

Single Point Cutting Tool: Definition, Types, Geometry, Nomenclature, Angle, PDF

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Single Point Cutting Tool is a tool that helps to perform several operations (like Turning, Facing, Producing Flat surface) on Lathe, Shaper, Planer Machine.

Today we are going to study Definition, Types, Geometry, Angle Nomenclature of Single Point cutting tool.

Note: At the bottom of the articles you can download PDF.

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Single Point Cutting Tool Definition:

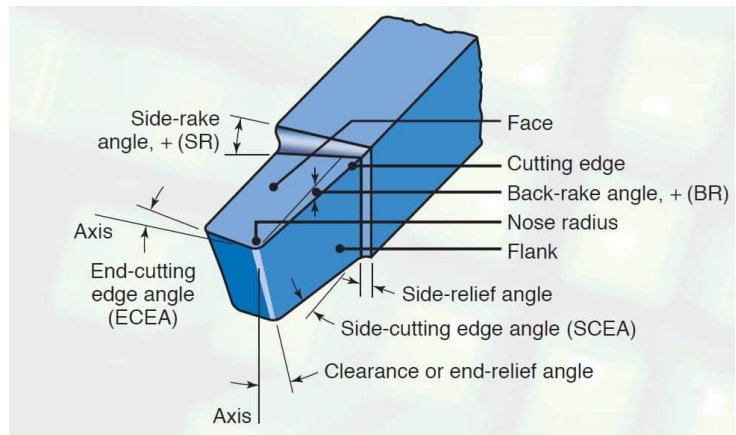
This tool consists of a sharpened cutting part called its point and the shank.

The point of the tool is bounded by the face (along which the chips slides as they are cut by the tool), the side flank or major flank the end flank or minor flank and the base.

As we know we perform several operations on the lathe (like turning, facing) from the single-point cutting tool.

Design and fabrication are very easy for this tool.

This tool can be made at a very cheaper rate as compared to others.



Single point cutting tool

Single Point Cutting Tool Types:

There are only two types of tool:

1. Single and
2. Multi-Point cutting tool.

1. Single Point cutting tool:

- One cutting point or tip is available
- Example: Lathe Machine, Planning Machine tool

2. Multi-Point cutting tool:

- More than One cutting point or tip is available
- Example: Milling cutter, Grinding wheel, drill tool, extra.

Single Point Cutting Tool Material:

This tool can be made from several materials like:

- *High carbon steel*
- *High-speed steel*
- *Ceramics*
- *Cerements*
- *Diamonds*
- *Ucon*
- *Cemented carbide*
- *CBN (Cubic boron nitrite)*

Single Point Cutting Tool Geometry / Nomenclature:

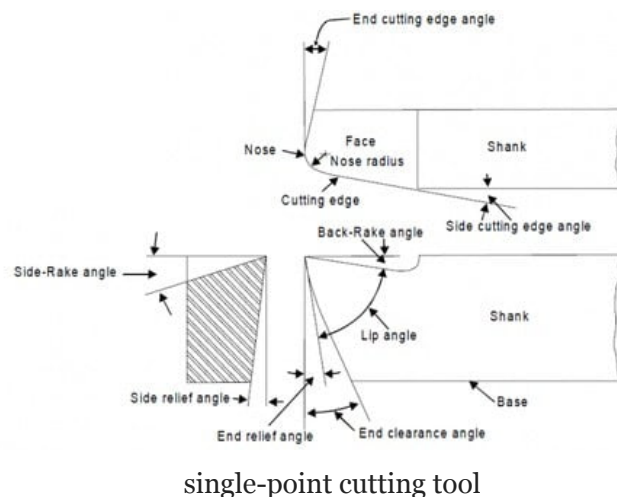
1. *Shank*
2. *Flank*
3. *Face*

4. *Heel*
5. *Nose*
6. *Nose radius*
7. *Cutting Edges*

Angle:

1. *Side Cutting edge angle*
2. *End cutting edge angle*
3. *Side relief angle*
4. *End relief angle*
5. *Back Rack angle*
6. *Side rack angle*

Here you can see in this diagram:



1. Shank:

This is the main body of the tool. The shank is used to hold the tool (i.e tool holder).

2. Flank:

The surface or surface below and adjacent to the cutting edge is called flank of the tool.

3. Face:

The surface on which the chips slide is called the face of the tool.

4. Heel:

It is the intersection of the flank and the base of the tool. It is a curved portion at the bottom of the tool.

5. Nose:

It is the point where the side cutting edge and end cutting edge intersects.

6. Noise radius:

The nose radius will provide long life and also good surface finish with it a sharp point on the nose.

7. Cutting edge:

It is the edge on the face of the tool which removes the material from the workpiece.

The tool cutting edge consists of side cutting edge (major cutting edge), end cutting edge (minor cutting edge and the nose).

Angle:

1. Side cutting edge angle:

This angle also is known as the lead angle. This is the angle between the side cutting edge and side of the tool shank.

2. End cutting edge angle:

This is the angle between the end cutting edge and a line normal to the tool shank.

3. Side relief angle:

It is the angle between the portion of the side flank immediately below the side cutting edge and a line perpendicular to the base of the tool and measured at the right angle to the end flank.

4. End relief angle:

It is the angle between the portion of the end flank immediately below the end cutting edge and a line perpendicular to the base of the tool and measured at the right angle to the end flank.

5. Back rack angle :

It is the angle between the tool face and a line parallel to the base of the tool and measured in a plane perpendicular through the side cutting edge.

The back rack angle is positive if the side cutting edge slopes downwards from the point towards the shank and The back rack angle is negative if the slope is side cutting edge is reversed.

6. Side rack angle:

It is the angle between the tool face and a line parallel to the base of the tool and measured in a plane perpendicular to the base and the side cutting edge.

This angle gives the slope of the face of the tool from the cutting edge.

The side rack angle is negative if the slope is toward the cutting edge. And the side rack angle is positive if the slope is away from the cutting edge.

Single Point Cutting Tool Advantages:

The main advantages are:

1. Design and fabrication are easy.
2. This tool is a little cheaper in price.

Single Point Cutting Tool Disadvantages:

The main disadvantages are:

1. *There is having little high tool wear rate.*
2. *Shorter tool life.*
3. *Low metal removal rate.*
4. *Low productive.*

Single Point Cutting Tool Application:

This tool is used in several machines for producing a flat surface like:

- ***Lathe machine***
- ***Shaper Machine*** and more

FAQ:

What is Single Point Cutting Tool?

It is a tool that is used in the production machines like Lathe Machine, Shaper Machine, Planer Machine and so on.

Is Drill bit Single Point a tool?

No. It is a different one. Drill bit tool used in the drilling machine.

What is the Nomenclature of the Single Point tool?

Shank

Flank

Face

Heel

Nose

Nose radius

Cutting Edges and More

Is this tool Perform in Milling Machine?

No. Here Multiple cutting tools perform.

On Which Machine Single Point cutting tool used? and What Operation it performs?

The machines like: Lathe, Shaper, Planer, Slotter, these tools used.