

FAQ - Reamer

1. What is Reamer?

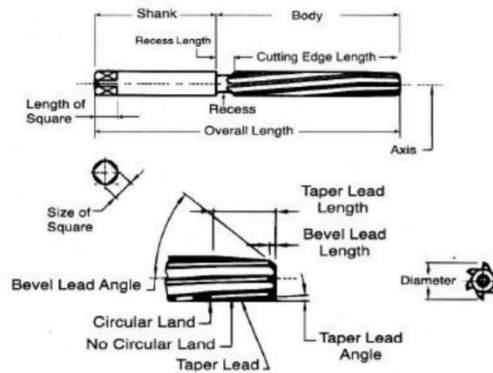
- A reamer is a tool used for expanding or finishing pre-drilled holes, bored, or cored to give a good finish and an exact dimension.



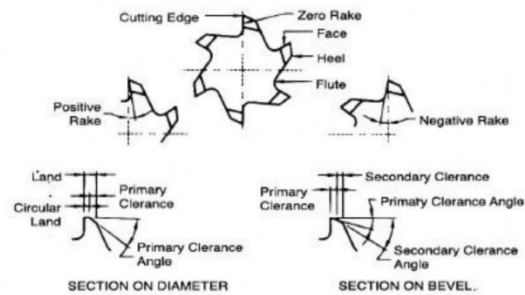
2. What is Reamer Nomenclature?



TERMS RELATING TO REAMERS



TERMS RELATING TO CUTTING GEOMETRY OF REAMERS



3. What are the Elements of Reamer?

1. Body
2. Shank
3. Recess
4. Axis
5. Overall Length
6. Taper Lead Length
7. Bevel Lead Length
8. Diameter
9. Taper Lead Angle
10. Bevel Lead Angle
11. Circular Land
12. Cutting Edge
13. Rake
14. Face
15. Heel
16. Flute
17. Land
18. Primary Clearance
19. Primary Clearance Angle
20. Secondary Clearance
21. Secondary Clearance Angle

4. What is *Body*?

- Portion of a reamer extending from Flute End to start of Shank is Body

5. What is Shank?

- The portion of the reamer by which it is held and driven.

6. What is Recess?

- That portion of the body is reduced in diameter below the cutting edges, pilot, or guided diameter.

7. What is Axis?

- Longitudinal centre line of the reamer.

8. What is overall length?

- The length over the extreme ends of the entering end and the shank not including external centres where used.

9. What is Taper Lead Length ?

- The length of taper is equal to the reamer's diameter.

10. What is Bevel Lead Length?

- The length of Bevel.

11. What is Diameter?

- The diameter of the reamer at the entering end immediately after the bevel or taper lead.

12. What is Taper Lead Angle?

- The angle of taper of flutes to the axis.
- To compensate for the difficulty of starting a hole.
- It allows the reamer to start straight and reduce the risk of breakage.

13. What is Bevel Lead Angle?

- The angle of taper of bevel to the axis.

14. What is Circular Land?

- The cylindrically ground surface adjacent to the cutting edge, on the leading edge of the land.

15. What is Cutting Edge?

- The cutting edge produced by the intersection of the face and the circular land or the surface left by the provision of primary clearance.

16. What is Rake?

- **The angle between a plane tangent to the cutting face** and the reamer axis.

17. What is Face?

- The portion of the flute surface adjacent to the cutting edge on which the chip impinges as it is cut from the work.

18. What is Heel?

- The edge produced by the intersection of the surface left by the provision of secondary clearance and the flute.

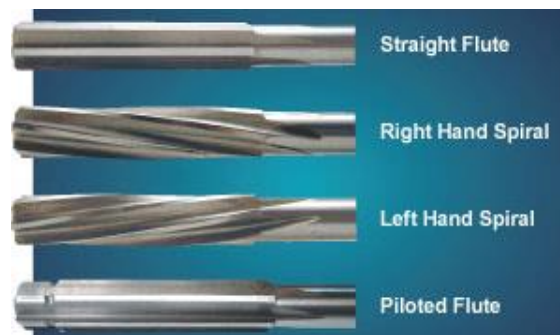
19. What is Flute ?

- Straight or helical, right or left groove on the body of Reamer.

19. What is purpose of Flute ?

- It facilitates chip removal and cutting fluid passage.

20. What are the various types of Flutes ?



21. What is Land?

- The portion of the fluted body left standing between the flutes, the surface, or the surfaces included between the cutting edge and the heel.

22. What is Primary Clearance?

- **Primary:** That portion of the land removed to provide clearance immediately behind the cutting edge.

23. What is Secondary Clearance?

- **Secondary:** That portion of the land removed to provide clearance behind the primary clearance or circular land.

24. What is rotation of cutting & types?

- The primary motion of the cutting edge relative to the workpiece.
- Right Hand Cutting: A reamer which rotates in a clockwise direction when viewed on the rear end of the reamer (counter-clockwise when viewed on the point end).
- Left Hand Cutting: A reamer which rotates in a counter-clockwise direction when viewed on the rear end of the reamer (clockwise when viewed on the point end).

25. What are the types of Reamer ?

1. Chucking reamer with parallel or taper shank
 - a) Fluted reamer
 - b) Rose reamer
2. Machine bridge reamer
3. Machine jig reamer
4. Parallel hand reamer with a parallel shank
5. Parallel or taper shank socket head reamer
6. Shell reamer
7. Taper pin hand or machine reamer
8. Expansion reamer

26. What is Chucking Reamer with Taper or Parallel Shank (Fluted)



- It is also known as a machine reamer.
- These types of Reamer consists of short parallel cutting edges with bevel lead and long body recess between shank.
- Cutting edges integral with a parallel or taper shank for holding the reamer.
- The flutes are all straight, but the shank may be straight or taper.

27. What is Chucking Rose Reamer?



- Straight or tapered shanks with straight or helical flutes
- Teeth on end have 45° chamfer back off to produce cutting edge
- Cut on end angle only
- The body is slightly tapered, smaller towards the shank to prevent bending in the hole.
- This type of reamer can remove a greater amount of metal than a fluted type.

28. What is Machine Bridge Reamer?



- These types of reamer have parallel cutting edges, with a long lead integral with a tapered shank for holding and driving the reamer.
- The flutes may be straight or helical.

29. What is Machine Jig Reamer?



- A machine jig reamer consists of short, parallel cutting edges with bevel lead and a guide between the shank and cutting edges integral with a tapered shank for holding and driving.
- The flutes are helical.
- The plain part of the body fits into a bushing in the jig and accurately locates the reamer.

30. What is Parallel Hand Reamer with Parallel Shank?



- This reamer consists of parallel cutting edges with taper and bevel lead integral with a shank of the nominal diameter of the cutting edges, and with a square on the end.
- The flutes may be straight or helical.
- The hand reamer has a square tang and is intended to be hand driven for accurately sizing the holes.
- The reamers are supposed to remove the minimum amount of metal from 0.05 to 0.125 mm.
- It is slightly tapered towards the end for a distance equal to its diameter for easy starting.

31. What is Socket Reamer for Morse Taper?



- This reamer may be straight or taper shank type and maybe hand or machine-driven.
- The reamers have taper cutting edges to suit Morse taper, integral with a parallel or taper shank.
- The flutes may be straight or helical.
- The reamers are available in a set of three: roughing, pre-finishing and finishing.
- The diameter of reamers is available for the finishing.
- Morse taper holes from No. 1 to 6.

32. What is Shell Reamer?



- A shell reamer has an axial hole for use on an arbor, and has virtually parallel cutting edges with a sharpened bevel lead.
- These types of reamer are employed for finishing large holes to save the tool. Numerous sizes of shells can be interchanged with one arbor.
- This saves the cost of the solid shank in each case.
- The shell reamer may be either of the rose chucking type for truing the hole or fluted type for finishing.
- The flutes may be straight or helical.
- The diameter of the reamer varies from 24 to 100 mm.

33. What is Taper Pin Reamer ?



- The reamer may be hand or machine is driven.
- This has taper cutting edges for holes to suit pins with a taper of 1 in 50, having-a parallel or taper shank for holding and driving the reamer.
- The flutes may be straight or helical.

34. What is Expandable Reamer?



- An Expandable Reamer is so made that it may be adjusted by a very small amount to compensate for wear, or to accommodate some variation in hole size.
- To effect expansion, the clamping nut is loosened, and the plug is pushed inward. This causes the expansion of the blades by a small amount.

35. What are the Applications of Reamer?

The following are the applications of reamer:

1. A reamer is a type of rotary cutting tool mostly used in metalworking.
2. A reamer is a tool used for expanding or finishing pre-drilled holes, bored, or cored to give a good finish and an exact dimension.
3. The reamer is intended to be used in a drill press, turret lathe.
4. Reamer is also used in the screw-cutting machine.

36. What are variables that determine reamer's performance?

- speeds,
- feeds,
- material of the workpiece

37. What is Pre-Drilling requirements for reaming?

Because the reamer must remove material from the inside of the bore, the bore must be made smaller than the nominal diameter of the bore true to size indicates. This difference is called "undersize"

Empirical values for undersizes of bore holes in steel are:

N in mm	U in mm
up to 5	0.1 - 0.2
5 - 20	0.2 - 0.3
21 - 32	0.3
33 - 50	0.5

N = nominal diameter

U = undersize by

With tough materials and light metal, the undersizes are larger than with steel.

The diameter (D) of the drill is calculated by the following formula:

$$D = N - U$$

D = diameter of the drill

38. What are recommended Coolants for reaming different materials?

Lubricating and cooling agents are as below

Steel:	cutting oil
Aluminium alloys:	spirit
Chromium-nickel alloys:	colza oil, petroleum

39. What are the recommended Tolerances for Reamed Hole Diameters?

Hole diameter, mm	Recommended tolerances, mm
0-13	± 0.013 to ± 0.025
Over 13-25	± 0.025
Over 25-50	± 0.05
Over 50-100	± 0.08

40. What is Addison's recommendation on Stock Removal?

- Addison recommends 2-3% of the reamer diameter as a starting point for stock removal.
- 2% for steels and tough alloys, 3% for non-ferrous materials and cast irons.