

MANUFACTURING TOOLS

Cutting Tools in Manufacturing

Cutting tools are used in manufacturing to remove material from a workpiece to give it the desired shape and size. These tools are made of hard materials like high-speed steel, carbide, and diamond to withstand high temperatures and forces during machining. Cutting tools can be classified based on their function, material, and application.

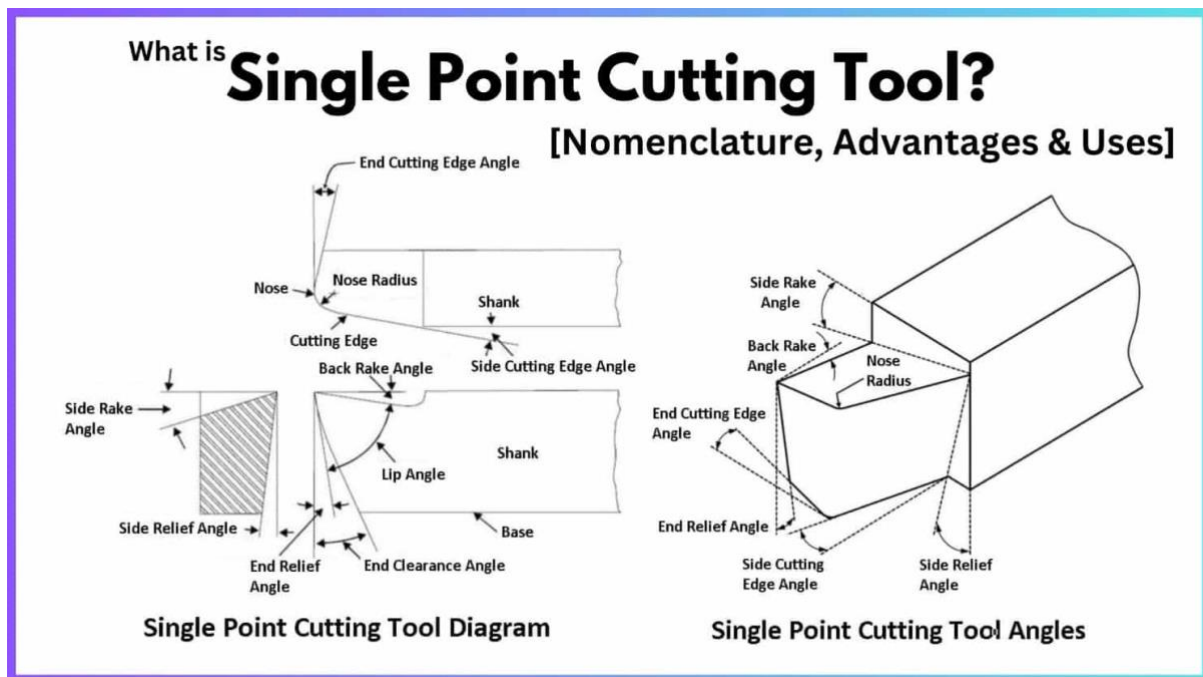
Types of Cutting Tools

Cutting tools are mainly categorized into two types:

1. **Single-Point Cutting Tools** – Have one cutting edge and are used for operations like turning and shaping.
2. **Multi-Point Cutting Tools** – Have multiple cutting edges and are used for operations like drilling and milling.

1. Single-Point Cutting Tools

These tools have a single cutting edge and are mainly used in turning, boring, and shaping operations.



Examples of Single-Point Cutting Tools:

a) Lathe Cutting Tools

- Used in lathe machines for turning, facing, and threading.
- Made of high-speed steel (HSS) or carbide.

b) Boring Tools

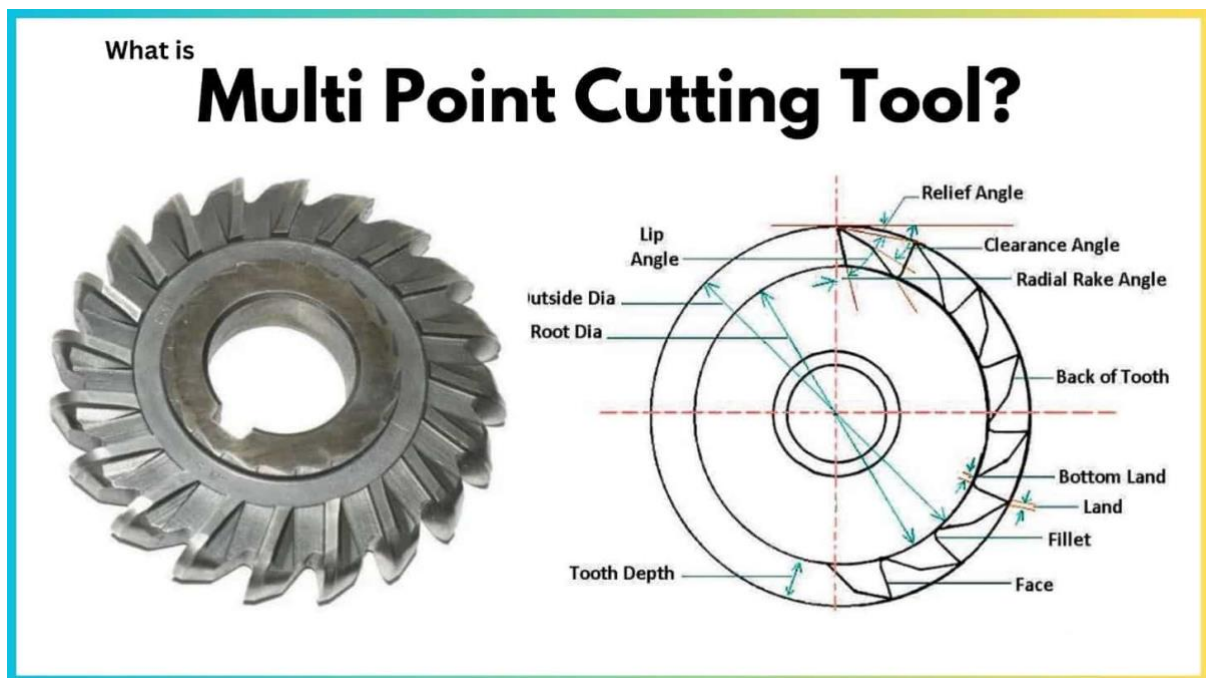
- Used to enlarge and finish holes inside a workpiece.
- Used in boring machines and lathes.

c) Planer and Shaper Tools

- Used in shaping and planing machines to remove excess material.
- Work in a reciprocating motion.

2. Multi-Point Cutting Tools

These tools have more than one cutting edge and are used for high-speed machining.



Examples of Multi-Point Cutting Tools:

a) Milling Cutters

- Used in milling machines to cut complex shapes and slots.
- **Types:**
 - End Mill: Cuts from the side and bottom.

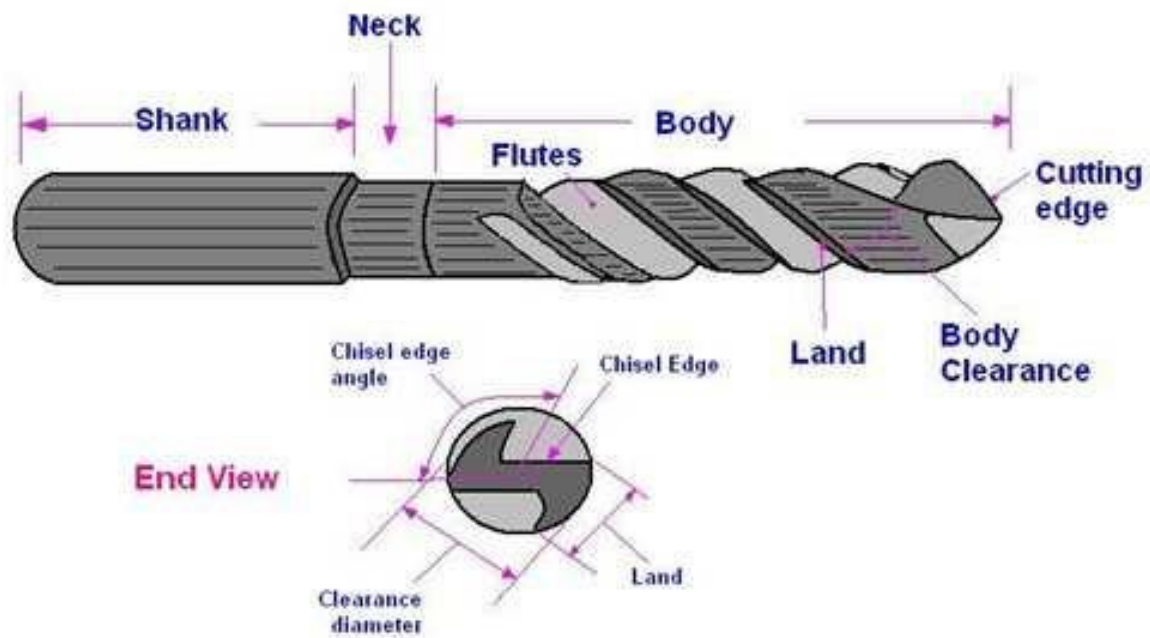
- Face Mill: Used for surface finishing.
- Slab Mill: Used for heavy material removal.



b) Drilling Tools

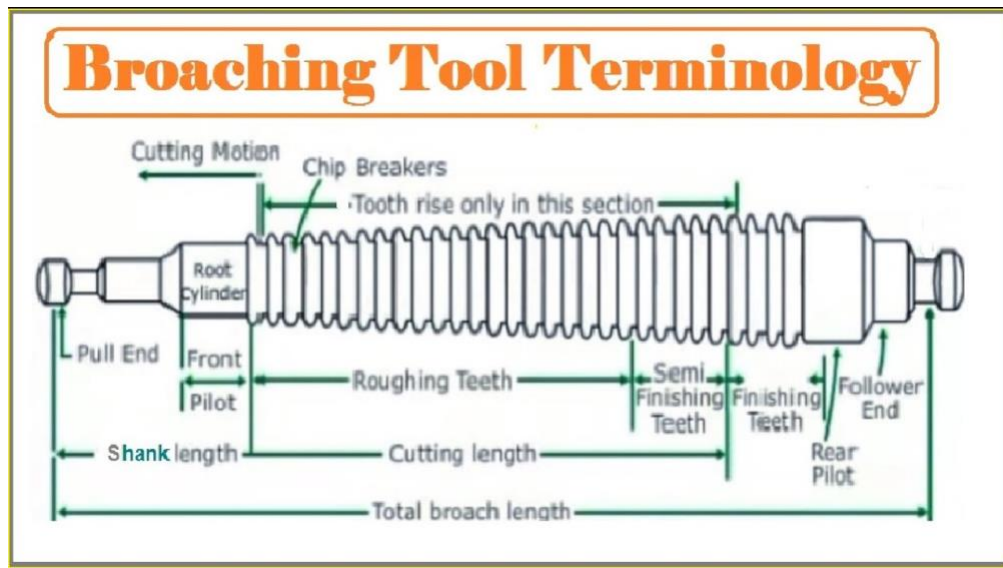
- Used for making holes in metal, wood, and plastic.
- **Types:**
 - Twist Drill: Common drill with a helical shape.
 - Center Drill: Used for precise hole marking.
 - Step Drill: Used for drilling multiple hole sizes.

Parts of Twist Drill



c) Broaching Tools

- Used for precision finishing of holes and surfaces.
- Consists of a series of cutting teeth arranged in a row.



d) Grinding Wheels

- Used for finishing and sharpening other tools.
- **Types:**
 - Cylindrical Grinding Wheel: Used for grinding cylindrical surfaces.
 - Surface Grinding Wheel: Used for flat surfaces.
 - Diamond Wheel: Used for cutting hard materials like glass and ceramics.

Other Types of Cutting Tools

Apart from traditional cutting tools, some specialized tools are also used in industries:

- **Saw Blades:** Used in cutting wood, metal, and plastic.
- **Plasma and Laser Cutters:** Used for cutting metals with high precision.
- **Water Jet Cutters:** Uses high-pressure water to cut materials without heat damage.

