and similar shaped files is known as the back.

SAFE means that the side, back, or edge, to whichever it refers, is smooth with no teeth.

BLUNT FILE. A file that has the same width and thickness from heel to point.

TAPER. This term is applied to a file having tapering sides, to distinguish it from the blunt file.

PACKING. All Simonds Files 10 inches in length and under are wrapped and packed one dozen in a box.

All over 10 inches are packed one-half dozen in a box.

Exceptions: 9-inch and 10-inch Flat and Hand, 10-inch Half-Round and Cabinet Files are packed one-half dozen in a box.

HINTS ON CARE AND USE

The File is one of the most generally used tools; respect it, handle it carefully.

•

When you want to see just where a File is cutting change the direction of the stroke.

•

Hard spots and corners on iron castings dull new files quickly. On such work first go over it a few times with an old file before putting your good file on the work. It is File economy.

•

Keep your files clean. Clean files cut faster and last longer. They may be easily cleaned with a file card or stiff fibre brush.

•

The oil with which new files are lightly coated should be removed before using the file on cast iron — this will make the teeth cut more easily. On fibrous material the oil helps.

•

Draw filing is done by holding the file at about a right angle with, and moving it sidewise over the length of the work.

Don't put pressure on the back stroke when filing.

•

Use just pressure enough to keep the file cutting. If allowed to slip or rub it will glaze the work and dull the teeth quickly.

•

Why not have a rack for your files instead of throwing them in a heap?

•

Kerosene or gasolene will clean oil from file teeth.

•

Keep your files dry and free from rust.

•

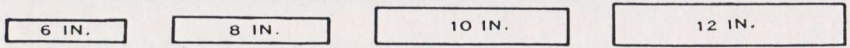
Rubbing chalk in file teeth helps when making fine, smooth cuts.

•

Regular, or standard files have two divisions: saw files and machinists' files. Saw files are single-cut. Machinists' files are usually double-cut. A double-cut file will cut faster than a single-cut but the latter gives a smoother finish.

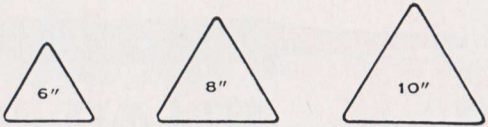
RED TANG SAW FILES

MILL FILES are used for sharpening mill saws and planer knives, for lathe work and draw-filing in machine shops.
Below we give cross-sections, exact size, of the most commonly used Mill Files.



TAPER FILES are used mainly for filing band and circular saws. Edges are cut to avoid sharp angles in saw gullets.

The 6-, 8-, and 10-inch Taper Saw Files are most used. Full size cross sections of these are shown at right.

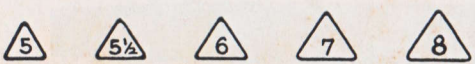


RED TANG SAW FILES

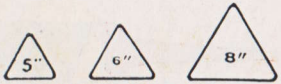
TAPER BAND SAW FILE. Edges are rounded and cut with two parallel rows of teeth to eliminate sharp angles in gullets of saw. For filing Band Saws.

SLIM TAPER FILE. Edges set and cut with one row of teeth. Very popular for filing Hand and Buck Saws.

EXTRA SLIM TAPER FILE — Triangular. Tapered to the point. For filing fine tooth Hand Saws.



Above are shown full size cross sections of most used Extra Slim Taper Files.



These illustrations show the full size cross sections of Slim Taper Files most commonly used.

RED TANG SAW FILES

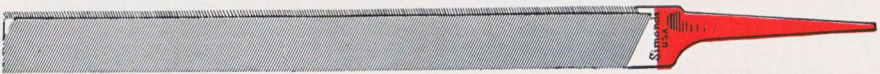
SPECIAL CROSS-CUT SAW FILE. Since it is the same width from point to heel the same amount of perfect work is secured from each half of each side of the file, an amount that will average considerably more than can be secured with a regular Mill File.

SPECIAL NARROW BAND SAW FILE is made with round corners to keep gullets round in Narrow Band Saws. Furnished in 6- and 7-inch lengths. No. 456 File for 4, 5, and 6 tooth saws; No. 3 File for 3-tooth saws.

SPECIAL HAND SAW FILE is especially designed and widely used for Hand Saw filing.

CANT SAW or LIGHTNING FILE is used for filing Cross-cut Saws with "M" teeth, Bucksaw Blades and Simonds Planer Saws. Also used on various styles of Circular Saws.

RED TANG FILES



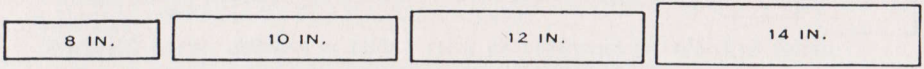
GREAT AMERICAN CROSS-CUT FILE. Wedge shaped, rounded back. For filing Great American type cross-cut Saws.

CABINET FILE. Tapered, slightly wider and thinner than a Half Round File. The teeth are widely spaced and large. For work in wood.

PLANER KNIFE FILE. Double end, blunt. Same width and thickness as Mill File. One end of each side single-cut, the other end double-cut. For sharpening Planer Knives without removing them from machine head.

RED TANG MACHINE SHOP FILES

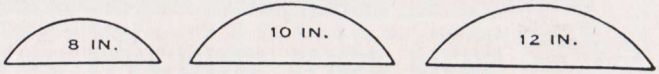
FLAT FILE is an all around file widely used by mechanics for all kinds of work.



Full size cross sections of Flat Files most commonly used.

HALF ROUND FILE. Double-cut. Mostly used in 8, 10 and 12 inch lengths, on concaved surfaces.

Full size cross sections at right.



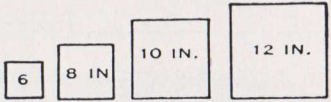
RED TANG MACHINE SHOP FILES

ROUND FILE (rat-tail). For enlarging round holes and for work on curved surfaces.

Full size cross sections of most used sizes shown at right.

SQUARE FILE. Tapered or blunt. Used by mechanics for enlarging rectangular holes.

Cross sections full size, of most used lengths shown.



PILLAR FILE. Equal in width and tapered in thickness. One safe edge. Narrower and thicker than Hand File. Used in machine shops in narrow work such as slots and keyways.

RED TANG MACHINE SHOP FILES

HAND FILE. Equal in width, tapered in thickness. One safe edge. Used mainly on flat surfaces. On account of shape and safe edge is used for certain types of work on which Flat File is not suitable.

THREE SQUARE FILE. Used in machine shops for cleaning out corners and angles. Sharp edges make them unfit for filing Hand Saws.

KNIFE FILE is shaped like a pocket knife blade. Used on die and other work having acute angles.

RED TANG MACHINE SHOP FILES

WARDING FILE. Uniform in thickness; extreme taper to the point. Used mostly by locksmiths for filing notches in keys.

LEAD FLOAT as name indicates, is used for filing babbitt. Also made in half-round shape.

LONG ANGLE LATHE is single-cut and is mostly used for lathe work. The angle and shape of teeth give smooth, shear cut without clogging.

RED TANG FILES

FOR ALUMINUM CASTINGS. A free, easy cutting file which, on aluminum and aluminum alloys, does excellent cutting without clogging. Made both flat and half round.

FOR BRASS. Smooth, fast cutting files on this type of material. Teeth do not fill up with chips or scratch the work. Made both flat and half round.

FOUNDRY FILE. Used in foundries for filing castings. Teeth are designed for longer wear on hard metals. Made both flat and half-round.

RED TANG FILES

Simonds Red Tang Files—List Price per Dozen

Revised to August 1, 1941

KIND		Length—Inches								
		4	5	6	7	8	10	12	14	16	18
MILL	Bastard	3.00	3.20	3.50	3.90	4.30	5.60	7.50	10.70	14.70	....
	2nd Cut	....	....	4.00	....	4.90	6.40	8.60	12.20	....	....
	Smooth	....	....	4.50	....	5.40	7.00	9.40	13.10	....	....
	ONE ROUND EDGE										
	Bastard	....	....	3.90	....	4.80	6.30	8.40	....	....	....
	TWO ROUND EDGE										
	Bastard	....	....	4.40	....	5.40	7.00	....	....	....	....
	BLUNT										
	Bastard	....	....	3.90	4.30	4.90	6.70	....	....	....	....
FLAT	Bastard	3.70	....	4.30	....	5.30	7.00	9.70	13.30	17.80	23.90
	2nd Cut	4.30	....	4.80	....	6.10	8.10	11.00	15.30	20.10	....
	Smooth	4.70	....	5.30	....	6.60	8.70	12.10	16.70	22.30	....
ROUND	Bastard	3.00	3.20	3.50	3.90	4.30	5.60	7.50	10.70	14.70	....
	2nd Cut	3.50	3.80	4.00	....	4.90	6.40	8.60	12.20	....	....
	Smooth	3.90	4.10	4.50	....	5.40	7.00	9.40	13.10	....	....
SQUARE	Bastard	3.80	....	4.60	5.10	5.50	7.40	10.20	13.90	18.70	25.10
	2nd Cut	4.60	....	5.10	....	6.30	8.50	11.50	16.10	....	....
	Smooth	4.90	....	5.50	....	7.00	9.10	12.80	17.50	....	....
HALF ROUND	Bastard	4.80	....	6.10	....	7.50	9.10	11.80	15.50	20.60	....
	2nd Cut	5.60	....	6.70	....	8.30	10.10	13.00	17.00	22.50	....
	Smooth	6.10	....	7.10	....	8.90	10.70	13.90	18.30	24.20	....
HAND	Bastard	....	....	4.30	....	5.40	7.50	10.70	15.00	20.10	....
	2nd Cut	....	....	5.10	....	6.30	8.70	12.30	17.00	....	....
	Smooth	....	....	5.60	....	6.70	9.40	13.50	18.20	....	....
	FINISHING										
	2nd Cut	....	....	....	....	....	....	15.20	20.60	....	....
	Smooth	....	....	....	....	....	....	16.20	21.70	....	....
THREE SQUARE	Bastard	....	....	6.10	....	7.50	9.10	....	....	....	....
	2nd Cut	....	....	6.70	....	8.30	10.10	....	....	....	....
	Smooth	....	....	7.10	....	8.90	10.70	....	....	....	....
PILLAR	Bastard	....	....	4.30	....	5.40	7.50	10.70	15.00	....	....
	2nd Cut	....	....	5.10	....	6.30	8.70	....	....	....	....
	Smooth	....	....	5.60	....	6.70	9.40	....	....	....	....
WARDING	Bastard	4.00	4.50	4.90	....	6.40	8.70	....	....	....	....
	2nd Cut	4.80	5.30	5.90	....	7.50	....	....	....	....	....
	Smooth	5.40	5.80	6.40	....	8.20	....	....	....	....	....
KNIFE	Bastard	5.40	....	6.90	....	8.50	10.10	....	....	....	....
	2nd Cut	6.10	....	7.50	....	9.10	11.50	....	....	....	....
	Smooth	6.40	....	7.90	....	9.50	12.30	....	....	....	....
LEAD FLOAT	Flat	....	....	....	....	6.30	8.60	11.80	....	....	....
	½ Round	....	....	....	....	8.50	10.70	14.10	....	....	....

These lists comprise all of the kinds, sizes, and cuts of files that will be regularly carried in stock. Anything differing from these files will be considered as special and will not be manufactured except in cases of urgent necessity; and when manufactured, price will be based strictly upon cost of material and cost of manufacture at time goods are made.

Write for Discounts

RED TANG FILES

Simonds Red Tang Files—List Price per Dozen

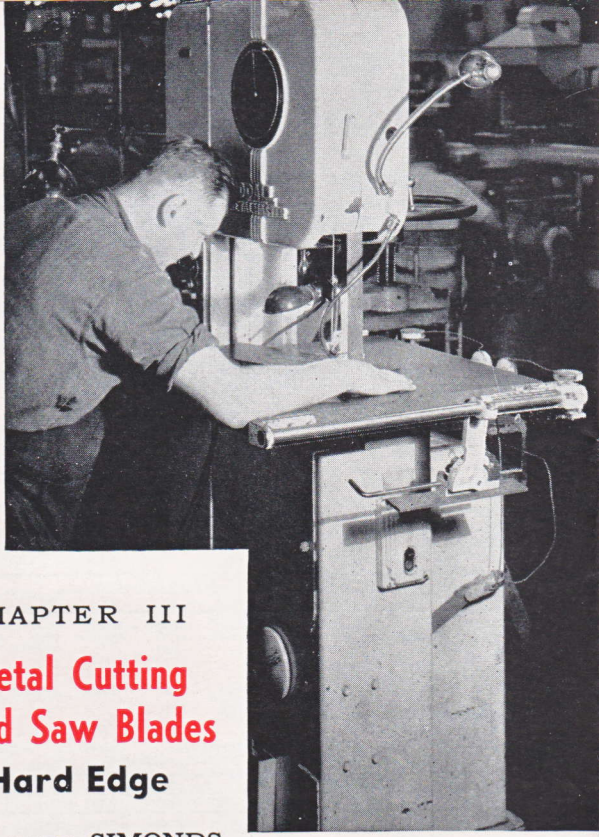
Revised to August 1, 1941

KIND	Length—Inches									
	3	4	4½	5	5½	6	7	8	9	10	12
Taper . Single Cut.	....	....	....	2.60	....	3.40	4.30	5.40	....	8.10	....
Slim Taper	2.10	2.20	2.30	2.50	2.90	3.10	3.80	4.50	....	6.40	....
Extra Slim Taper .	....	2.20	2.30	2.50	2.90	3.10	3.80	4.50	....	6.40	....
Double Extra Slim .	....	2.20	2.30	2.50	2.90	3.10	3.80	4.50	....	....	....
Band Saw Taper											
Regular . .	....	....	....	....	....	4.70	....	6.70	....	....	....
Slim . . .	....	....	....	....	....	3.90	....	5.30	....	....	....
Band Saw Blunt . .											
Regular . .	....	....	....	....	....	4.70	....	6.70	....	....	....
Slim . . .	....	....	....	....	....	3.90	....	5.30	....	....	....
Hand Saw											
Blunt Slim	....	....	....	....	....	3.80	....	....	....	....	....
Special Hand Saw .	....	....	....	....	3.80	4.50	5.40	....	....	....	....
Special Cross-Cut .	....	....	....	....	....	3.90	4.30	4.90	....	6.70	....
Great Am. Cross-Cut	....	....	....	....	....	....	....	7.50	....	9.10	....
Pit Saw	....	....	....	....	....	6.10	....	7.50	....	....	....
Cant Saw	....	....	....	....	....	5.40	6.10	6.40	....	8.70	....
Double Ender . . .	....	....	....	....	....	....	3.50	3.90	4.40	4.90	....
Planer Knife . . .	....	....	....	....	....	....	....	6.40	....	8.60	....
Cabinet	....	....	....	....	....	....	....	10.10	....	13.70	18.70
Wood . Flat . . .	....	....	....	....	....	....	....	6.30	....	8.60	11.80
Half Round	....	....	....	....	....	....	....	8.50	....	10.70	14.10

Special Purpose	Length—Inches						
	6	7	8	10	12	14	16
Aluminum . Flat . . .	....	....	....	8.50	11.00	14.50	19.50
Half Round	....	....	....	13.50	16.00	20.00	25.00
Brass . . . Flat . . .	....	....	....	8.50	11.00	14.50	19.50
Half Round	....	....	....	13.50	16.00	20.00	25.00
Dado	....	....	....	7.40	....	....	....
Foundry. . Flat . . .	....	....	5.30	7.00	9.70	13.30	....
Half Round	....	....	7.50	9.10	11.80	15.50	....
Gullet . For Wide Bands	....	....	7.00	9.40	....	....	....
Long Angle Lathe . . .	....	....	....	8.60	11.80	16.00	....
Narrow Band . No. 3 .	4.70	5.60 (For 3-tooth saws)					
No. 456	3.90	4.50 (For 4, 5, or 6-tooth saws)					

Rasps	Length—Inches						
	6	8	10	12	14	16	18
Flat Wood . Bastard . .	....	9.40	12.80	17.50	23.20	30.80	....
Smooth . .	....	12.80	17.50	23.20	30.80	40.90	....
Half Round Wood							
Bastard . .	8.10	10.10	13.70	18.70	24.80	32.90	....
Smooth . .	10.10	13.70	18.70	24.80	32.90	43.60	....
Cabinet . . 2nd Cut . .	10.10	12.80	17.50	22.80	29.60	....	....
Smooth . .	11.70	15.50	20.70	26.80	33.90	....	....
Shoe . . . Flat . . .	....	10.10	13.70	....	....	....	....
Half Round	....	10.10	13.70	....	....	....	....
Horse. . . Plain ⅓ File	....	....	....	12.80	17.80	24.40	32.90
Tanged . .	....	....	....	16.80	23.10	32.20	....

Write for Discounts



CHAPTER III

Metal Cutting Band Saw Blades

Hard Edge

The name SIMONDS has long been identified with the highest quality in metal cutting band saws. Because of the accuracy and uniformity of manufacture, Simonds Blades are particularly fitted to meet the demand

created by the constant increase of precision contour sawing. The teeth are accurately milled from a tough alloy steel of the highest quality. Great pains are taken at the Simonds Factory to maintain the proper tooth clearance or set and to see that this set is absolutely even on both sides of the blade. Due to these precautions Simonds Band Saw Blades cut with such accuracy that the smooth cut surfaces need very little machining. Specially controlled hardening and tempering operations plus a rigid final inspection insure the users of Simonds Hard Edge Metal Cutting Band Saws of satisfying service day in and day out.

Care of the Machine

In justice to good blades, care should be taken to see that the Band Saw Machine is in good working order. Guides should be properly adjusted so that the blade will run perfectly straight and not bind.

The material to be cut should be held tightly and if several pieces are to be "ganged" or cut at one time they should be clamped securely together so that individual pieces cannot move.

Size of Saws Required for Various Metal Cutting Band Saw Machines

Machine	*Length*	*Width*
Armstrong Blum	14′ 8″	5/8″ or 3/4″
Atkins No. 3	15 3	5/8, 3/4 or 1
Atkins No. 4	14 1	5/8, 3/4 or 1
Houghton	12 6	5/8 or 3/4
Kalamazoo	10 5	3/4
Klemm No. 1	11 2	5/8 or 3/4
Klemm No. 2	15 8	5/8 or 3/4
Laidlaw CM and CMT	15 6	1
Laidlaw JM-30 and SM-30	16	1
Laidlaw JM-20 and SM-20	11	5/8
Milband (Thompson)	12 11	3/4
Milband (Avey)	14 9	1
Milclark	10 10	1/4 to 3/4
Napier	12 3	1
Napier, Jr.	8 4	3/4
Racine	7 8	1/8 to 5/8
Stockbridge 6″	12 5 1/2	5/8
Stockbridge 9″	13	5/8
Stockbridge 12″	15 5 1/2	3/4
Thompson	15 8	5/8 or 3/4
Wells No. 5	8 2 1/2	1/2
Wells No. 7 and No. 8	11 5	3/4
Williamson	20 9	5/8
Wright	15 8	5/8 or 3/4

Here are a few things to check if you are having trouble with your Band Saws:—

Blade Failure May be caused by improperly shaped guide rolls, loose guide rolls, guides or wheels out of line, guides with sharp edges, guides too far from work, saws drawn too

taut or not taut enough, and saws twisted by forcing the material against the saws with too great a pressure.

Cracking at the Gullets

The conditions mentioned before would cause the saw to run imperfectly. The twisting and rubbing of the saw would result in friction which in turn would case-harden the saw. A hardened saw is not elastic enough to stand the strain of bending, and consequently as the saw rides over the wheels of the machine, the saw cracks at its weakest point, the gullet.

Shelled Teeth

Teeth are shelled by feeding the saw too heavily, by work improperly held, and by cutting thin material with a coarse tooth saw.

Saws Running Out of the Cut

Saws will run out of the cut when too heavy feeds are used. Guide rolls should be carefully adjusted to give maximum support to the blade. Care should be taken to prevent damage to the teeth of the blade which can easily be caused by the teeth coming in contact with the guide rolls or resting on the steel of the band saw wheel.

Saws Dulling

Many band saw blades are worn out too quickly by running at too great a speed. This generates heat on the tooth edge, causing them to dull rapidly. Always use a slow speed with moderate feed. Too light a feed also wears blades excessively, as teeth start to rub rather than cut.

Standard Specifications and List Prices

Width	*Thickness*	*Teeth*	*Price per ft.*	*Welding per saw*
3/32	.025	18——32	$.10	$.40
1/8	.025	14–18–24	.10	.40
3/16	.025	10——14–18–24–32	.10	.40
1/4	.025	10–12–14–18–24–32	.10	.40
5/16	.025	18–24	.10	.40
3/8	.025	8–10——14–18–24	.10	.40
1/2	.025	6–10——14–18–24	.11	.40
5/8	.032	8–10——14–18–24	.14	.50
3/4	.032	6–8–10–12–14	.16	.50
1	.035	6–8–10——14	.20	.50

Regular Set—All blades furnished regular set except 32 teeth per inch.

Wavy Set—Furnished only on blades with 32 teeth per inch.

In conjunction with the following table a few simple facts should be kept in mind:

No one type of blade will cut all types of material.

Thin sheet stock requires a fine tooth blade to prevent stripping of teeth; heavy stock requires coarse teeth to give ample room between the teeth for chips.

In contour sawing the radius of the curve to be cut must govern the width of saw to be used. Small radii require a narrower blade. For heavy production work a wide blade will soon pay for itself.

Always use a slow speed and moderate feed. This prevents excessive wear of blades due to overheating.

No band saw blade will cut accurately if the guide rolls are not properly adjusted to hold the blade firmly and prevent it from leading out of the cut.

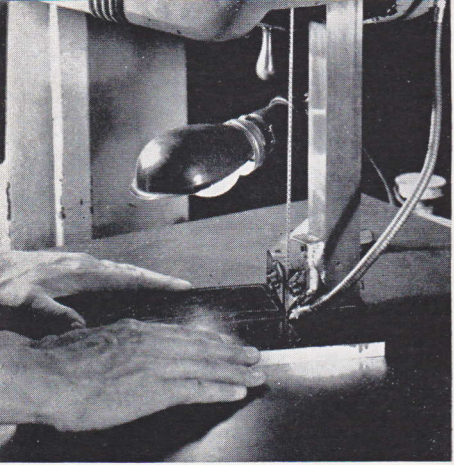
The wheels of the band saw machine should be covered with live rubber or beveled in such a way that the set teeth do not press on the steel rim.

The Selection of the Proper Saw for Your Job

Cutting conditions vary in every plant and a trial of several tooth sizes and various machine speeds can best determine what the right specifications of your saw should be.

The chart below will give general specifications for the proper tooth size to use for cutting different types of materials.

Metal	*Teeth*
Cast Iron, Annealed Tool Steel, High Speed Steel	14
Cold Roll Steel, Carbon Steel, Steel Billets	14
Rails and Malleable Iron	14
Machinery Steel	10
I Beams	10
Sheet Steel	24
Wrought Iron and Steel Pipe	18
Drill Rod and Light Tool Steel Bars	18-24
Sheet Iron	18
Steel Tubing	18-24
Copper	10-12
Cast Aluminum—Aluminum Gates	8-10
Gates on Aluminum Alloys	12-14
Manganese Bronze	14
Hard Brass	14
Soft Brass, Sheet Brass, Brass and Bronze Castings	14
Fibre and Builders' Board	14



Hard Edge

Narrow Width Blades

Furnished in 100-foot Coils

For Precision Sawing

Since the introduction of such precision machines as Do-all, Grob, and Tannewitz, band saw cutting has taken on a new significance. Accurate cutting replacing milling and shaping are now being done at a great saving in time and expense.

A wide variety of cutting is now being done with these precision saws. They are used for cutting machine steel, tool steel and alloy steels, cast iron and boiler plate. (See page 39 for suggested number of teeth.)

Also aluminum, Duraluminum, brass, copper, lead and zinc as well as on non-metallic materials such as plastics, fibre, hard rubber, builders' board, bakelite, etc.

Simonds Blades for contour sawing are furnished in 100-foot coils in the following widths: $\frac{3}{32}''$, $\frac{1}{8}''$, $\frac{3}{16}''$, $\frac{1}{4}''$, $\frac{5}{16}''$, and $\frac{3}{8}''$. This handy package keeps blades in good condition in plants equipped to weld their own saws. See list on page 38 for number of teeth furnished for various width blades.

Each Package Clearly Marked with Correct Specifications

SIMONDS Spring Temper
Metal Cutting Band Saw Blades

A blade that can be refiled and set when dull.

Especially recommended for cutting thin sheet steel as used on automobile bodies and fenders, light structural shapes, fibre, bakelite, brass tubing, etc.

Recommended speed for cutting *sheet metal* about 10,000 feet per minute. Use a 6-tooth saw in either the straight or bull tooth style.

For *brass* or *bronze* in the form of sheets, castings, rods or tubing, saws should run from 1500 to 1800 feet per minute. An 8-tooth saw is in greatest demand.

For cutting large *aluminum* and *copper* castings a 3-tooth saw running at high speed is recommended. Sheet *aluminum*—at about 1800 feet per minute—with a 6-tooth saw.

Fibre and *bakelite* use a 3-tooth saw running about 4000 feet and 2000 feet per minute respectively.

When ordering specify the width, length, number of teeth to the inch, character of material to be cut; its size and shape; also make and speed of machine.

LIST PRICES—SPRING TEMPER

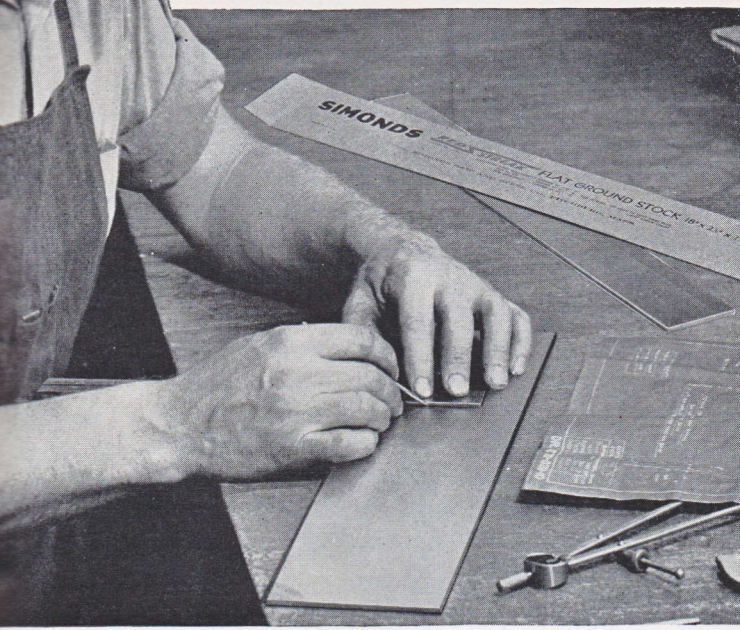
Width Inches	Thickness	Teeth per inch	Price per foot	Price Brazing
1/4	23 ga. (.025)	8–10	$.14	$.50
3/8	23 ga. (.025)	8–10	.15	.50
3/8	21 ga. (.032)	8–10	.16	.50
1/2	23 ga. (.025)	6–8–10	.17	.50
1/2	21 ga. (.032)	6–8–10	.18	.50
5/8	23 ga. (.025)	4–6–8–10	.18	.60
5/8	21 ga. (.032)	4–6–8–10	.20	.60
5/8	20 ga. (.035)	4–6–8–10	.21	.60
1/4	20 ga. (.035)	4–6–8	.23	.60
1	20 ga. (.035)	4–6–8	.28	.60
1 1/4	19 ga. (.042)	3–4	.35	.70

Standard number of teeth per inch, 3 to 10. Saw Blades of different widths, heavier gauge, or with finer teeth than listed are special. Prices quoted on application.

For the convenience of customers desiring to braze or join their own saws we supply them in coils of 250 feet.

SIMONDS

Flat Ground Stock



If you make any product or tool parts which have two flat, parallel surfaces not more than 6″ wide—and which are of any thickness from 1/64″ to 1″.

If hardening is required for any such parts—as cams, gages, pawls—and many other items that you may have been cutting from bar stock and having to machine all over you can save with Simonds Flat Ground Stock.

Save Hours of Machining Any flat part can be cut from a piece of desired thickness—with a bandsaw, circle-cutting saw or trepanning tool—in far less time than it can be sawed or parted from a bar. And after the cutting is done, it takes only a bit of edge finishing to complete the part. Diemakers and machinists can do better work—and more of it.

High Carbon Tool Steel Made and Ground By Simonds Every piece of Simonds Flat Ground Stock is made from uniformly annealed high carbon tool steel produced in Simonds own steel mills. It is easy to machine. It will not shrink or warp after heat treating. Any parts you make from it will be of highest quality.

How is it Supplied Simonds Flat Ground Stock is supplied in finished, rectangular pieces 18″ long, ranging in width from ½″ to 6″, and in thickness from 1/64″ to 1″. (See table, page 46). Each piece is finished by grinding the two flat sides parallel, straight, and to a

thickness limit of plus or minus .001″. Edges and ends are square, parallel, and accurate to dimension. Grinding is done lengthwise of the piece.

Each Piece Separately Packed . . . and Marked

Each piece is packed in its own envelope, marked with the width and thickness—and also with general instructions for proper heat-treating. Individual packing makes stock easy to identify and store . . . prevents rusting, scratching, dustmarking. Ask your dealer about it.

Hardening

Thickness up to and including 3/32 inch is satisfactorily quenched in oil from a hardening temperature of 1450 degrees F. It is essential, before quenching, that the stock be thoroughly and uniformly heated. Thickness over 3/32 inch for best hardening results is quenched in brine or water from 1450 degrees F. The oil quench on material 3/32 inch and under prevents distortion. General heat treating instructions are printed on each envelope in which material is packaged.

Tempering

For Grinding—Temper at 350 degrees F. for 15 minutes or heat to a light straw color.

For Filing—Temper at 600 degrees F. for 15 minutes or heat to a very dark blue.

STANDARD STOCK SIZES

Thickness Inches	Width Inches	Length Inches	Net Price Per Bar
1/64	1	x 18	$ .85
	1½	x 18	1.05
	2	x 18	1.25
	2½	x 18	1.55
	3	x 18	1.85
	4	x 18	2.50
1/32	¾	x 18	$ .60
	1	x 18	.60
	1½	x 18	.80
	2	x 18	1.00
	2½	x 18	1.25
	3	x 18	1.50
	3½	x 18	1.75
	4	x 18	2.00
	5	x 18	3.00
	6	x 18	4.00
3/64	1	x 18	$ .55
	1½	x 18	.75
	2	x 18	.95
	2½	x 18	1.15
	3	x 18	1.40
	4	x 18	1.90
	5	x 18	2.75
	6	x 18	3.75
1/16	½	x 18	$ .40
	¾	x 18	.45
	1	x 18	.50
	1¼	x 18	.65
	1½	x 18	.70
	2	x 18	.90
	2½	x 18	1.10
	3	x 18	1.35
	3½	x 18	1.60
	4	x 18	1.85
	5	x 18	2.50
	6	x 18	3.50
3/32	½	x 18	$ .55
	¾	x 18	.65
	1	x 18	.70
	1½	x 18	.85
	2	x 18	1.00
	2½	x 18	1.20
	3	x 18	1.40
	3½	x 18	1.65
	4	x 18	1.90
	5	x 18	2.75
	6	x 18	3.75
1/8	½	x 18	$ .60
	¾	x 18	.70
	1	x 18	.75
	1¼	x 18	.85
	1½	x 18	.90
	2	x 18	1.05
	2½	x 18	1.30
	3	x 18	1.50
	3½	x 18	1.75
	4	x 18	2.00
	5	x 18	2.85
	6	x 18	4.00
5/32	¾	x 18	$ .75
	1	x 18	.85
	1½	x 18	1.10
	2	x 18	1.40
	2½	x 18	1.60
	3	x 18	1.80
	4	x 18	2.30
3/16	½	x 18	$ .75
	¾	x 18	.90
	1	x 18	.95
	1¼	x 18	1.15
	1½	x 18	1.20
	2	x 18	1.50
	2½	x 18	1.70
	3	x 18	2.00
	3½	x 18	2.30
	4	x 18	2.60
	5	x 18	3.50
	6	x 18	4.50
7/32	1	x 18	$1.05
	1½	x 18	1.35
	2	x 18	1.60
	2½	x 18	1.90
	3	x 18	2.20
	4	x 18	3.00
1/4	¼	x 18	$1.00
	½	x 18	.95
	¾	x 18	1.05
	1	x 18	1.15
	1½	x 18	1.45
	2	x 18	1.80
	2½	x 18	2.20
	3	x 18	2.60
	3½	x 18	3.05
	4	x 18	3.50
	5	x 18	4.50
	6	x 18	5.50
5/16	5/16	x 18	$1.25
	½	x 18	1.20
	1	x 18	1.50
	1½	x 18	1.80
	2	x 18	2.15
	2½	x 18	2.60
	3	x 18	3.05
	4	x 18	4.00
3/8	3/8	x 18	$1.50
	½	x 18	1.50
	¾	x 18	1.65
	1	x 18	1.75
	1½	x 18	2.05
	2	x 18	2.40
	2½	x 18	2.95
	3	x 18	3.50
	4	x 18	4.50
1/2	½	x 18	$1.75
	¾	x 18	2.15
	1	x 18	2.65
	2	x 18	3.30
	3	x 18	4.40
	4	x 18	5.40
3/4	¾	x 18	$2.50
1	1	x 18	$3.25

Sizes not listed are special.

Special Flat Ground Stock prices on application.

Made from annealed Tool Steel, and ground within limits of plus or minus .001 inch All Simonds Flat Ground Stock is square on both edges and ends.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

Convenient Tables

Long Measure

1 foot = 12 inches
1 yard = 3 feet
1 rod = 5½ yards = 16½ feet
1 mile = 320 rods = 1760 yards = 5280 feet
1 nautical mile = 6080 feet
1 knot = 1 nautical mile per hour
1 furlong = ⅛ mile = 660 feet = 220 yards
1 league = 3 miles = 24 furlongs
1 fathom = 2 yards = 6 feet
1 chain = 100 links = 22 yards
1 link = 7.92 inches
1 hand = 4 inches
1 span = 9 inches

Square Measure

144 square inches = 1 square foot
9 square feet = 1 square yard
30¼ square yards = 1 square rod
160 square rods = 1 acre
640 acres = 1 square mile

Cubic Measure

1 cubic foot = 1728 cubic inches
1 cubic yard = 27 cubic feet
1 register ton = (shipping measure) 100 cubic feet
1 U.S. shipping ton = 40 cubic feet
1 cord = 128 cubic feet
1 U.S. liquid gallon = 4 quarts = 231 cubic inches
1 imperial gallon = 1.20 U.S. gals. = 0.16 cubic feet
1 board foot = 144 cubic inches

Metric Long Measure

1 centimeter = 10 millimeters
1 decimeter = 10 centimeters
1 meter = 10 decimeters
1 dekameter = 10 meters
1 hektometer = 10 dekameters
1 kilometer = 10 hektometers
1 inch = 2.54 centimeters
1 meter = 39.37 inches
1 yard = 0.914 meters
1 mile = 1609 meters = 1.61 kilometers

Circular Measure

60 seconds = 1 minute
60 minutes = 1 degree
90 degrees = 1 quadrant
4 quadrants = 1 circle or circumference

Land Measure

A tract of land, 1 mile square, containing 640 acres, is called a section.

To find the number of acres in a tract of land:

Rule: Divide the number of square rods by 160; or number of square chains by 10.

One side of a square tract or lot containing 1 acre is 208.7 feet.

Dry Measure

2 pints = 1 quart
8 quarts = 1 peck
4 pecks = 1 bushel
196 lbs. flour = 1 barrel

Counting

12 things = 1 dozen
12 dozen = 1 gross
12 gross = 1 great gross
20 things = 1 score

Liquid Measure

4 gills = 1 pint
2 pints = 1 quart
4 quarts = 1 gallon
(1 gallon in U.S. = 231 cubic in.)

Weights — Avoirdupois

1 pound = 16 ounces
1 hundredweight = 100 pounds
1 ton = 20 hundredweight = 2000 pounds
1 long ton = 2240 pounds

Troy
(Used in weighing gold, silver, jewels)

1 pennyweight = 24 grains
1 ounce = 20 pennyweight
1 pound = 12 ounces

Wood

A cord of wood is equivalent to a pile, closely stacked, 8 feet in length, 4 feet in breadth and 4 feet in height. To check the number of cubic feet of wood in any pile of the shape of a rectangular solid, measure the length, width, and height in the pile in feet and multiply these three dimensions together. The result is the number of cubic feet of wood in the pile.

Useful Information

To find the circumference of a circle, multiply the diameter by 3.1416.

To find the diameter of a circle, multiply the circumference by 0.31831.

To find the area of a circle, multiply the square of the diameter by 0.7854.

To find the surface of a ball (sphere), multiply the square of the diameter by 3.1416.

To find the side of a square equal in area to a given circle, multiply the diameter by 0.8862.

Doubling the diameter of a pipe increases its capacity four times.

The radius of a circle x 6.283185 equals the circumference.

The square of the circumference of a circle x 0.07958 equals the area.

Half the circumference of a circle x half its diameter equals the area.

The circumference of a circle x 0.159155 equals the radius.

The square root of the area of a circle x 0.56419 equals the radius.

The square root of the area of a circle x 1.12838 equals the diameter.

A gallon of water (U. S. standard) weighs 8½ lb. and contains 231 cu. in. A cubic foot of water contains 7½ gal., 1728 cu. in., and weighs 62½ lb. at a temperature of about 39 deg. F. These weights change slightly above and below this temperature.

Simonds Saw and Steel Co.

Established 1832

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Boston, Mass.

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Chicago, Ill.

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Seattle, Wash.

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New York, N. Y.

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Portland, Ore.

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