

Grinding machine

A **grinding machine** is a machine tool used for producing very fine finishes or making very light cuts, using an abrasive wheel as the cutting device. This wheel can be made up of various sizes and types of stones, diamonds or of inorganic materials. For machines used to reduce particle size in materials processing see grinding.

Construction

The grinding machine consists of a power driven grinding wheel spinning at the required speed (which is determined by the wheel's diameter and manufacturer's rating, usually by a formula) and a bed with a fixture to guide and hold the work-piece. The grinding head can be controlled to travel across a fixed work piece or the workpiece can be moved whilst the grind head stays in a fixed position. Very fine control of the grinding head or tables position is possible using a vernier calibrated hand wheel, or using the features of NC or CNC controls.

Grinding machines remove material from the workpiece by abrasion, which can generate substantial amounts of heat; they therefore incorporate a coolant to cool the workpiece so that it does not overheat and go outside its tolerance. The coolant also benefits the machinist as the heat generated may cause burns in some cases. In very high-precision grinding machines (most cylindrical and surface grinders) the final grinding stages are usually set up so that they remove about 2/10000mm (less than 1/100000 in) per pass - this generates so little heat that even with no coolant, the temperature rise is negligible.

Types of grinders

These machines include the

- Belt grinder, which is usually used as a machining method to process metals and other materials, with the aid of coated abrasives. Sanding is the machining of wood; grinding is the common name for machining metals. Belt grinding is a versatile process suitable for all kind of applications like finishing, deburring, and stock removal
- Bench grinder, which usually has two wheels of different grain sizes for roughing and finishing operations and is secured to a workbench. It is used for shaping tool bits or various tools that need to be made or repaired. Bench grinders are manually operated.
- Cylindrical grinder which includes the **centerless grinder**. A cylindrical grinder may have multiple grinding wheels. The workpiece is rotated and fed past the wheel/s to form a cylinder. It is used to make precision rods.
- Surface grinder which includes the **wash grinder**. A surface grinder has a "head" which is lowered, and the workpiece is moved back and forth past the grinding wheel on a table that has a permanent magnet for use with magnetic stock. Surface grinders can be manually operated or have CNC controls.
- Tool and Cutter grinder and the **D-bit grinder**. These usually can perform the minor function of the **drill bit** grinder, or other specialist toolroom grinding operations.
- Jig grinder, which as the name implies, has a variety of uses when finishing jigs, dies, and fixtures. Its primary function is in the realm of grinding holes and pins. It can also be used for complex surface grinding to finish work started on a mill.

