Manufacturing prcesses I.

Materials Engineering
(BMEGEMTAMM1)
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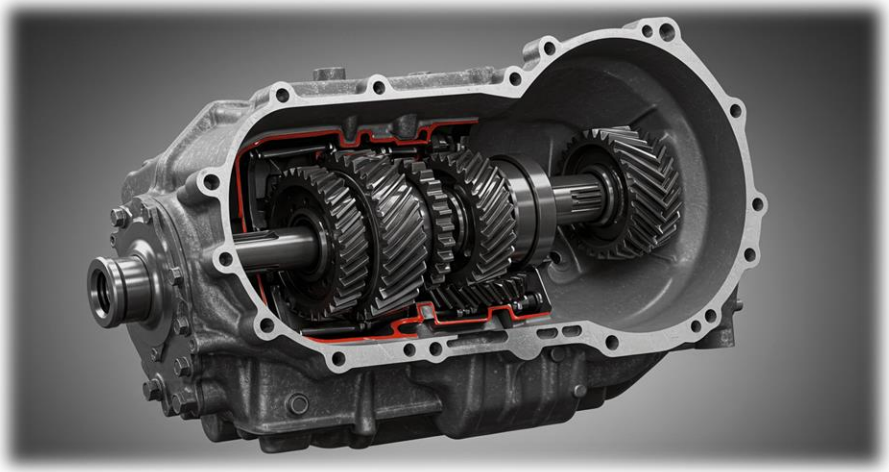
Dr. Dorina Kovacs
kovacs.dorina@gpk.bme.hu
MT épület 061.

Manufactured parts

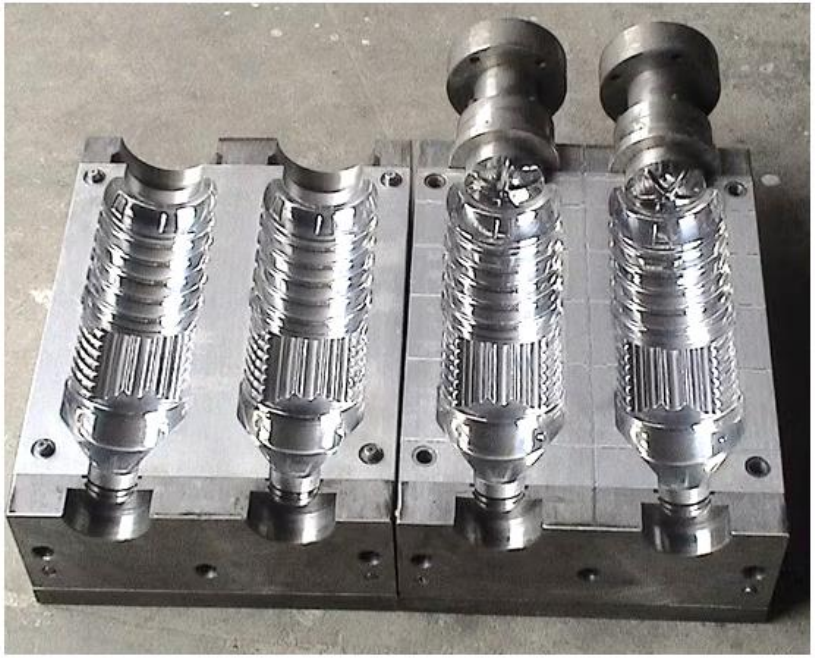
Gear

Engine



Gearbox

Manufactured parts



Injection molding tool

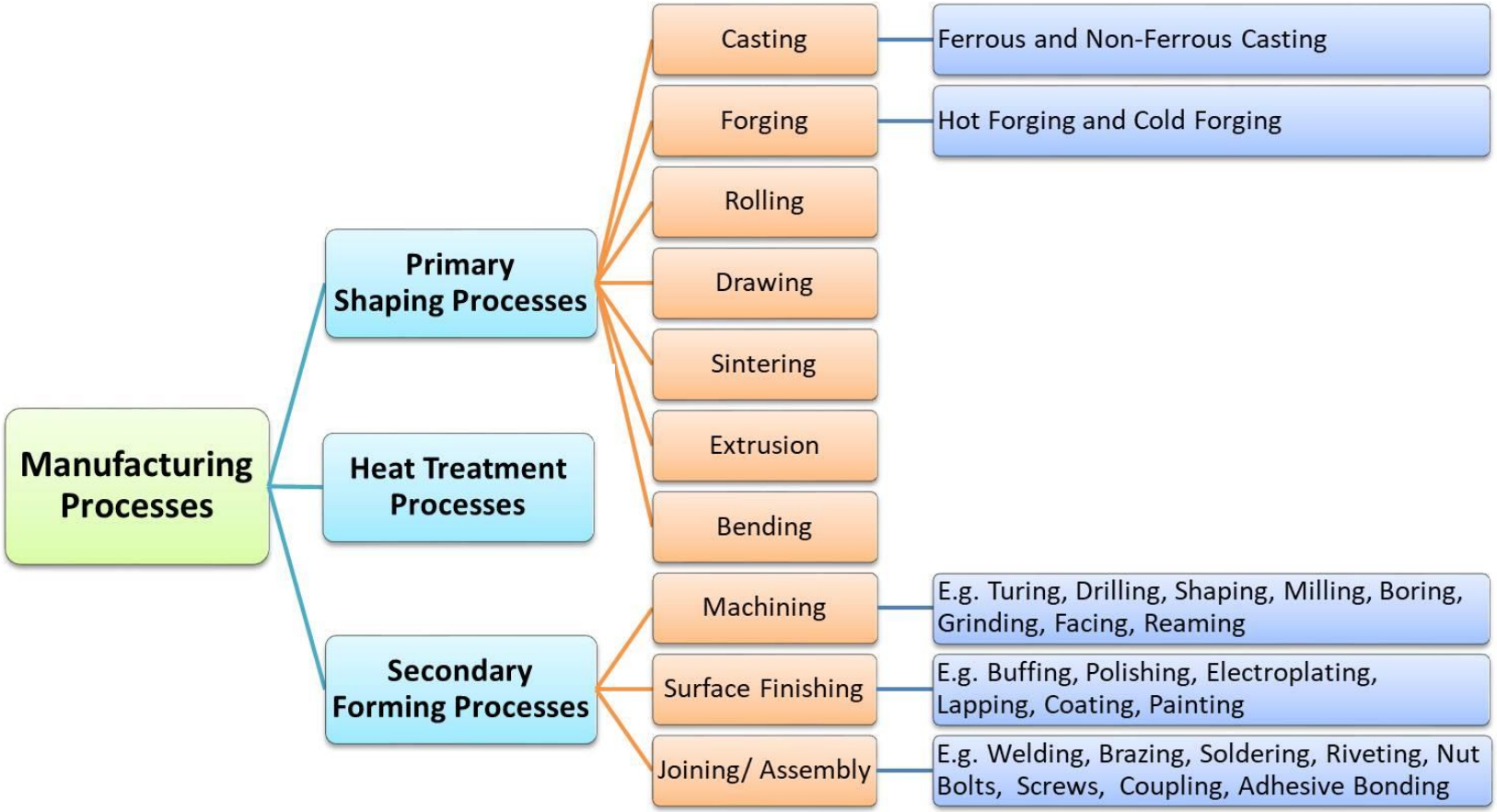
Plastic bottle

Manufactured parts

Deep drawing die

Can

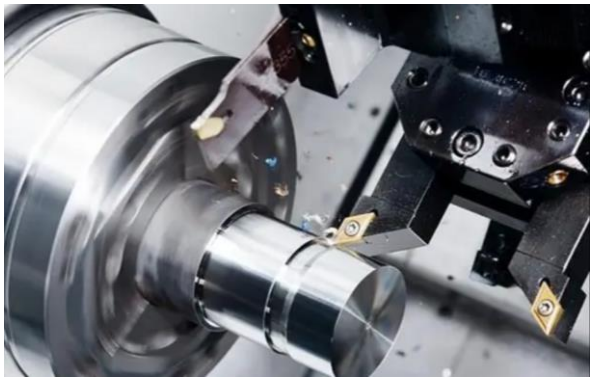
MANUFACTURING PROCESSES TYPES



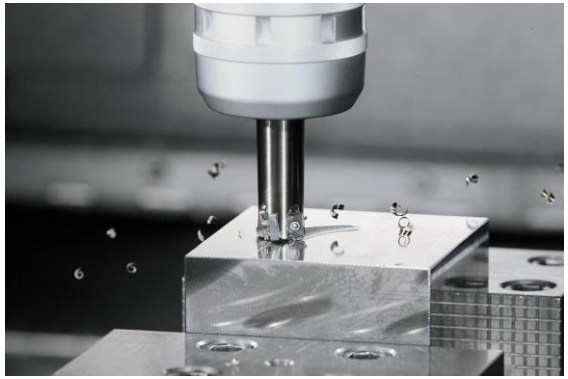
Machining

Machining (also known as cutting or chip removal) is a collective term for subtractive manufacturing processes in which workpieces are **given a specific geometric shape by continuously removing material** from their surface.

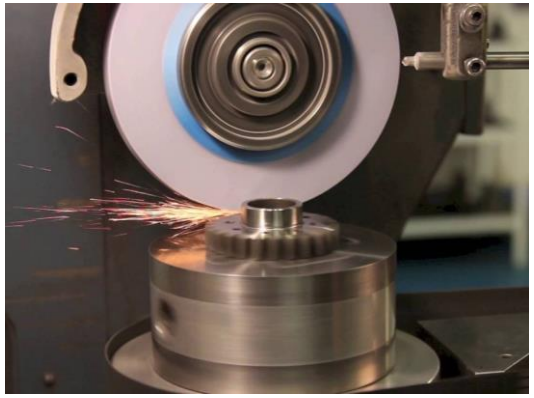
Turning



Milling



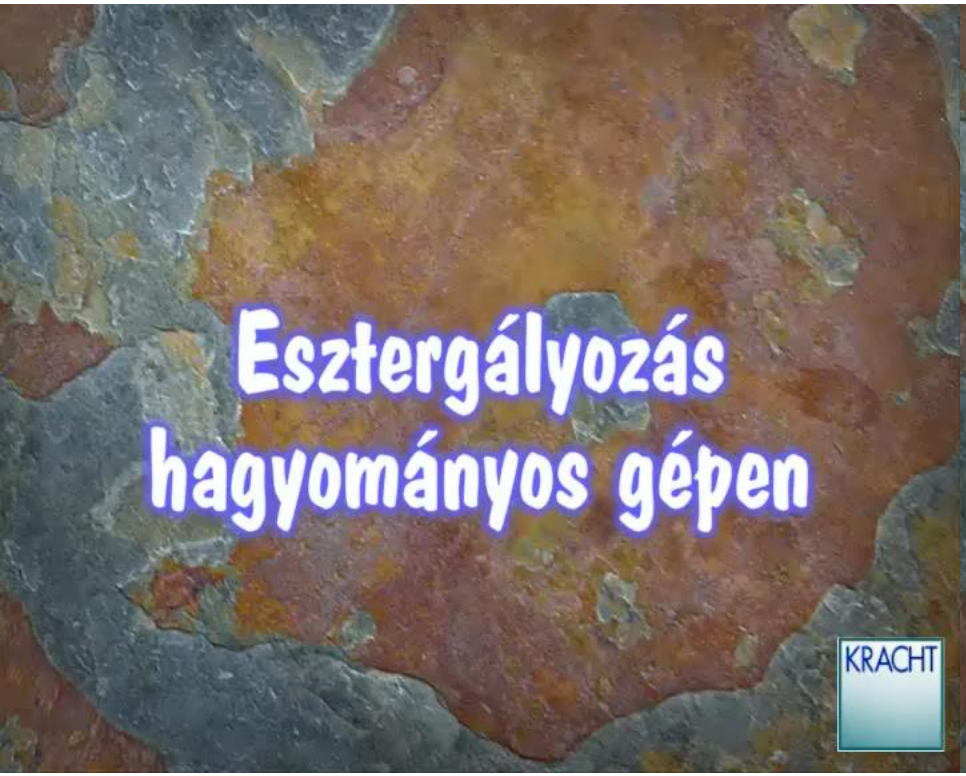
Grinding



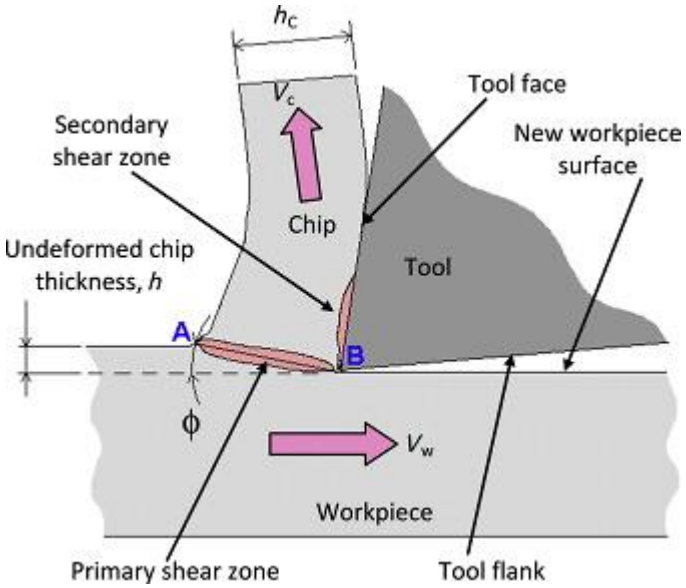
Drilling

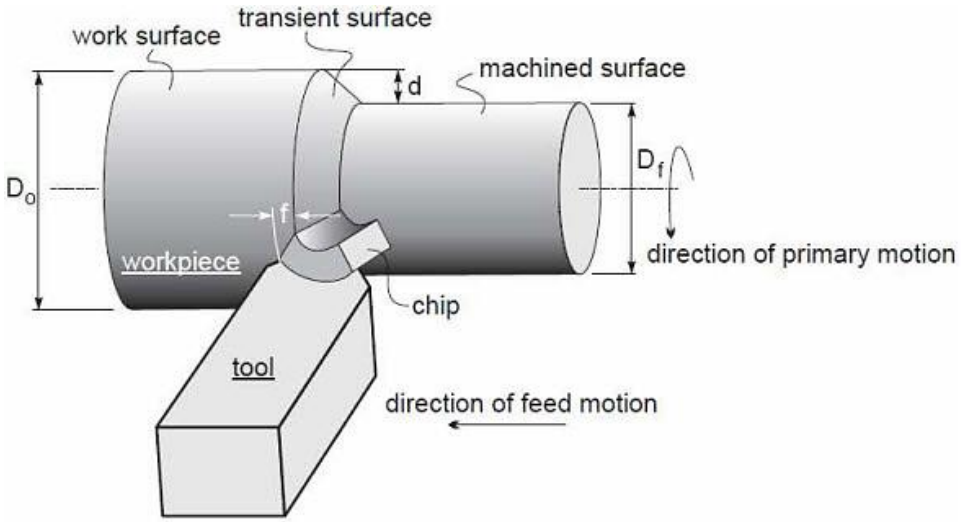
Turning

Turning is a machining process that involves cutting with a geometrically defined cutting edge and is used to manufacture **rotationally symmetrical components**. During turning, **the workpiece rotates around its own axis and is machined by tools**. Cutting, grooving, and shaping tools are used for machining.

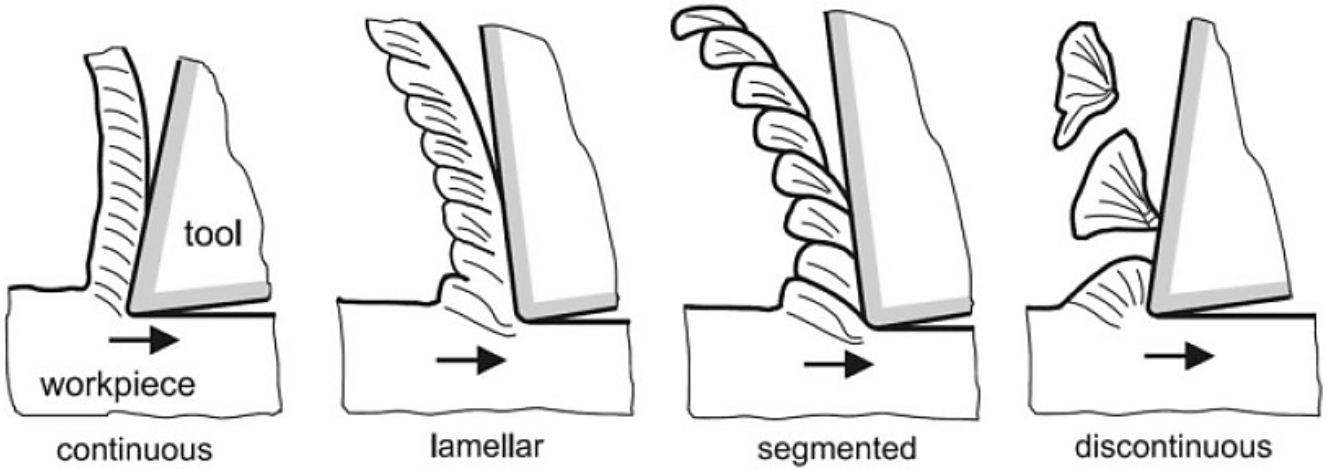


Turning





Removed material from the surface: chip.



Turning tools

External Thread Tool


Turning Tool


Internal Thread Tool


Chamfering Tool


Round Nose Tool


Grooving Tool


Under Cutting Tool


Facing Tool


Reaming Tool


Boring Tool

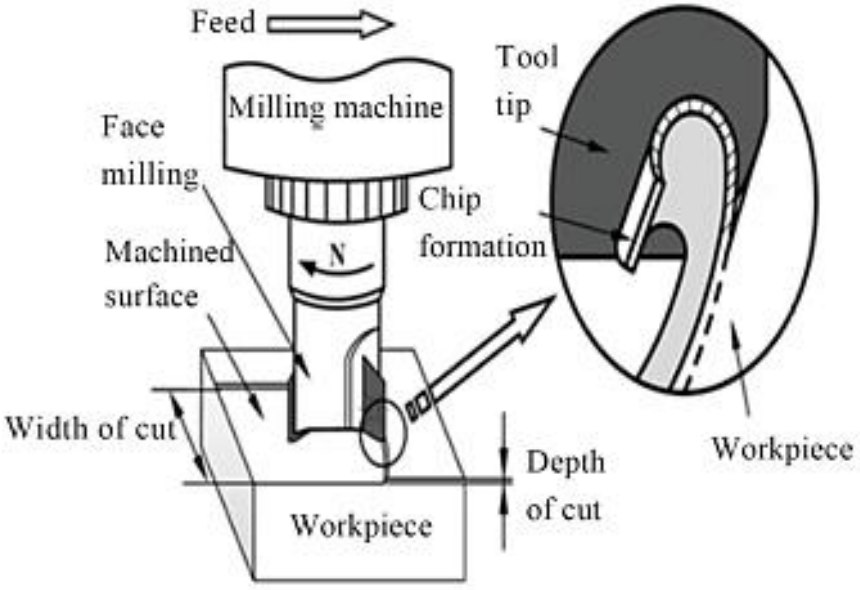
Turned parts

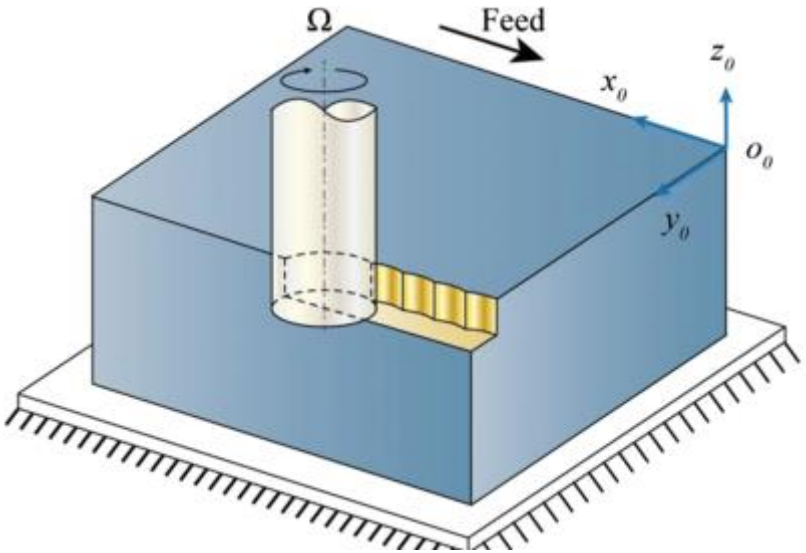
Shafts
Bushings
Rings
Nut
Special screws

Milling

Milling is the **removal of contours from a fixed workpiece using rotating tools**. It is a form of machining with geometrically defined cutting edges and is used, among other things, to produce grooves and guide components.

Milling


Feed
Milling machine
Face
milling
Machined
surface
N
Chip
formation
Tool
tip
Width of cut
Workpiece
Depth
of cut
Workpiece


Ω
Feed
z_0
x_0
o_0
y_0

Milling tools

End Mill Cutter

Roughing End Mill

Thread Mill Cutter

Woodruff Cutter

Ball Cutter

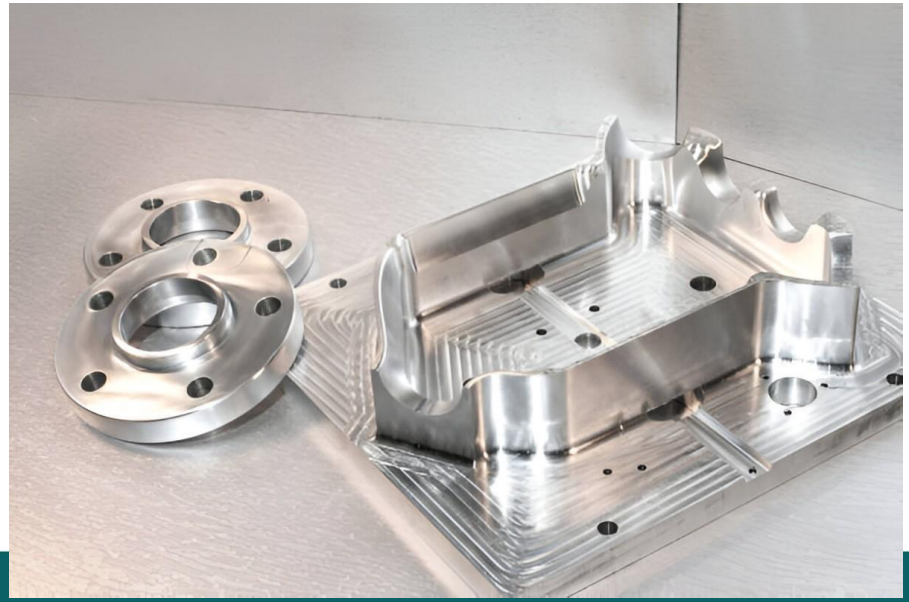
Concave Milling Cutter

Fly Cutter

Side Milling Cutter

Face Milling Cutter

Milled parts

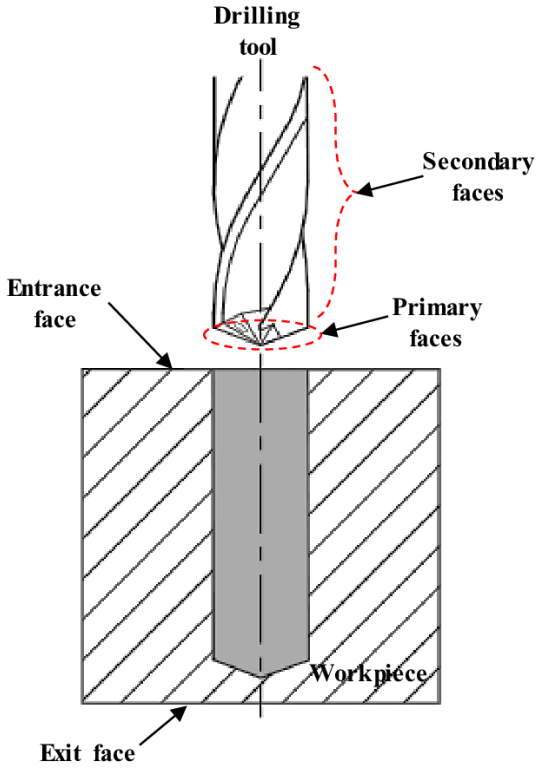


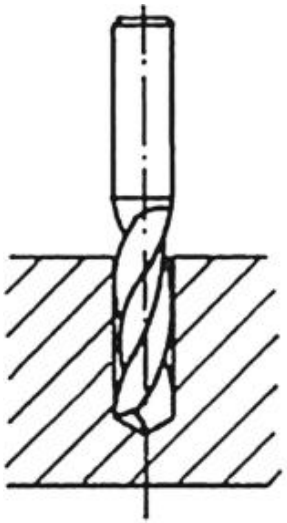
Dies
Boxes

Drilling

Drilling is a machining process for **producing internal surfaces** (bores) by inserting a drill bit into the workpiece. Drilling is a machining process with a geometrically defined cutting edge. It is used, for example, in the manufacture of engine blocks, door locks, housings, and lock cylinders.

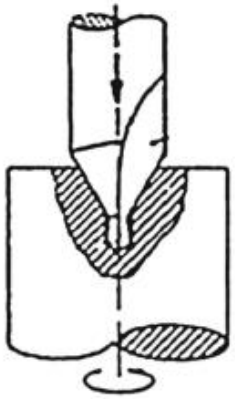
Drilling



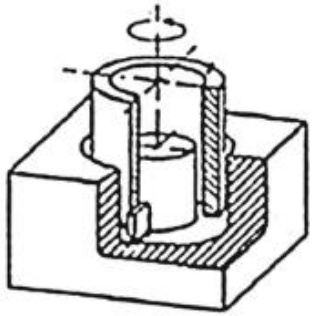


Drilling (full drilling)

Drilling (enlarging)



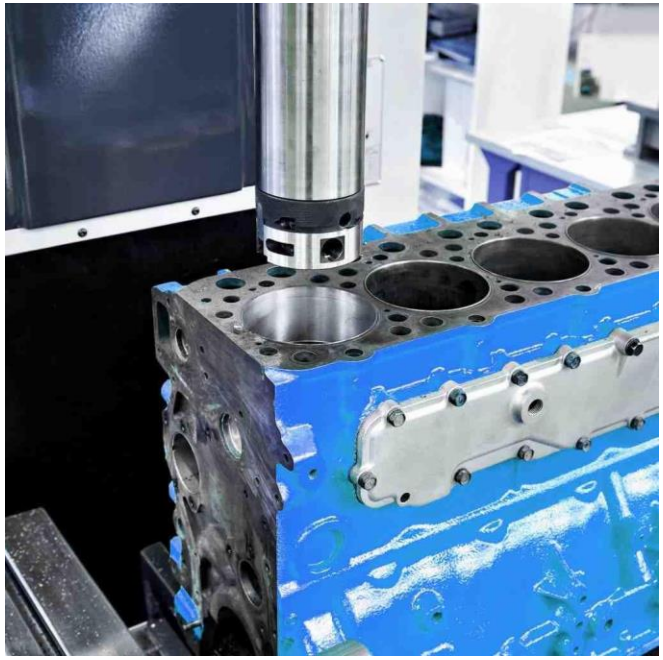
Centre drilling



Trepanning

Drilling tools (drill)

Drilled products



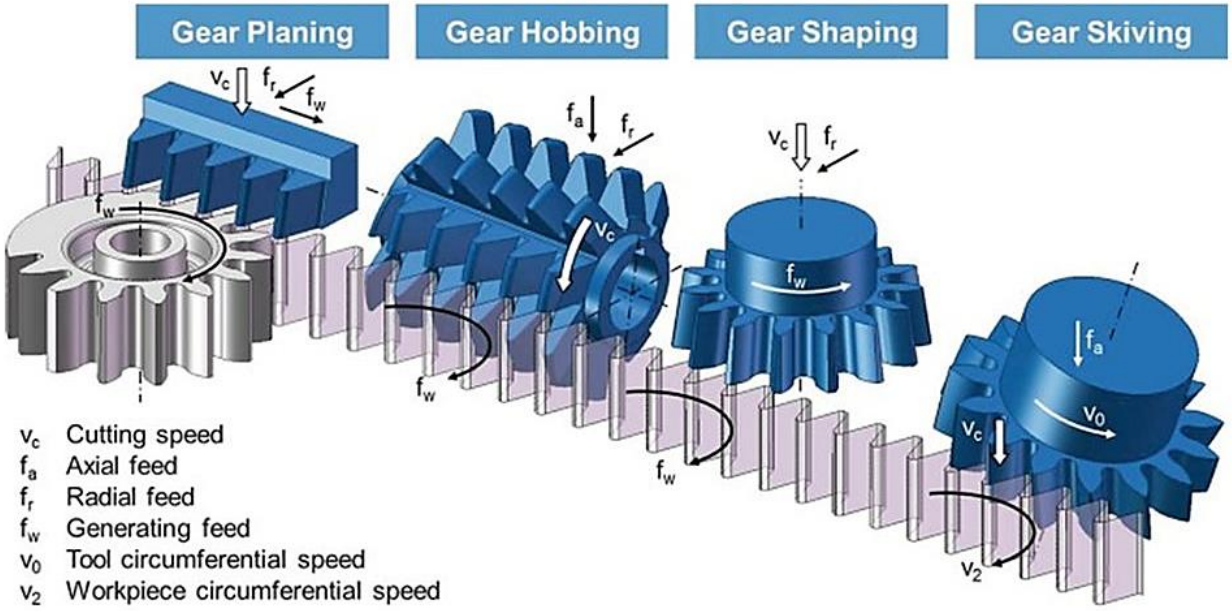
Holes in:

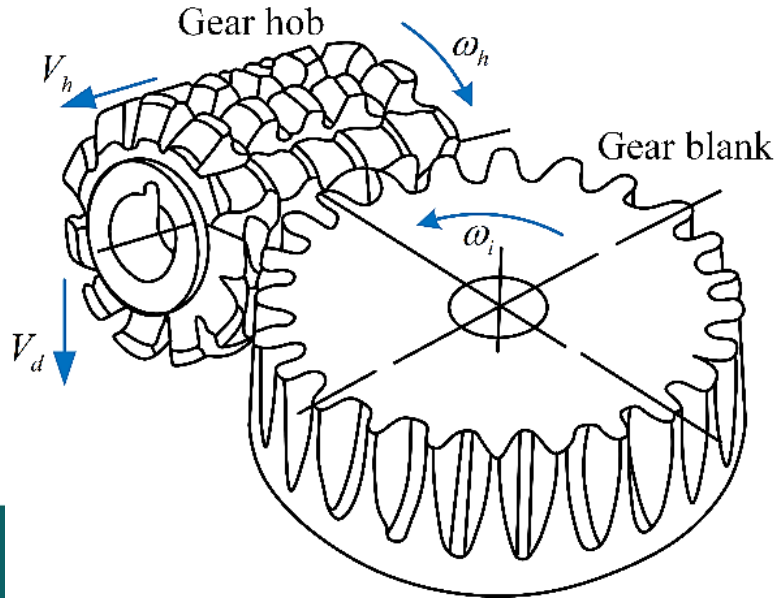
- **engine blocks**
- **housing**
- **cylinders**

Gear cutting

Gear cutting is any **machining process for creating a gear**. The most common gear-cutting processes include hobbing, broaching, milling, grinding, and skiving. (Such cutting operations may occur either after or instead of forming processes such as forging, extruding, investment casting, or sand casting.)

Gear cutting



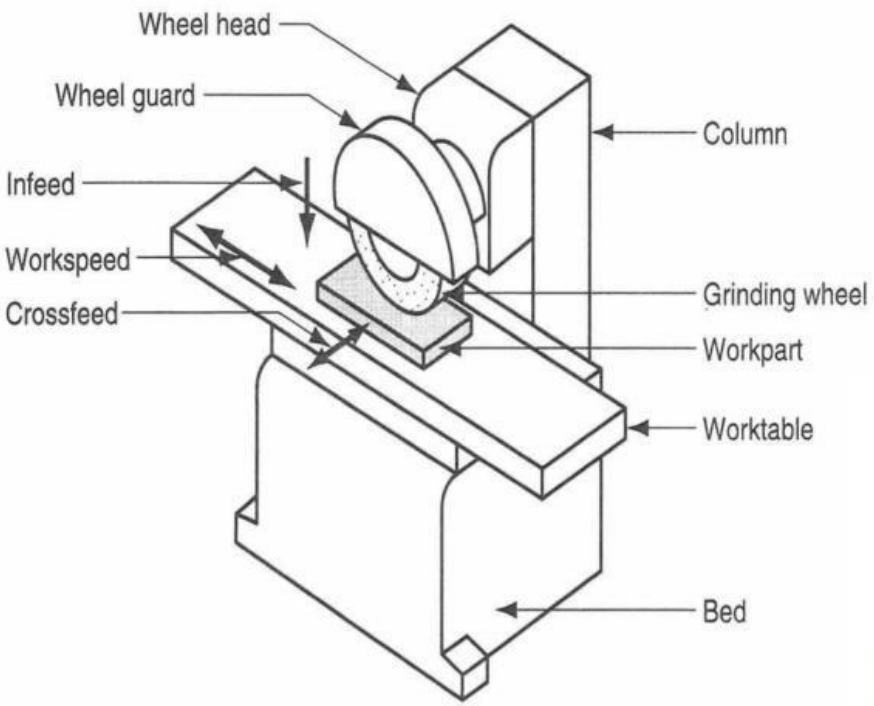


Hobbing tools and gear types

Grinding

Grinding is a cutting process that involves machining with an undefined cutting edge and **is used for finishing or smoothing surfaces**.

Grinding


Wheel head
Wheel guard
Column
Infeed
Workspeed
Crossfeed
Grinding wheel
Workpart
Worktable
Bed


CHRIS-MARINE
SWEDEN
MALMÖ