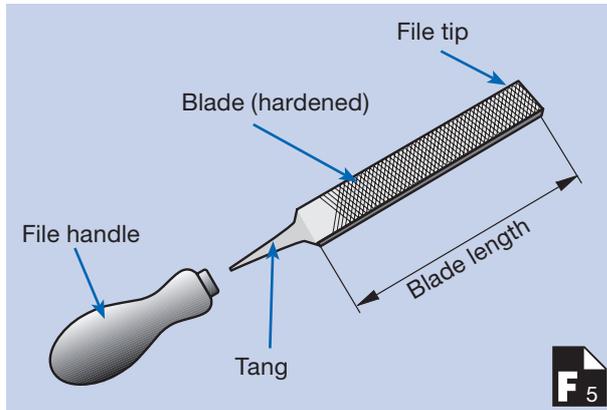## 3.5 General information about filing

Filing is a cutting process for shaping and finishing workpieces. The action of filing removes numerous small chips from the workpieces. Filing can be done by hand or on a machine.

Individual parts of a file

F 5

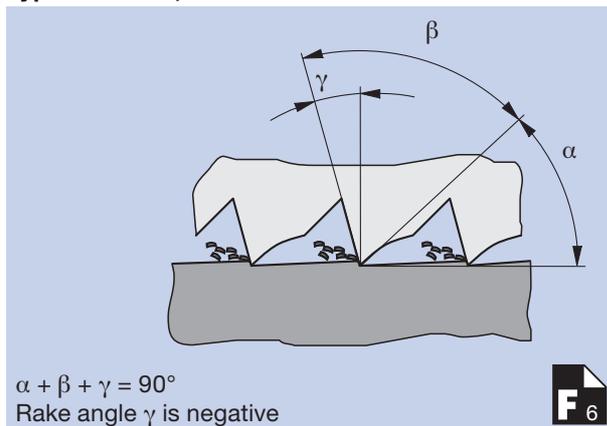## 3.6 Components of the file and how it works

Individual parts of a file

A file consists of a hard file blade, a soft tang and a file handle. The size of a file is denoted by its length (the length of its blade).
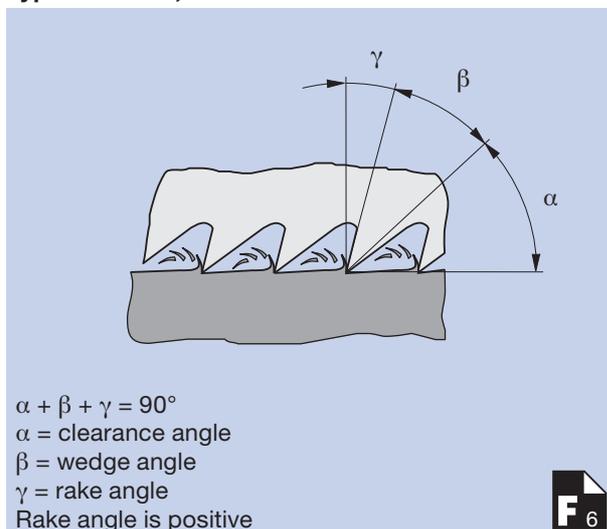
Example file designation

File A 300-1

A   = flat hand file

300 = blade length 300 mm

1   = grade of cut 1 (coarse file)

Types of tooth, hewn file

$\alpha + \beta + \gamma = 90°$
Rake angle γ is negative

F 6

Types of tooth

Files have the following different types of tooth:
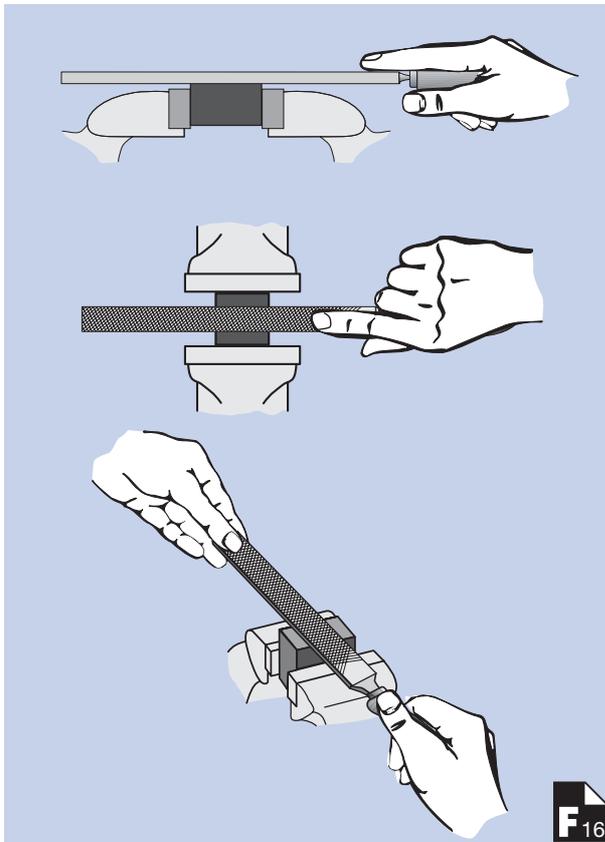
▶   Hewn teeth and

▶   Milled teeth

Hewn teeth have a scraping effect. They are suitable for hard materials (steel, cast iron).

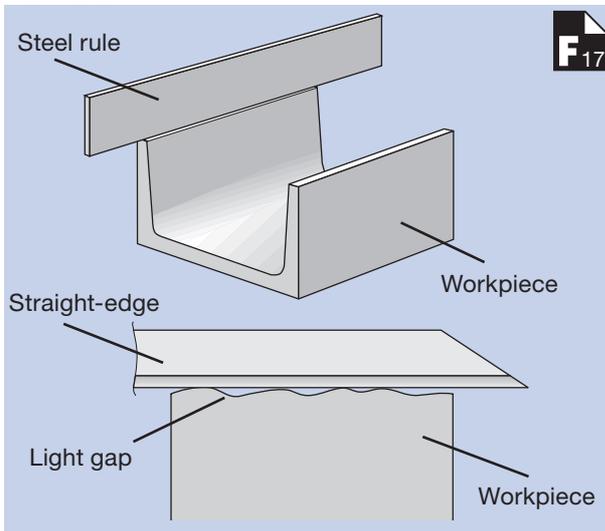Milled teeth have a cutting effect. They are suitable for soft materials (wood, aluminium, plastic).

Types of tooth, milled file

$\alpha + \beta + \gamma = 90°$
α = clearance angle
β = wedge angle
γ = rake angle
Rake angle is positive

F 6
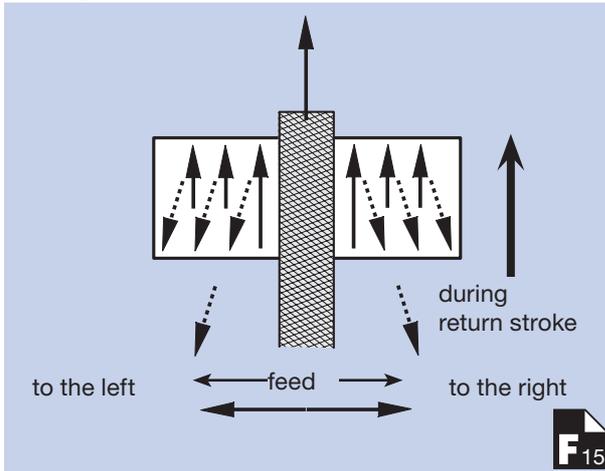
Feed

Chips can be removed evenly by means of equal feed motion to both sides.

A good match between the forces to be applied and the motion completed is vital for:

- ▶ Moving the file correctly
- ▶ The quality of filing work
- ▶ Rational chip removal

Cutting motion

during return stroke

to the left   feed   to the right
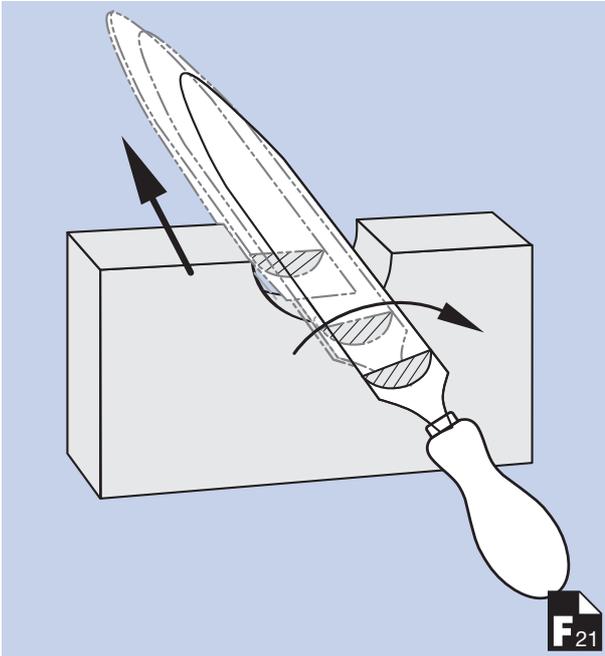
F 15

Holding medium and small files

Wrap your right hand around the file handle so that your index finger is lying on the blade, or additionally take hold of the head of the file with the thumb and index finger of your left hand.

Holding small files
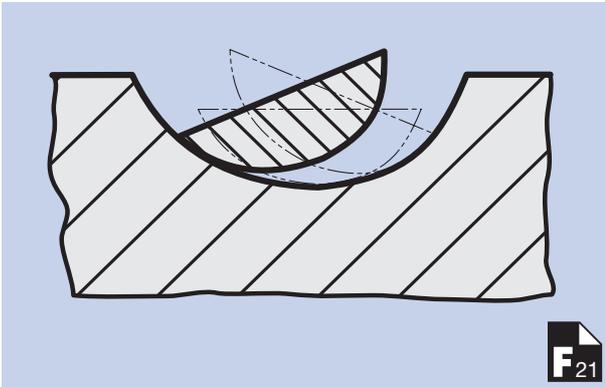
F 16

Checking evenness (light gap method)

To check evenness, place the edge of a steel rule on the surface being filed. Hold the workpiece up against a light source with the steel rule at eye level. A light gap will appear where there are recesses.

To achieve an even surface, file down the problem areas identified.

Light gap method

Steel rule

F 17

Workpiece

Straight-edge

Light gap

Workpiece

Internal curvature

Half round or round files are needed to file internal curvatures.

The radius of the file must always be smaller than the radius to be produced.

Moving without side feed

▶ Scribe an internal radius using a template or dividers. Use an insert when scribing with dividers (height adjustment).

▶ Using a coarse file, file the radius until just before the scribing mark. (Allow for the necessary finishing allowance.) The file moves in a straight line during this process, as it does during even filing.

Rotation of the file through the longitudinal axis

▶ Use a fine file to file and finish the radius. Make sure that the file turns through its longitudinal axis. This produces feed from the side.

▶ The feed from the side generated with the half round file should be reduced at the exit edges of the radii.
Risk of slipping!

▶ Deburr the workpiece on all sides.

Symbols for groove direction
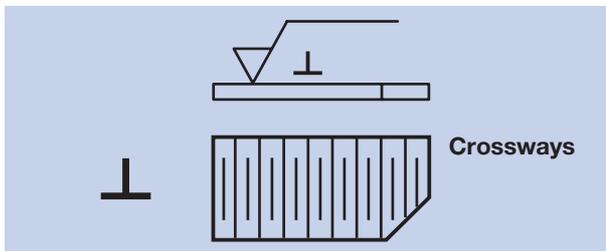## DIN EN ISO 1302

If the surfaces of workpieces need to have a specific groove direction (e.g. file stroke direction), this information is specified in the workshop drawing as follows according to DIN EN ISO 1302:

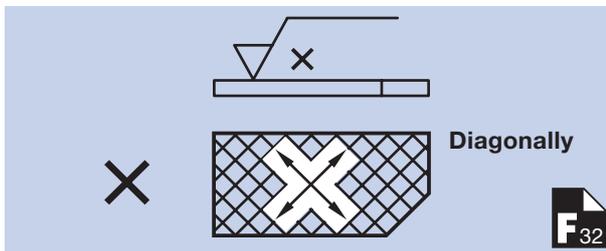**Groove direction (DIN EN ISO 1302)**
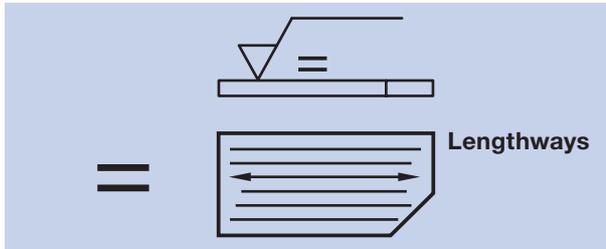
Groove direction parallel to the longest workpiece edge in which the symbol is being used

(lengthways)

At right angles to the longest workpiece edge in which the symbol is being used

(crossways)

Groove direction crossing

(diagonally)