

WELCOME

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We wish you good luck and success in your studies and in your aviation career!

REVISION LOG

VERSION	EFFECTIVE DATE	DESCRIPTION OF CHANGE
001	2016 01	Module Creation and Release
002	2016 08	Module Revisions
003	2019 10	Refined content sequencing to Appendix 1.
003.1	2021 10	Corrected description of file types (Sub-Module 07, Pages 3.15-3.16)

Version 003 - The following content was added for clarity:

Sub-Module 01	International Fire Classification
Sub-Module 02	Tool Care
Sub-Module 06	Accuracy of Drilled Holes; Formula for Determining Bow
Sub-Module 08	Cleco Fasteners
Sub-Module 11	Types of Lubricants
Sub-Module 13	Bowden Cables
Sub-Module 14	Composite Bonding; Ultrasonic Inspection
Sub-Module 16	Example Mass And Balance Computations
Sub-Module 17	Storage Methods
Sub-Module 18	Rewrite of Non-destructive Testing Methods
Sub-Module 19	Heavy Landing Inspection Checklist

MODULE EDITIONS AND UPDATES

ATB EASA Modules are in a constant state of review for quality, regulatory updates, and new technologies. This book's edition is given in the revision log above. Update notices will be available Online at www.actechbooks.com/revisions.html

If you would like to be notified when changes occur, please join our mailing list at www.actechbooks.com

Revision Version 003.1 - Effective Date: 2021 10

Crossfiling involves clamping the metal between two strips of wood and filing the edge of the metal down to a preset line. Draw filing is used when larger surfaces need to be smoothed and squared. It is done by drawing the file over the entire surface of the work.

To protect the teeth of a file, files should be stored separately in a plastic wrap or hung by their handles. Files kept in a toolbox should be wrapped in waxed paper to prevent rust from forming on the teeth. File teeth can be cleaned with a file card.

Most files are made of high-grade tool steels that are hardened and tempered. Files are manufactured in a variety of shapes and sizes. They are known either by the cross section, the general shape, or by their particular use. The cuts of files must be considered when selecting them for various types of work and materials. Files are used to square ends, file rounded corners, remove burrs and slivers from metal, straighten uneven edges, file holes and slots, and smooth rough edges.

Files have three distinguishing features: (1) their length, measured exclusive of the tang (*Figure 3-24*); (2) their kind or name, which has reference to the relative coarseness of the teeth; and (3) their cut.

Files are usually made in two types of cuts: single cut and double cut. The single cut file has a single row of teeth extending across the face at an angle of 65° to 85° with the length of the file. The size of the cuts depends on the coarseness of the file. The double cut file has two rows of teeth that cross each other. For general work, the angle of the first row is 40° to 45°. The first row is generally referred to as "overcut," and the second row as "upcut;" the upcut is somewhat finer and not as deep as the overcut.

Files-Types And Use

Files and rasps are cataloged in three ways:

- Length. Measuring from the tip to the heel of the file. The tang is never included in the length.
- Shape. Refers to the physical configuration of the file (circular, rectangular, or triangular or a variation thereof).
- Cut. Refers to both the character of the teeth or the coarseness — rough, coarse, and bastard for use on heavier classes of work and second cut, smooth and dead smooth for finishing work.

Most Commonly Used Files: (*Figure 3-25*)

- Hand files—These are tapered in width and parallel in thickness. They have one safe edge (smooth edge) which permits filing in corners, and on other work where a safe edge is required. Hand files are double cut and used principally for finishing flat surfaces and similar work.
- Flat files—These files are slightly tapered toward the point in both width and thickness. They cut on both edges as well as on the sides. They are the most

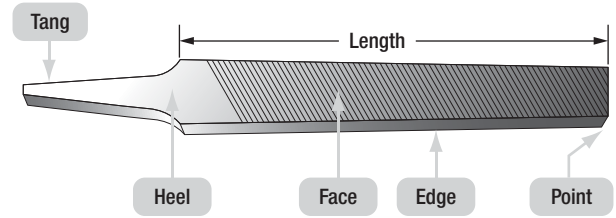


Figure 3-24. Hand file.

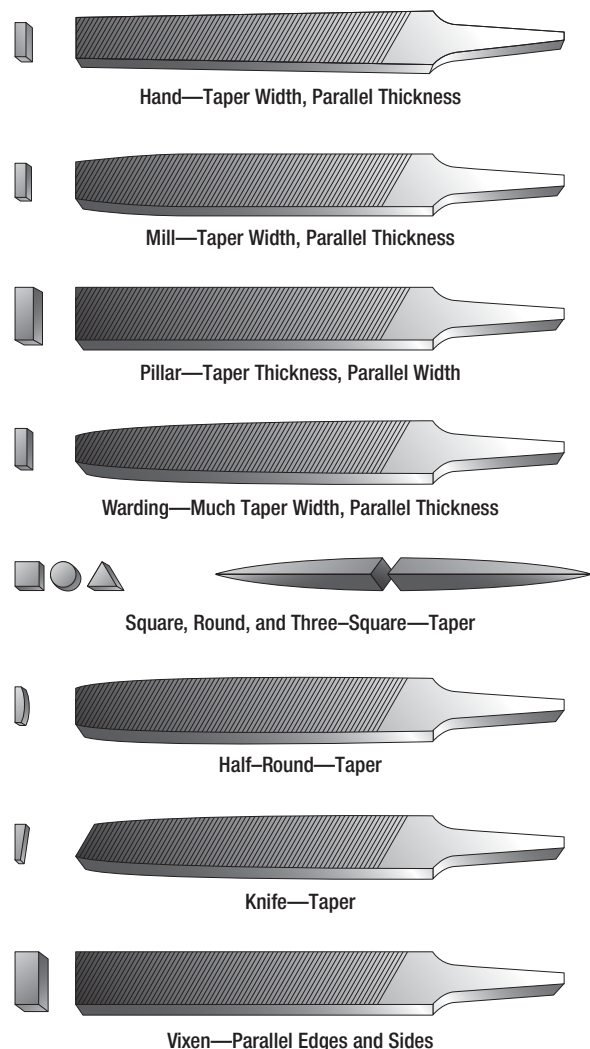


Figure 3-25. Types of files.

common files in use. Flat files are double cut on both sides and single cut on both edges.

- Mill files—These are usually parallel in thickness and tapered in width for about 1/3rd of its length. The teeth are ordinarily single cut. These files are used for draw filing and to some extent for filing soft metals.
- Square files—These files may be tapered or blunt and are double cut. They are used principally for filing slots and key seats, and for surface filing.
- Round or rattail files—These are circular in cross section and may be either tapered or blunt and single or double cut. They are used principally for filing circular openings or concave surfaces.
- Triangular and three square files—These files are triangular in cross section. Triangular files are single cut and are used for filing the gullet between saw teeth. Three square files, which are double cut, may be used for filing internal angles, clearing out corners, and filing taps and cutters.
- Half-round files—These files cut on both the flat and round sides. They may be single or double cut. Their shape permits them to be used where other files would be unsatisfactory.
- Lead float files—These are especially designed for use on soft metals. They are single cut and are made in various lengths.
- Warding file—Rectangular in cross section and tapers narrowly in width. This file is used for narrow space filing where other files cannot be used.
- Knife file—Knife blade section. This file is used by tool and die makers on work having acute angles.
- Wood file—Same section as flat and half-round files. This file has coarser teeth and is especially adaptable for use on wood.
- Vixen (curved-tooth files)—Curved-tooth files are especially designed for rapid filing and smooth finish on soft metals and wood. The regular cut is adapted to work on cast iron, soft steel, copper, brass, aluminum, wood, slate, marble, fiber, rubber, and so forth. The fine cut gives excellent results on steel, cast iron, phosphor bronze, white brass, and all hard metals. The smooth cut is used where the amount of material to be removed is very slight, but where a superior finish is desired.

The following methods are recommended for using files:

1. Crossfiling. Before attempting to use a file, place a handle on the tang of the file. This is essential

for proper guiding and safe use. In moving the file endwise across the work (commonly known as crossfiling), grasp the handle so that its end fits into and against the fleshy part of the palm with the thumb lying along the top of the handle in a lengthwise direction. Grasp the end of the file between the thumb and first two fingers.

To prevent undue wear of the file, relieve the pressure during the return stroke.

2. Drawfiling. A file is sometimes used by grasping it at each end, crosswise to the work, then moving it lengthwise with the work. When done properly, work may be finished somewhat finer than when crossfiling with the same file. In drawfiling, the teeth of the file produce a shearing effect. To accomplish this shearing effect, the angle at which the file is held with respect to its line of movement varies with different files, depending on the angle at which the teeth are cut. Pressure should be relieved during the backstroke.
3. Rounding corners. The method used in filing a rounded surface depends upon its width and the radius of the rounded surface. If the surface is narrow or only a portion of a surface is to be rounded, start the forward stroke of the file with the point of the file inclined downward at approximately a 45° angle. Using a rocking chair motion, finish the stroke with the heel of the file near the curved surface. This method allows use of the full length of the file.
4. Removing burred or slivered edges. Practically every cutting operation on sheet metal produces burrs or slivers. These must be removed to avoid personal injury and to prevent scratching and marring of parts to be assembled. Burrs and slivers will prevent parts from fitting properly and should always be removed from the work.

Lathe filing requires that the file be held against the work revolving in the lathe. The file should not be held rigid or stationary but should be stroked constantly with a slight gliding or lateral motion along the work. A standard mill file may be used for this operation, but the long angle lathe file provides a much cleaner shearing and self-clearing action. Use a file with "safe" edges to protect work with shoulders from being marred. There are several precautions that any good craftsman will take in caring for files.