

## 84.61

**84.61 - Machine-tools for planing, shaping, slotting, broaching, gear cutting, gear grinding or gear finishing, sawing, cutting-off and other machine-tools working by removing metal or cermets, not elsewhere specified or included.**

8461.20 - Shaping or slotting machines

8461.30 - Broaching machines

8461.40 - Gear cutting, gear grinding or gear finishing machines

8461.50 - Sawing or cutting-off machines

8461.90 - Other

The heading covers machine-tools working by removing metal or cermets, not elsewhere specified or included.

In general machine-tools are power-driven but similar machines, worked by hand or pedal, are also covered by this heading. These latter types can be distinguished from the hand tools of heading 82.05 and from the tools for working in the hand of heading 84.67, by the fact that they are usually designed to be mounted on the floor, on a bench, on a wall or on another machine, and are thus usually provided with a base plate, mounting frame, stand, etc.

The heading includes :

- (1) **Planing machines** which are for working the external plane or sectional surfaces of an article with the help of tools with a single cutting edge. These are machine-tools in which the tool is fixed while the table holding the article to be planed moves with a reciprocating planar motion. However, certain large planing machines such as pit planing machines or plate edge planers have a fixed table and are used for working articles of a great length (e.g., rails).

Some planing machines are fitted with one or two auxiliary or additional milling machine carriages, which replace an equal number of planing carriages. These machine-tools called "planing and milling machines" are considered as planing machines, even though it is possible by reducing the speed of the table to use them for milling work. They must not be confused with some milling machines called "plano-milling machines" of heading 84.59, the appearance of which is similar to that of a planing machine, but which are equipped only with milling carriages.

Planing machines may also possess one or two grinding slides in addition to planing carriages. The addition of these grinding heads allows these planing machines to be used as table surface trueing machines. Some models are fitted at one and the same time with planing carriages, milling carriages and grinding slides, while others are fitted with devices to allow them to carry out slotting work.

- (2) **Shaping machines** which are machine-tools operating on the planing principle and which can be differentiated from planing machines by the fact that the article to be worked is fixed during the cut, while the tool moves with a reciprocating linear movement. Because of the overhang of the tool holder, its maximum run is limited and for this reason the shaping machine is usually restricted to working articles of small dimensions.

- (3) **Slotting machines** which are machine-tools operating by the planing method in which the article to be worked is immobile during the cut, while the tool is moved with a reciprocating linear movement in vertical or sometimes inclined direction. These machines, by reference to use, are slotting tools which are machines characterised by their short slide stroke; slotting-punching machines for carrying out the work necessary for the rapid removal of considerable quantities of material from an extra thick article. These machines use either slide tools (with a single cutting edge), or a punching tool (with four cutting edges); vertical slotting machines; slotting with transverse displacement slide; machines called "grooving machines" (by pulling or pushing), the working process of which resembles that of broaching machines the difference being the tool used.
- (4) **Broaching machines.** The tool (the broach) is pulled or pushed across the work or through a hole, for surface working or shaping. Among the different types of broaching machines are horizontal or vertical machines with simple slide; double machines ("duplex") which consist of two slides each working on one broach or broaching presses which are vertical machines working on the broach by pressure.
- (5) **Gear-cutting, gear-grinding and gear-finishing machines.** This heading covers gear-cutting machines designed exclusively for making gears by removing metal from cylindrical or conical blanks.

Gear-cutting machines work principally according to the following processes :

- module-controlled milling-cutting in which a milling disc or conical cutter is used as a tool. This process is currently used for cutting spur gearing;
  - reproduction cutting in which the teeth are produced by a planing tool (straight cutting tool). This process is for bevel gear-cutting and cylindrical gear-cutting;
  - cutting by meshing, using a tool such as a worm hob, a rack cutting tool (or chasing tool) or a pinion tool (for circular cutter). This process allows internal or external straight or helical and conical gears to be worked;
  - abrasive cutting.
- (6) **Sawing machines.** Depending on the form of tool used, the following machines on this type can be distinguished :
- reciprocating sawing machines or oscillating sawing machines in which the tool consists of a straight toothed blade which moves with a reciprocating linear movement;
  - circular saws, which employ a circular tool, toothed on its outer edge and turning at great speed. This tool is commonly called a "slitting saw blade" or "slotting saw blade";
  - bandsaw sawing machines, which use a very long blade, one side of which is toothed and the ends of the blade are joined to form a band.
- (7) **Cutting-off machines.** These machine-tools differ from sawing machines by virtue of the tools they use. The latter can be either cutting tools analogous to lathe tools, or abrasive or metal discs.
- cutting-off machines with cutting tools employ either of two methods.

One type works in the same way as slide lathes but is distinguishable from them by the fact that the tool holders cannot be moved lengthwise, unlike the saddles of slide lathes.

The other type works like a spindle or axle turning machine in which the tool itself is fixed while the article to be worked moves on a carriage. It is distinguishable from the latter, however, by the fact that the article to be worked can only be moved in one direction.

Both the above types can only carry out one cutting-off operation.

Those which work like slide lathes consist of a hollow spindle of large diameter which works on the rotating articles. A very short bed supports one or two tool holders which can be moved transversely. In those which work like a spindle or axle turning machine, the article to be cut is fixed on a carriage which enables it to be moved. The tool itself is fixed on the machine and consists of a crown turning at high speed on which cutting tools are arranged in rings;

- cutting-off machines with abrasive discs have a construction similar to those of circular saws, but the slitting saw blade is replaced by a double-edged abrasive wheel;
  - cutting-off machines with metal discs, also known as friction sawing machines, are characterised by the fact that they operate by means of a mild steel disc with a toothless periphery. This disc, which may be fluted, is rotated in such a way as to give it a peripheral speed such that if the periphery of the disc is gradually brought in close proximity to a piece of metal, the latter immediately melts without having close contact with the disc. This phenomenon is the result of friction combined with the oxidising action of the air trapped between the disc and the metal to be cut.
- (8) **Filing machines**, which are of similar design to reciprocating sawing machines but which use a file rather than a blade.
- (9) **Engraving machines**, other than those of heading 84.59 or 84.60.

#### PARTS AND ACCESSORIES

**Subject** to the general provisions regarding the classification of parts (see the General Explanatory Note to Section XVI), parts and accessories (**other than** the tools of **Chapter 82**) of the machine-tools of this heading are classified in **heading 84.66**.

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The heading also **excludes** :

- (a) Hand tools (**heading 82.05**).
- (b) Machine-tools for working any material by removal of material, by laser or other light or photon beam, ultrasonic, electro-discharge, electro-chemical, electron beam, ionic-beam or plasma arc processes; water-jet cutting machines (**heading 84.56**).
- (c) Machining centres, unit construction machines (single station) and multi-station transfer machines, for working metal (**heading 84.57**).
- (d) Tools for working in the hand, pneumatic, hydraulic or with self-contained electric or non-electric motor (**heading 84.67**).
- (e) Machines and appliances for testing, of **heading 90.24**.