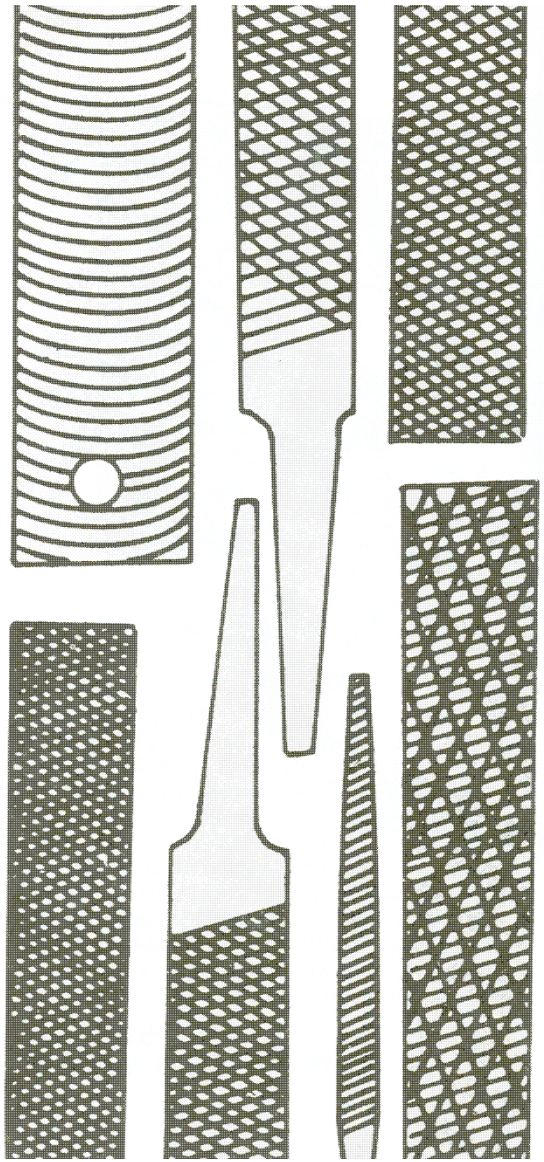
SIMONDS

The Professionals' Edge™

Facts On Files



Facts On Files

Including Helpful Tips
And Proper Filing Techniques

THE SURFACE THAT'S MADE ROUGH . . . TO MAKE OTHER SURFACES SMOOTH!

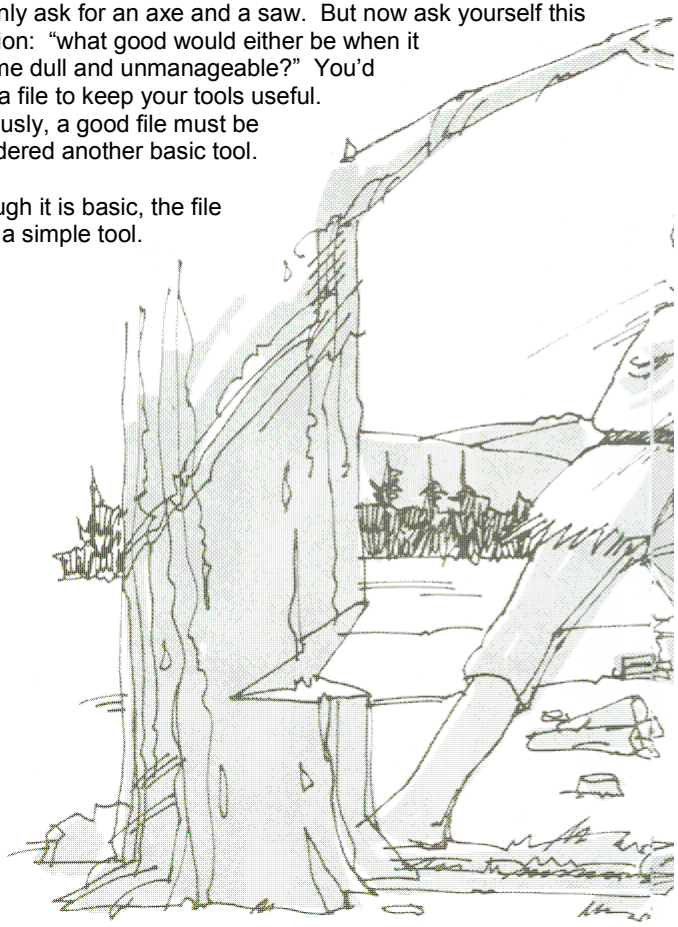
This booklet not only shows you how to get the most out of a very basic tool, but it also makes it easy for you to select from the twenty different types of Simonds files in common use today. The famous Simonds brand is unquestionably among the most respected symbols of quality and reliability in the industrial marketplace. Every Simonds Red Tang file is precision cut for uniform tooth height and sharpness, scientifically heat treated for maximum hardness and edge-holding ability and is individually checked and user-proved for cutting ability and uniformity.

Turn the page to meet the ones that best meet your needs.

THE FILE AS A BASIC NECESSITY

Imagine cutting a whole new life for you and your family out of sheer wilderness. What basic tools would you want? You'd certainly ask for an axe and a saw. But now ask yourself this question: "what good would either be when it became dull and unmanageable?" You'd need a file to keep your tools useful. Obviously, a good file must be considered another basic tool.

Although it is basic, the file is not a simple tool.



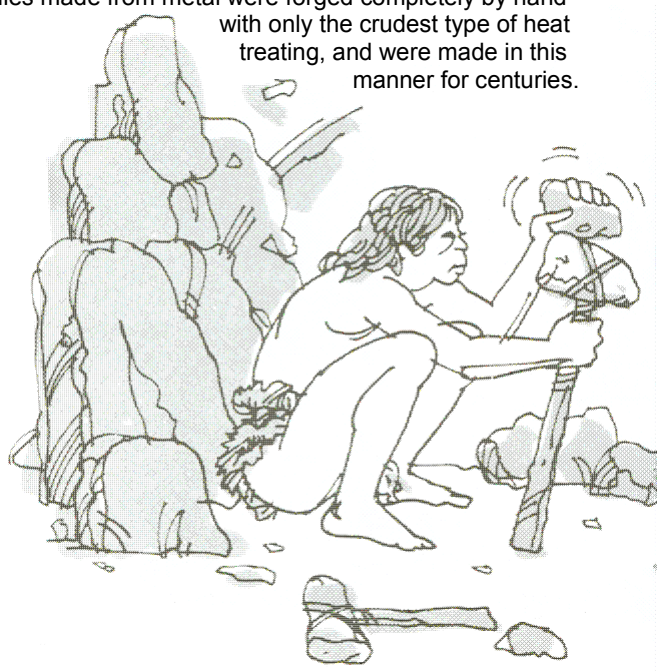
Available in a wide range of types and sizes, files have become very sophisticated. Every finishing operation has a file specifically suited to it. When you know and use the right file, your job is simplified, and you get the results you demand.

Simonds has been making files since 1836 and has pioneered improvements of this basic tool. We hope this booklet will help you use the right file in the Right way for the right job.

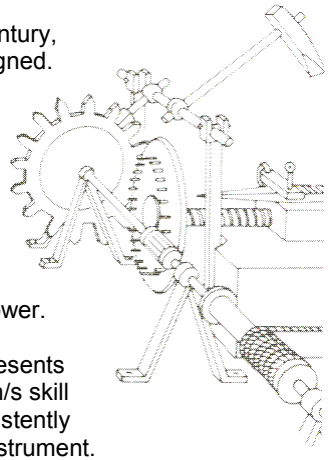
THE ANCIENT HISTORY OF THE MODERN FILE

The file is one of the oldest tools known to man. Its development probably came about when prehistoric man wanted a better cutting edge on his crude stone axe. The first file was probably a rough stone used with an abrasive effect to make the edge of an axe much thinner and sharper after long and hard labor.

With the advent of the metal age, files were made from bronze or iron. They were a great advancement, and form the basis for today's highly efficient file as a cutting tool. The first files made from metal were forged completely by hand with only the crudest type of heat treating, and were made in this manner for centuries.



Improvements occurred only as iron was improved and refined into what we now know as steel. Cutting the teeth into files was accomplished by the use of a hammer and chisel. Each tooth was made by striking a chisel at the proper angle and space. Making an entire file, which might have hundreds of teeth, was a long, tiresome job.



Near the end of the fifteenth century, a file cutting machine was designed. However, the first successful machine wasn't put into use until the middle of the eighteenth century. The power source for these early machines was water, which was later changed to steam, and finally to today's electric power.

Modern file manufacturing represents a unique blend of the craftsman/s skill and current technology to consistently produce a superior precision instrument. Today, our factories contain the most modern machinery available. Our experts process the finest steel (made to our specifications) to produce the world's best metal cutting files and rasps.

WHAT FILE FOR WHAT JOB?

Files are graded according to the degree of fineness or coarseness and whether the teeth are single- or double-cut.

Single-cut files have rows of teeth cut parallel to each other at an angle of about 65 degrees from the centerline. Single-cut files are used for sharpening tools, finish filing and draw-filing. They are also the best tools for smoothing the edges of sheet metal.

Double-cut files have rows of teeth criss-crossed so teeth become diamond-shaped for fast cutting. Use double-cut files for quick removal of material and for rough work.

The fineness or coarseness of a file indicates tooth spacing and the number of teeth per inch. There are three basic different grades: Bastard Cut, Second Cut and Smooth Cut. Bastard Cut has the fewest number of teeth per inch. Second Cut has more teeth per inch. Smooth Cut has the greatest number of teeth per inch. Varying degrees of coarseness or fineness are comparable only when files of the same length and shape are compared because coarseness of a file increases as the length from tip to heel increases. Which means a 6-inch file, either single or double-cut, has more teeth per inch than a 12-inch file.

DIFFERENT SHAPES FOR DIFFERENT SHAPES OF WORK

Use a triangular file on acute internal angles and to clear out square corners. Triangular, or three-square, files can also be used to sharpen saw teeth.

Use a mill file in smoothing lathe work, draw-filing and other fine precision work. Mill files are always single-cut.

Use a flat file for general purpose work - bastard cut for rough work and second cut or smooth for smooth finishing.

Use a square file to enlarge rectangular-shaped holes and slots. Round files do the same thing for round openings.

Use a half-round file when you want one file for a wide range of different jobs - the flat side on flat surfaces, the rounded side for curved surfaces.

Use Swiss Pattern files when fitting parts of delicate mechanisms.

HELPFUL TIPS AND PROPER TECHNIQUES FOR FILING

The Industrial Art: It is easier to train an apprentice to properly operate a lathe, planer or milling machine than it is to teach him good filing.

Flawless filing is an art. It is the mark of a first-rate craftsman. It recalls the old days when an apprentice had to file down given pieces of steel to the top edge of a line scribed by his maser craftsman. Then another piece was similarly treated, and the apprentice had to file both pieces so smoothly that they could be fitted together perfectly.

Filing, as an industrial art, must observe the basic principles governing the following: holding the work, kind of filing operation, worker's stance, gripping the file, stroking motion, and working pressure.

Holding the Work: Most work that is filed is held in a vise - unless it is held firmly, chattering and vibration will result. This would cause the file teeth momentarily to lose contact with the surface and the depth of cut would vary with unsatisfactory results and probable damage to the file.

The top of the vise should be on the same level as the elbow when the arm is bent. If the mechanic is of less than average stature, a small platform should be placed on the floor to achieve the proper working height. However, the work should be lowered if heavy filing is to be done. In die and tool making, much of the work is small and delicate. As this requires simply a movement of the arms or of one hand and arm alone, the vise and work should be higher - not only so the work can be more closely scrutinized and the movement of the file more accurately guided, but also the filer may be able to stand erect at his work.

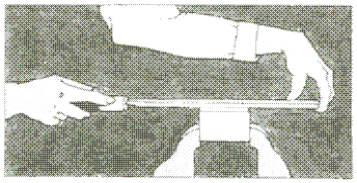
The high finish obtained after much time consuming effort may easily be marred if the work is held in the vise carelessly. Polished work and soft metal can be protected by pieces of copper, brass, zinc, tin plate or other soft metals placed between the jaws of the vise and the work. Pieces of wood are best when working on aluminum or lead. For highly polished work on mild steel for fine screw threads, pieces of leather are recommended.

Filing Operation: The three basic filing operations are:

- Straight-forward filing. In this operation the file is pushed straight ahead across the work.
- Draw-filing. This is an operation in which the file is grasped at each end, and with an even pressure alternately pulled and pushed over the work. The file remains perpendicular to the direction of motion.
- Lathe filing. This is an operation in which the file is stroked against the work as the latter revolves in a lathe.

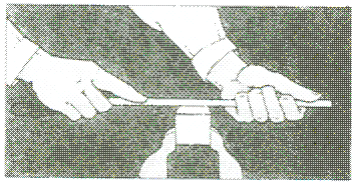
Filer's Stance: The feet should be placed well apart - the left foot being about 24 inches in front of the right foot. The operator should have the full free swing of the arms from the shoulder. Any separate movement of the wrist and elbow should be avoided if possible.

Gripping the File: The following directions are for files operated with both hands. They are intended for a right-handed person; although they will apply equally well for a left-handed person when the file positions are reversed.



Normal Filing

The handle of the file should be held in the right hand and the tip held with the left hand. Although the position of the left hand varies with the type of work to be done, the right-handed grip remains the same. The file handle rests in the palm of the right hand, with the thumb laying along the top of the handle and the fingers curling around the handle and pointing upward, all the fingers falling into a natural grip.

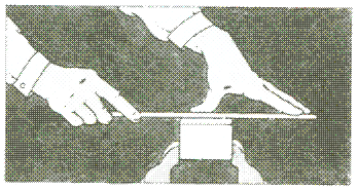


Heavy Stock Removal

When the top of the file is gripped with the left hand with the ball of the thumb pressing upon the top of the file and lying in line with the file axis, and with the fingers winding around the file, a powerful grip is secured that enables the maximum pressure to be applied and a large quantity of material to be removed. This grip is generally used with a medium or long file.

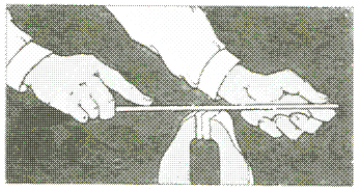
When a lighter stroke is desired and less pressure is to be applied, the direction of the left thumb is changed more and more until it lays at right angles, or nearly so, with the length of the file. The tip of the file is then held between just the thumb and the first two fingers of the left hand.

For Flat Filing, the thumb and fingers of the left hand are stretched as far apart as possible and pressed evenly against the file. This assures a uniform distribution of the pressure over the whole length. As a result, the file tends to remain horizontal and any unevenness in the surface can be readily detected. This position also permits the use of the file's full length, since the left hand is not in the way of the work.



Flat Filing

For Very Accurate Work, or when curved surfaces are to be filed, the tip of the file should be held by just the thumb and index finger of the left hand. This grip allows for maximum guidance and control.



Precision Work

When the file can be held with one hand, as in precision die work, the index finger of the right hand is generally placed on top of the handle so it lies as nearly as possible in the direction of the file. The thumb and other fingers fall into a natural grip.

Filing a Narrow Piece: On work of this sort, it is often easier to get and hold a flat surface if the file is held diagonally to the work. As the file is pushed forward, it is moved to the right from one end of the piece to the other. After a few strokes the process is repeated to the left so that an absolutely level, smooth finish is obtained.

Stroke and Pressure: The teeth of the file cut only on the forward stroke. Accordingly, the file should be carried forward on an almost straight line, with the pressure first applied

by the left hand at the beginning of the stroke, then later with both hands equally in the middle of the stroke, and finally with the right hand alone at the end of the stroke.

If pressure is applied on the return stroke, the teeth are dulled and the file quickly ruined. Except when working on soft metals, the return stroke should be made with the file lifted clear of the work. If too much pressure is employed on the forward stroke, the teeth are liable to clog or shell off. Just enough pressure should be applied to keep the file cutting efficiently.

Remember, at the start of the stroke, the leverage favors the right hand and the file tends to round off the near side of the work. As the stroke is completed, the leverage favors the left hand, with the file is brought down harder on the far side of the work - the file tends to develop a curved surface instead of a flat one. This may be minimized by carefully following the directions above. With practice, patience and perseverance, it is possible to file a surface that is absolutely true and square.

Beginners' Faults: Most defective filing is caused when the beginner allows the file to rock or see-saw, thereby producing a convex surface instead of the level surface desired. To avoid this, the body should be kept still and the arms made to pivot about the shoulders. Also, try not to remove too much metal in one stroke. Take it easy!

Make sure the file is clean before starting. If it is dirty, it can easily be cleaned with a file card. When a new file is used, rub it with chalk to keep the teeth from clogging. Merely rubbing soft chalk over the teeth prevents the filings from getting wedged in the teeth. Chalking is also an advantage during finishing as otherwise the pins are likely to scratch the work.

***** Never use a file without a handle. Never use a loosely fitting handle. *****

Draw-filing is defined as operating a file in such a way that its length is transverse to the direction of motion. Draw-filing is used where a smooth level surface on planes or edges of the work is desired.

The file is held with both hands, with the fingers on the edge away from the body and the thumbs on the edge toward the body of the filer. The file is alternately pulled toward the body then pushed away across the work with an even pressure. Draw-filing allows the file to be held steadily, resulting in a fine surface finish without scoring or scratching.

Ordinarily a single-cut mill bastard file or a long-angle lathe file should be used so the metal is cut with a true shearing or shaving action and scoring is avoided. If metal is to be removed rapidly or in comparatively large amounts, as for example, on the end of a metal plate or sheet, a flat or hand bastard file may be employed. This roughing down may then be followed by finishing with a mill file.

In draw-filing, the beginner has a tendency to apply most of his effort when the file is in the middle of its stroke. This can cause the surface to develop a hollow spot. This must be guarded against by careful testing after filing. Such a hollow area may be removed by applying a few more strokes at the end of the work.

To remove the sharp edge that draw-filing produces, hold the file at an angle and run it lightly down each edge.

Lathe Filing: If lathe tooling has been properly ground and set for the proper speed and feed, most work that is finish-turned on the lathe is smooth enough - no additional finishing is necessary. However, the work may sometimes have a slight taper that needs correction. Since another cut on the lathe may result in the work being undersize, the correction can be made easily by a filing operation known as lathe filing.

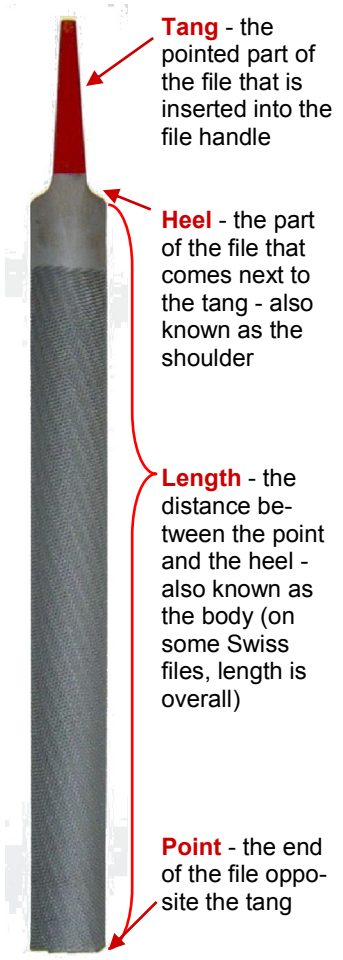
Unless lathe filing is properly performed, it will do more harm than good. First, select a long-angle lathe file to give a true shearing cut without producing ridges or scores (a single-cut mill bastard file may be used). The speed of the lathe should be increased to about 50% higher than normal. Ensuring that the work is revolved toward the operator, hold the file at a slight angle and use a long forward steady stroke, moving laterally about half the width of the file on each stroke. Don't hold the file rigid or stationary - keep stroking continually. Clean the file frequently with a file card or brush, occasionally applying chalk to prevent pinning or clogging of the teeth.

Using a File Card: As you file, the teeth may become clogged with some of the metal filings which can, in turn, scratch he work you are trying to make smooth. This condition is known as pinning and can be prevented by keeping the file teeth clean. Rubbing chalk between the teeth will also prevent pinning but the best method is to clean the file regularly with a file card or brush and brush with a pulling motion holding the card parallel to the rows of the teeth.

Care of Files: Take care to break in a new file gently by using it only on flat surfaces of soft metals such as brass, bronze, or smooth cast iron. Use only a light pressure to prevent tooth breakage. You can also protect file teeth by hanging the files in a rack when they are not in use, or by storing them in drawers with wooden partitions. Be sure to keep files away from water or moisture and avoid getting them oily. Oil makes the file slide across the work without much cutting. If you keep files in a tool box, be sure they're wrapped in paper or cloth for extra protection.

Safety: Never use a file without a tight-fitting handle. If you use a file that doesn't have a handle and the file hits something or gets jammed, the tang could easily be driven into your hand or cause some other injury.

COMING TO TERMS WITH THE FILE

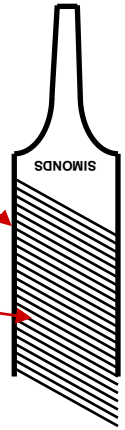


Tang - the pointed part of the file that is inserted into the file handle

Heel - the part of the file that comes next to the tang - also known as the shoulder

Length - the distance between the point and the heel - also known as the body (on some Swiss files, length is overall)

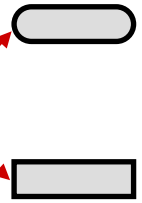
Point - the end of the file opposite the tang



Teeth - the cutting ridges on the file's surface

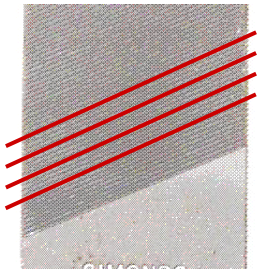
Side - the wide file surface

Edge - the narrow file surface - may be *round* or *square* - if no teeth are cut, they are known as *safe edges*

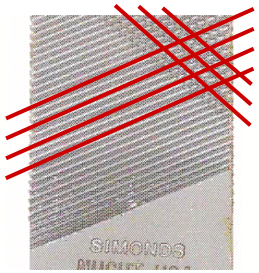


Back - the rounded side of all half-round files

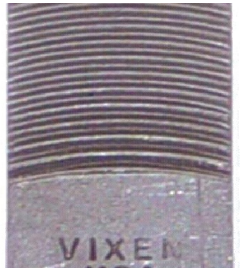
Cut - The character of the file teeth. The four standard file cuts are: Single-Cut, Double-Cut, Rasp-Cut and Curved-Cut. Curved-Cut.



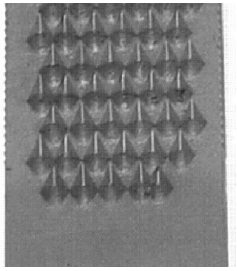
Single-Cut files have a single set of diagonal rows of teeth, parallel to one another and extending across the working face of the file.



Double-Cut files have two sets of diagonal rows. The first set is called the overcut. The second set is cut at a different angle with the file axis, and is known as the upcut (it is finer than the overcut).



Curved-Cut is an arrangement of file teeth in curved contours across the working face of the file. The teeth are milled with a decided undercut (or positive rake).

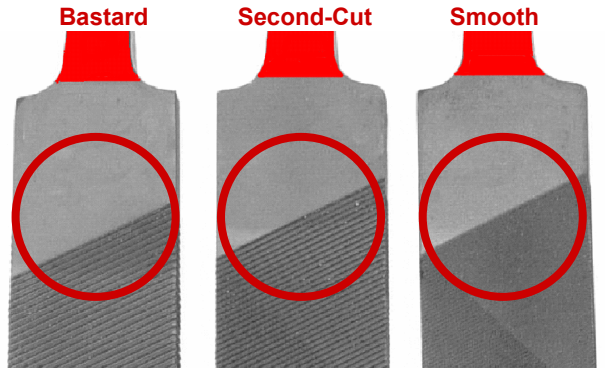


Rasp-Cut is a pattern where each tooth is individually formed by a single-point tool or punch - the teeth are formed separately and are disconnected.

Blunt: A file with edges and width parallel from end to end.

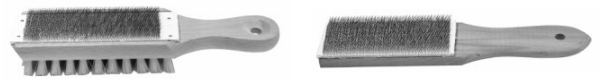
Taper: The reduction in the dimensions of a file from the heel toward the point. A file may taper in width, in thickness, or both.

Coarseness of Teeth: The spacing of the file teeth, or the number of teeth per inch - called as Bastard (coarsest), Second-Cut (medium), and Smooth (finest).



File Brush: A combination of a fiber-bristled brush and file card - used to clean dirt and chips from a file.

File Card: A wire brush for cleaning files.



SIMONDS FILE INNOVATIONS

Spiral Cut Half Round Files

No more sore elbows or uneven concave surfaces!

A built-in “twist & roll” action on the half round side allows a more natural filing motion and leaves a **super smooth finish**! Flat side available with Multi-Kut® for a wide range of uses

Multi-Kut® Files

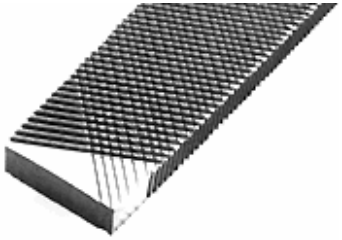
The “world’s most versatile file” - combines the best filing features of a Flat file and a Mill file.

Remove material faster while creating a smooth finish! The combination of coarse teeth and a double “chip breaker” groove cut into the file allows this product to do the work of a Flat file and a Mill file - **2 in one!** Feature available on Simonds Flat Files and the Flat side of Simonds Half Round Files!

SIMONDS FILE INNOVATIONS

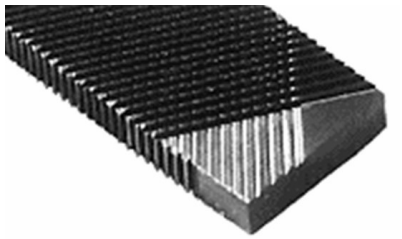
Nucut “Wavy Tooth” Files

A file innovation inspired by the Simonds Variable Pitch band saw blade! This file cut offers a unique design of “coarse to fine to extra fine” tooth spacing that enables material to be removed faster and smoother without “chatter”. Due to reduced stress on the file teeth, **this file will last longer**! Hogging has never been easier!



Black MaxiSharp® Files

The Premium hand file range!



Select Simonds files are specially treated with a black oxide coating. Black Maxi Sharp® Files last longer due to the **increased resistance to loading** in use and **increased resistance to rust** that the coating imparts to the file.

THE WORK RELATED FILE FINDER

Aluminum Alloy	Flat Bastard File, Aluminum File, Multi-Kut File or Vixen File
Auger Bit	Auger Bit File
Auto Body	Flexible Vixen File or special 14" Auto Body Files
Babbitt	Vixen File
Bearing, Brass	Lead Float File or Multi-Kut File
Bearing, Bronze	Flat Bastard File or Multi-Kut File
Beveling	Flat Bastard, Second-Cut and Smooth-Cut File
Blacksmith	Rasp and Flat Bastard File
Bolt Threads	Taper, Mill or Knife File
Brass	Flat Bastard File or Multi-Kut File
Bronze	Flat Bastard File or Multi-Kut File
Cabinet, Wood	Cabinet File or Cabinet Rasp
Cast Iron	Flat, Half-Round, Square or Round File, according to shape of material
Casting, rough	Flat Bastard File
Conduit	Flat Bastard File, Round File for inside diameter
Contact Points	Contact Point File
Copper	Flat Bastard File or Multi-Kut File
Cutter, Machine Tool	This tool is genearally ground and sharpened by an emery wheel - can be filed only when in an annealed condition; use file to suit sahpe of surface
Cutter, Milling	See Cutter, Machine Tool
De-Scaling	Flat Bastard File or Multi-Kut File
Die Block	Flat Bastard File or Multi-Kut File

Die Casting	Flat Bastard File, Half-Round Bastard File, Round Bastard File, Multi-Kut File, Square Bastard File, or Mill Bastard File, according to shpae of the die casting and finish desired
Die Forging	Flat Bastard File or Half-Round Bastard File, according to shape of the die forging
Die Shop	Swiss Pattern Files of appropirate shape
Electric Connections (Cleaning)	If surface is alrge, use Mill bastard File, otherwise use Contact Point File
Fender, Auto	Flexible Vixen File or 14" Flat Special Body File
Fiber	Flat Bastard File or Rasp
Fin Work	Swiss Pattern Files
Finishing	Mill Bastard File - for lathe filing, use Mill Bastard File or Long Angle Lathe File
Foundry, Casting	Flat Bastard File
Furniture Making	Cabinet File, Cabinet Rasp or Mill Bastard File
Garden Tool	Rotary Mower and Garden Tool File or Mill Bastard File
Grooving	Square Bastard, Round Bastard, Half-Round Bastard, or Slim Taper, according to shape of groove.
Hand Edge Tools	Rotary Mower and Garden Tool File or Mill Bastard File
Hard Rubber	Flat Bastard File
Hole	Round Bastard File or Square Bastard File

Horn, Cattle	Shoe Rasp
Horseshoeing	Horse Rasp
Hot Metal, Filing	Flat Bastard File
Iron	Coarse or Bastard-Cut File, according to shape of material
Joint, Mortise and Tenon	Cabinet File or Cabinet Rasp
Joint, Solder	Vixen File
Keyway	Square Bastard or Pillar Bastard File
Keys, Filing	Warding Bastard File
Knife	Mill Files
Lathe-Turned Section	Mill Bastard File or Long Angle Lathe File
Lawn Mower	Mill Bastard File or Rotary Mower Garden Tool File
Lead	Vixen Babbitt File
Lead Pipe, Fitting	Vixen Half-Round File
Lock, Mending	Warding Bastard File
Machinists' Work	Machinists' File such as Flat, Half-Round, Square or Round - also Mill or Tapers, in cuts according to work
Millwrights' Work	Flat, Half-Round, Round, Square, Mill or Taper in cuts according to work
Model, Metal	Swiss Pattern Files
Molded Part	Flat Bastard File or Mill Bastard File
Notch	Taper or Knife File
Ornaments, Wood Making	Cabinet File, Cabinet Rasp, Round, Bastard, Mill Bastard and Slim Taper File
Pattern Making, Wood	Cabinet File, Cabinet Rasp, Round Bastard, Square Bastard, Mill Bastard and Slim Taper Files
Pipe Fitting	Half-Round Bastard File

Planer Knife, Carbon Steel	Mill Bastard File
Plastics	Flat Bastard File, also Mill Bastard File, sharpened for plastics
Plumbers' Work	Half-Round Bastard File
Rotary Mower Blade	Rotary Mower and Garden Tool File
Rough Filing	Coarse or Bastard-Cut File, according to shape of material
Slot	Knife File or Slim Taper
Snagging	Flat Bastard File
Soft Metal	Flat Bastard File or Vixen File
Solder	Vixen File
Stainless Steel	Flat, Multi-Kut or Mill File, sharpened for stainless
Steel	Flat Bastard File
Steel Alloy	Use file applicable to the shape of the material - file steel alloy only when it is annealed
Switch Contacts	Contact Point File or Mill Bastard File, according to surface area of switch contacts
Switch, Electric	Mill Bastard File or Contact Point File, according to size of switch
Template	Files, including Flat Bastard File, Half-Round Bastard File, Mill Bastard File, or Round Bastard File
V-Groove	Knife File
Voltage Regulator	Voltage Regulator File
Woodworking	Cabinet File or Cabinet Rasp
Zinc	Vixen File

THE SAW FILE FINDER

Band Saw	Band Saw Taper Single-Cut File
Cant Saw	Cant Saw File or Mill Bastard File
Chain Saw	Round File, Special Square File or Lozenge File (Special Mill File for depth gauge)
Circular Saw	Mill Bastard File, Cant Saw File and Slim Taper Files
Cross-Cut Saw	Cross-Cut Saw File, Mill File, Round File or Round Edge Mill File
Hand Saw	Slim Taper, Extra Slim Taper or Double Extra Slim Taper File, according to points of saw - file recommended for saw points per inch 5 - 7" Regular Taper 5-1/2 - 7" Regular Taper 6 - 7" or 8" Slim Taper 7 - 7" or 8" Slim Taper 8 - 6" Slim Taper, 7" Extra Slim Taper or 8" Double Extra Slim Taper 9 - 6" Extra Slim Taper, 7" Double Extra Slim Taper 10 - 5" or 6" Extra Slim Taper
Wood or Buck Saw	Mill Bastard File or Slim Taper File

ILLUSTRATED FILE FINDER

Cross-Section	Name	Shape	C
	Flat	Rectangular	U c
	Hand	Rectangular	C s
	Pillar	Almost Square	C s
	Warding	Thin	U c
	Square	Square	B s
	Three-Square	Triangular	S s
	Round	Circular	U c
	Half-Round	Third-Circular	U c
	Knife	Knife-Shaped	U c

ILLUSTRATED FILE FINDER F

Cross-Section	Name	Shape	C
	Aluminum	Flat Rectangular	M c
	Aluminum	Half-Round	M c
	Long Angle Lathe	Flat Rectangular	M c

R FOR MACHINISTS' FILES

Character of Teeth	Taper	General Uses
Usually bastard, also second-cut and smooth	Tapered in width	A general-purpose file
One-edge safe - bastard, second-cut and smooth	Uniform in width	Finishing flat surfaces
One-edge safe - bastard, second-cut and smooth	Uniform in width	Keyways, slots, narrow work
Usually bastard, also second-cut and smooth	With sharply tapered, thickness uniform	Filing ward notches in keys, narrow work
Bastard, second-cut and smooth	Tapered	Enlarging holes or recesses, mortises, keyways and splines
Sharp edges - bastard, second-cut and smooth	Tapered	Filing acute angles, corners, grooves, notches
Usually bastard, also second-cut and smooth	Either tapered ("rat tail") or blunt	Enlarging holes, shaping curved surfaces
Usually bastard, also second-cut and smooth	Usually tapered	Concave corners, crevices, round holes
Usually bastard, also second-cut and smooth	Tapered, curving to a narrow point	Cleaning out acute angles, corners, slots

FOR SPECIAL-PURPOSE FILES

Character of Teeth	Taper	General Uses
Made in one cut only - fast-cutting teeth	Tapered	Filing aluminum alloys and other soft metals
Made in one cut only - fast-cutting teeth	Slightly tapered	Filing aluminum alloys and other soft metals
Made in one cut only - fast-cutting teeth	Slightly tapered	Lathe work where smooth finish is desired, also soft metals

ILLUSTRATED FILE FINDER

Cross-Section	Name	Shape	C
	Hand	Rectangular	D a s
	Pillar	Width narrower than Hand file	D b
	Warding	Thin rectangular	D s
	Square	Square	D
	Three-Square	Triangular (equilateral)	D s
	Round	Circular	D
	Half-Round	Third circular	D
	Knife	Knife-shaped	D s
	Crossing	Oval, with unequal radii	D
	Equaling	Rectangular	D s
	Barrett	Trapezoidal	C o
	Crochet	Flat, with round edges	D
	Cant	Triangular (Isosceles)	D s e
	Slitting	Flat diamond	D s e
	Pippin	Apple seed	D

FOR SWISS PATTERN FILES

Character of Teeth	Taper	General Uses
Double-cut on two flat faces and one edge - other edge safe or uncut	Uniform in width	Flat surfaces
Double-cut on two flat faces - both edges safe	Uniform in width	Flat surfaces, slots
Double-cut on two flat faces, single-cut on two edges	Tapered in width, uniform in thickness	Slots, locks and keys
Double-cut	Tapered	Corners, holes
Double-cut on three faces, single-cut on edges	Tapered	Corners, holes
Double-cut	Either tapered or uniform (straight)	Corners, holes
Double-cut	Tapered	Corners, holes
Double-cut on flat faces, single-cut on edges	Tapered	Slots
Double-cut	Tapered	Corners, holes
Double-cut on flat faces, single-cut on edges	Uniform in width	Slots, corners
Cut only on wide flat face - other faces safe	Tapered	Corners, flat surfaces, burring gear teeth
Double-cut	Tapered	Slots, flat surfaces, rounded corners
Double-cut on three faces, single-cut on two sharp edges	Tapered	Corners
Double-cut on four faces, single-cut on two sharp edges	Blunt	Slots, corners
Double-cut	Tapered	Rounded corners, holes

SAFETY

- Never use a file without a properly installed handle. If you use a file that doesn't have a handle and the file hits something or gets jammed, the tang could easily be driven into your hand or cause some other injury
- Always secure the work in a proper clamping device - never file material held in your hand.
- Wear safety glasses - don't take the chance of getting filings in your eyes.
- When lathe filing, respect the machinery - use all safety guards and utilize safe operating procedures. Make sure the work is rotating towards you.

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NOTES

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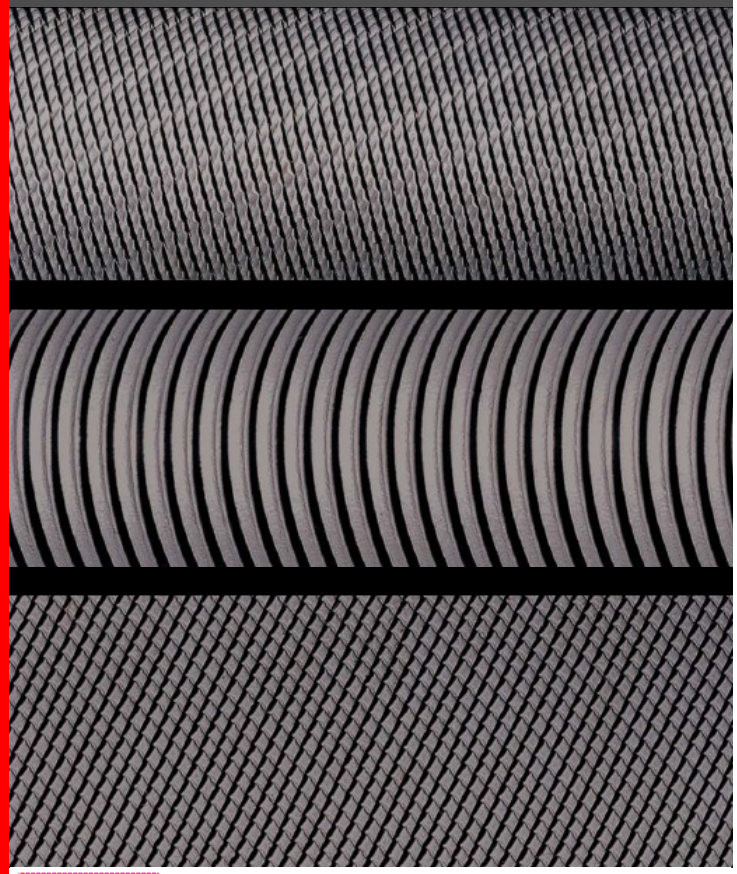

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