

1. A plug gauge is used for measuring
- (a) Taper bores
 - (b) Cylindrical bores
 - (c) Spherical bores
 - (d) Screw threads

Ans:(b)

2. The backlash between gears is expressed in terms of
- (a) Difference between addendum and dedendum.
 - (b) Difference between PCD (pitch circle diameter) of two gears.
 - (c) The clearance between faces of the mating gears
 - (d) The actual gear width on pitch circle minus the standard gear width for a given number of teeth on gear.

Ans:(c)

Note: Backlash is defined as the excess thickness of tooth space over the thickness of the mating tooth. There are two basic ways in which **backlash** arises: tooth thickness is below the zero **backlash** value; and the operating center distance is greater than the zero **backlash** value

3. Chisels used for metal cutting are
- (a) Hardened
 - (b) Annealed
 - (c) Hardened and tempered
 - (d) Annealed, hardened and tempered

Ans:(d)

4. For cutting mild steel, the cutting angle of a chisel should be
- (a) 55°
 - (b) 60°
 - (c) 70°
 - (d) 75°

Ans:(b)

5. Accuracy is
- (a) Repeatability of a measuring process
 - (b) Error of judgement in recording an observation
 - (c) Ability of an instrument to reproduce same reading under identical situation.
 - (d) Agreement of the result of a measurement with the value of the measured quantity.

Ans:(b)

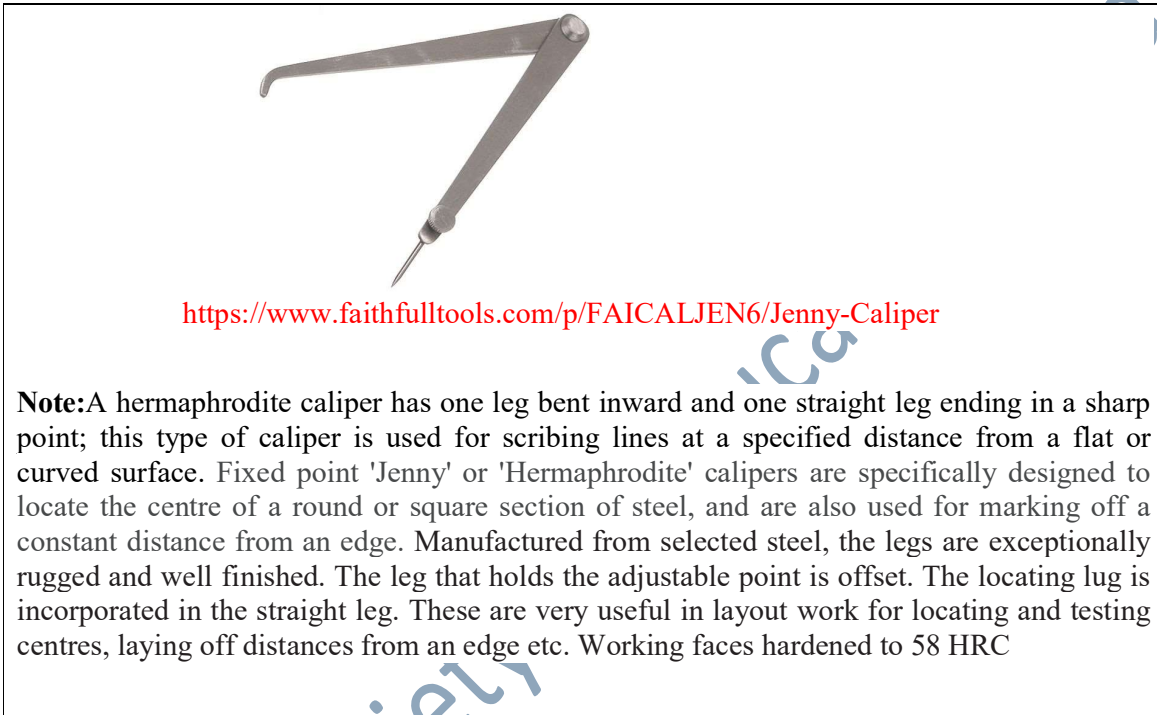
6. The process which helps in producing a fine grain structure and improved mechanical properties is known as

- (a) Tempering
- (b) Annealing
- (c) Hardening
- (d) Normalising

Ans: : (b)

7. A hermaphrodite calliper/Jenny calliper is
- (a) An outside calliper (b) An inside calliper (c) A divider
- (d) Has one left bent and other straight with a sharp point.

Ans: d



8. The type of bearing suitable for high temperature applications where lubrication is impossible and where corrosion or chemical action limits choice of materials would be

- (a) Cast iron bearing (b) Jewel bearing
- (c) Bearing made by powder metallurgy (d) Aluminium bearing.

Ans: (c)

These bearings incorporate graphite-based lubrication which can lubricate at high temperatures and low speeds, eliminating the risk of metal-to-metal contact

9. A fixture is a production tool that
- (a) Locates the component
- (b) Holds the component
- (c) Control the cutting tool.
- (d) Locates and holds the component

Ans: (b)

10. The portion of the shaft carried in the bearing is often referred to as
 (a) Cage (b) Thrust (c) **Journal** (d) Race

Ans: (c)

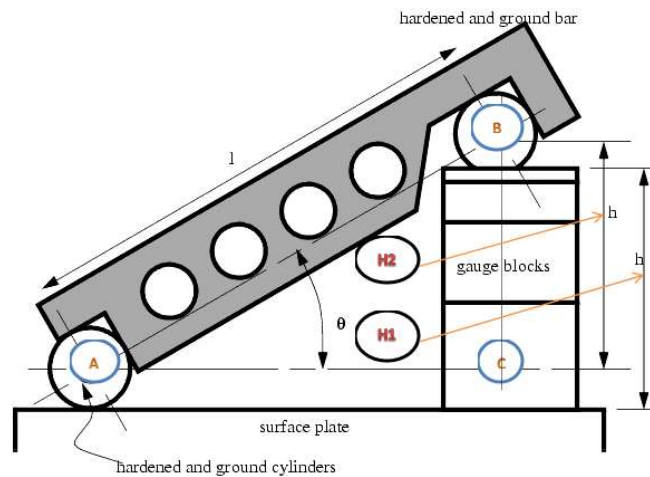
11. A dimension expressed as $20^{-0.01}$ is the case of
 (a) Bilateral tolerance (b) **Unilateral tolerance**
 (c) Accuracy limiting tolerance (d) Any of the above

Ans: (b)

12. A sine bar is used for
 (a) Levelling the job for drilling
 (b) **Finding the angle of a taper job**
 (c) Measuring the diameter of holes
 (d) Checking the profile of a thread

Ans: (b)

A sine bar is used in conjunction with slip gauge blocks for precise angular measurement. A sine bar is used either to measure an angle very accurately or face locate any work to a given angle offering a high degree of accuracy in measuring angles for milling, grinding and inspection applications. A sine bar is used in conjunction with slip gauge blocks for precise angular measurement. A sine bar is used either to measure an angle very accurately or face locate any work to a given angle. Sine bars are made from a high chromium corrosion resistant steel, and is hardened, precision ground, and stabilized.

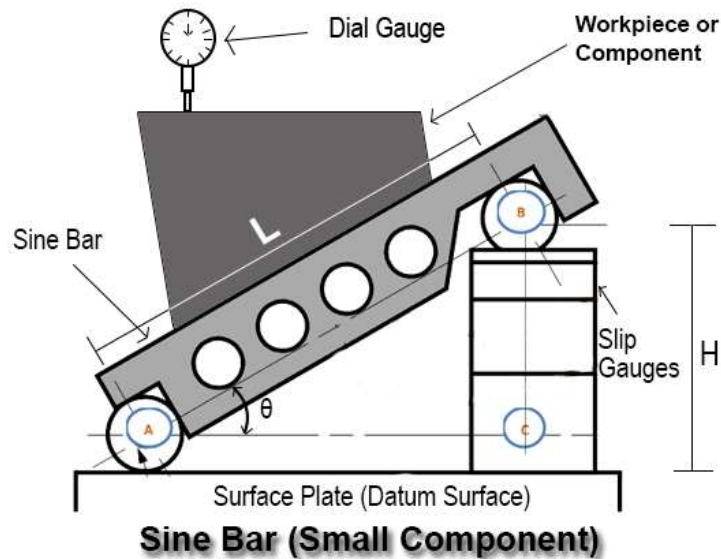


l = distance between centres of ground cylinders (typically 5" or 10")
 h = height of the gauge blocks
 θ = the angle of the plate

$$\theta = \arcsin\left(\frac{h}{l}\right)$$

<https://openoregon.pressbooks.pub/manufacturingprocesses45/chapter/unit-3-sine-bar/>

Working when angle of small component is to be measured:



<http://www.mechanicalwalkins.com/sine-bar-working-principle-construction-working-errors-and-types-of-sine-bar/>

To measure the angle of a small component, the sine bar is set up at an approximate angle on the surface plate by placing one roller of sine bar over the suitable number of slip gauges combination. The component whose angle is to be measured is placed over the sine bar. A dial gauge is used to check whether the upper surface of the component is parallel to the surface plate. This dial gauge is moved over the component throughout its length.

14. The electrolyte in lead acid cell is

- | | |
|------------------------------------|------------------------|
| (a) Concentrated Hydrochloric Acid | (b) Distilled water |
| (c) Dilute Sulphuric Acid | (d) Carbon di sulphide |

Ans: (c)

15. The methods of hardness testing carried out on big machine components which cannot be carried to a testing machine is the

- | | |
|---------------------------|----------------------------|
| (a) Shore hardness test | (b) Brinell hardness test |
| (c) Vickers hardness test | (d) Rockwell hardness test |

Ans: (a)

May be performed in-situ - The Shore method is widely used for measuring hardness of large machine components like rolls, gears, dies, etc

Shore durometer hardness test

Shore A scale is used for testing soft Elastomers (rubbers) and other soft polymers. Hardness of hard elastomers and most other polymer materials (Thermoplastics, Thermosets) is measured by **Shore D** scale.

Shore hardness is a measure of the resistance of a material to penetration of a spring loaded needle-like indenter. Hardness of Polymers (rubbers, plastics) is usually measured by Shore scales.

Shore hardness is tested with an instrument called Durometer. Durometer utilizes an indenter loaded by a calibrated spring. The measured hardness is determined by the penetration depth of the indenter under the load.

https://www.substech.com/dokuwiki/doku.php?id=shore_durometer_hardness_test

The hardness of rubber-elastic polymers and elastomers according to Shore is determined using the test procedure standardised to ISO 7619-1 or ASTM D2240. In this test method, the indentation depth of a spring-loaded indenter into the material is determined.

16. The included angle of a pipe thread is

- (a) 60° (b) 47° (c) 55° (d) 45°

Ans: (c)

Note: NPT and NPS threads have a 60° **included angle** and have a Sellers **thread form** (flattened peaks and valleys).

17. The main purposes of annealing is

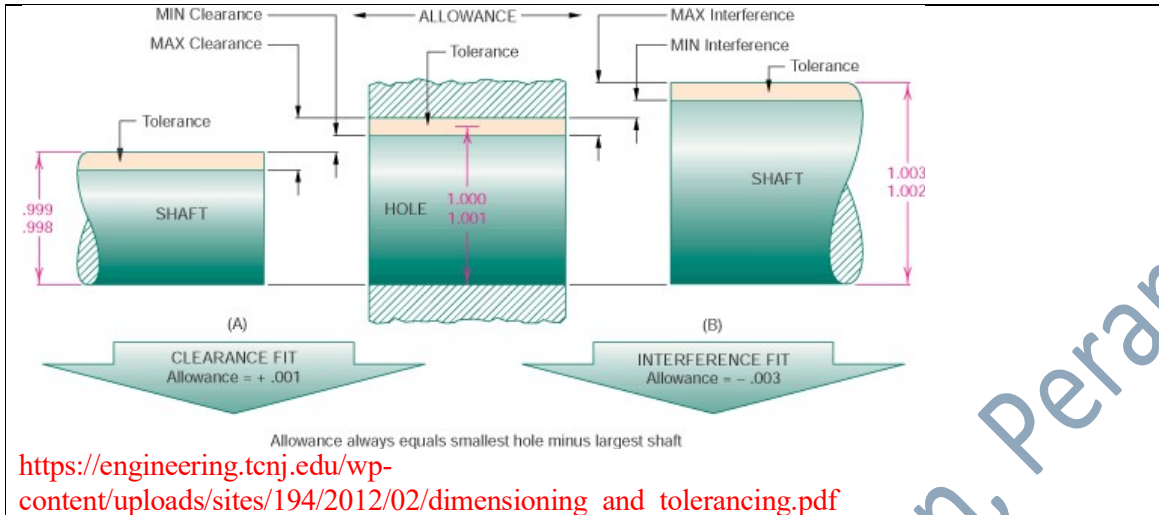
- (a) To increase the hardness
 (b) To increase the toughness
 (c) To improve machinability
 (d) To increase distortion.

Ans: (c)

18. A dimension expressed as $20^{\pm 0.01}$ is the case of

- (a) Bilateral tolerance (b) Unilateral tolerance
 (c) Accuracy limiting tolerance (d) Any of the above

Ans: (a)



WHAT IS A TOLERANCE?

A **tolerance** is an acceptable amount of dimensional variation that will still allow an object to function correctly.

UNILATERAL TOLERANCE

Unilateral tolerance is a type of unequally disposed tolerance where variation from the true profile is only permitted in one direction.

BILATERAL TOLERANCE

Bilateral tolerance is the term used when the tolerance zone is distributed from the target value or true profile in both directions. Bilateral tolerances allow equal variation on each side of the target.

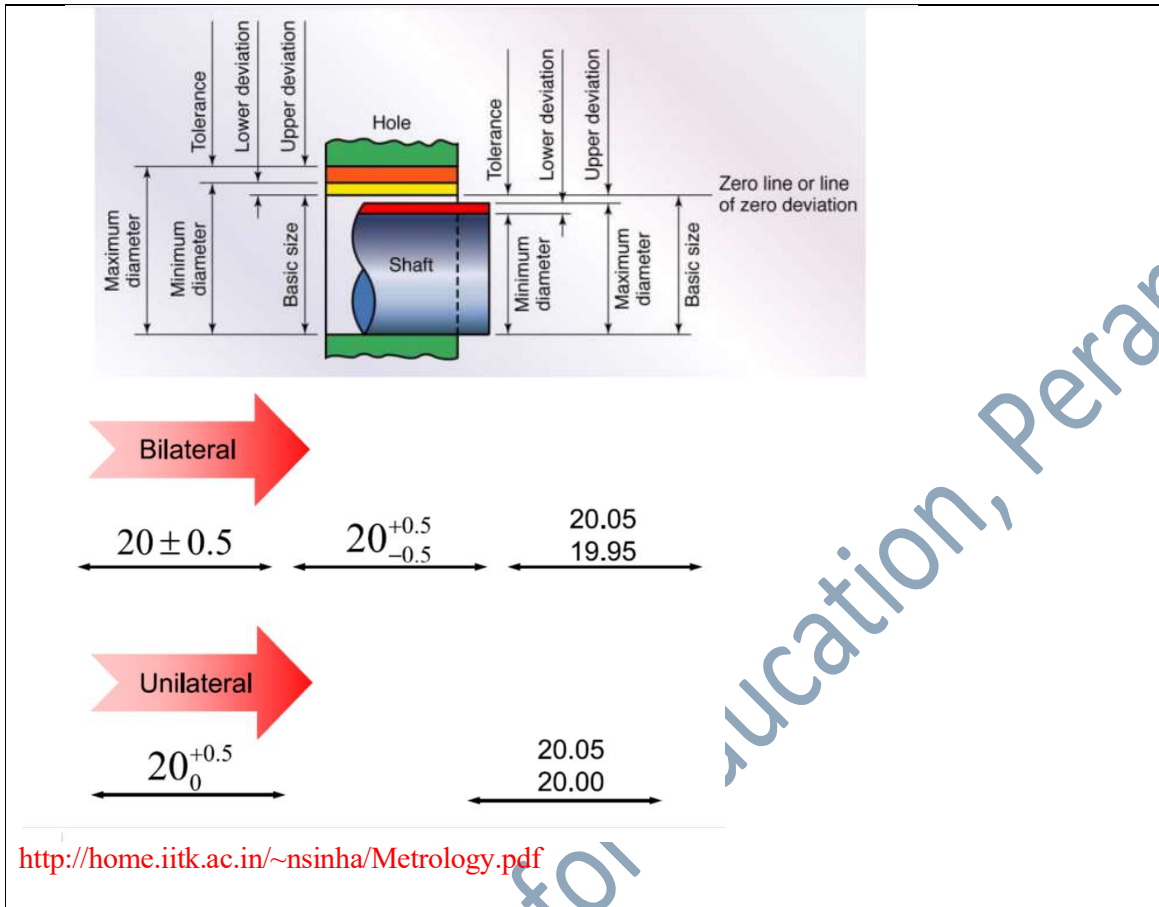
Three types of fits

There are three types of fit that should be considered when working with tolerances.

Clearance fit occurs when two toleranced mating parts will always leave a space or clearance when assembled.

Interference fit occurs when two toleranced mating parts will always interfere when assembled.

Transition fit occurs when two toleranced mating parts will sometimes be an interference fit and sometimes be a clearance fit when assembled.



19. In workshops, the Air Compressors are driven by

- (a) Synchronous motors
- (b) Squirrel cage induction motors
- (c) Slip Ring Induction motors
- (d) Large Commutator motors

Ans: (b)

20. The energy consumed by 50 nos. of 40 W bulbs will be (for the same duration)

- (a) Equal to that consumed by 4 nos. of 500 watt bulbs
- (b) More that consumed by 40 nos. of 60 watt bulbs
- (c) Equal to that consumed by 25 nos. of 100 watt bulbs.
- (d) Less than that consumed by 5 nos. of 250 watt bulbs.

Ans: (a)

21. A variac is used

- (a) To vary the supply frequency
- (b) As a load in testing a generator or a motor
- (c) To test a diode

(d) To change the applied voltage

Ans: (d)

22. The level of illumination on a surface is measured in

- (a) Decibel (b) Watts/lumen (c) **Lux** (d) Candela

Ans: (c)

Note:

- **Lumen (lm)** - The SI unit of luminous flux
- **Intensity of Light** - the Quantity of visible light that is emitted in unit time per unit solid angle
- **Candela (cd)** - The SI unit of luminous intensity.
- **Illuminance** - the amount of luminous flux per unit area
- **Lux (lx)**. The lux (symbol: lx) is the SI derived unit of illuminance, measuring luminous flux per unit area. It is equal to one lumen per square metre. One lux is equal to one lumen per square meter, i.e., Lux - Lm/m²
- **Footcandle** - A non-SI unit of light intensity. While lux is lm/m², a footcandle is lm/ft².

23. One millivolt is

- (a) **One thousandth of a volt** (b) 1/100 volt
 (c) 1/millionth of a volt (d) Thousand times one volt

Ans: (a)

24. In a simple A.C. Circuit when load is a pure resistance the power factor will be

- (a) Infinity (b) **Unity** (c) 0.8 (d) Zero

Ans: (b)

25. A transistor has

- (a) **3 terminals** (b) 4 terminals (c) 2 terminals (d) No terminals

Ans: (a).

The 3 terminals are named base, collector and emitter. The current flowing through the base (IB) controls the current through the collector (IC).

26. Inside a tube light starter a small capacitor is used to

- (a) Improve the power factor
 (b) For protecting the tube against heavy arcing

- (c) To suppress radio interference
- (d) To protect the starter contacts

Ans: (c)

Note: The **capacitor** is (in most common **fluorescent lamp** circuits) is for power factor correction. Since there is a coil in the ballast, the **capacitor is used** to bring the power factor back towards unity.

27. The electricity is supplied to each residential unit to residences in India at
- (a) 415 V, 3 ϕ , 50 Hz
 - (b) 230 V, 1 ϕ , 50 Hz
 - (c) 230 V, 3 ϕ , 50 Hz
 - (d) 110 V, single phase, 60Hz

Ans: (b)

28. For fitting a pump in a assembly, four holes in correct locations are to be drilled. Which is the most desirable method of doing this work in a production belt?

- (a) Individual marking
- (b) Approximation
- (c) Experience
- (d) Use a drill jig

Ans: (d)

29. The process used for finishing the existing hole to required accuracy is called

- (a) Trepanning
- (b) Turning
- (c) Tapping
- (d) Reaming

Ans: (d)

30. The mechanism used for converting rotary motion to linear motion is

- (a) Belt drive
- (b) Piston
- (c) Gear wheel
- (d) Rack and pinion

Ans: (d)

31. The fit provided between wheel and axle of a Rail coach wheel set is

- (a) Clearance fit
- (b) Interference fit
- (c) Running fit
- (d) Push fit

Ans: (b)

32. 1 micron is equal to ... metre

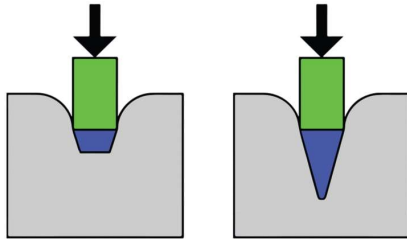
- (a) 10^{-6}
- (b) 10^{-3}
- (c) 10^{-2}
- (d) None of these

Ans: (a)

33. Which of the following is used for measurement of flatness?

polymers. The two most common test procedures are the Shore A and the Shore D scales. The Shore A scale is used for “softer” rubbers while the Shore D scale is used for “harder” ones. Other Shore scales, such as Shore O and Shore H hardness, are used less often.

The Shore hardness is measured with an apparatus known as a Durometer (see figure 2.24) and the determined hardness values are therefore referred to as **Durometer hardness**. The hardness value is determined by the indentation distance into the sample. The type of indenter and applied load is determined by the durometer hardness scale. Due to the viscoelastic behavior of rubbers and plastics, the indentation reading may change over time—so the indentation time is sometimes reported along with the hardness number.



<https://www.industrialspec.com/about-us/blog/detail/what-is-durometer-elastomer-and-plastic-hardness>

39. The shot peening of springs improves its

- (a) Machinability
- (b) Ductility
- (c) Fatigue strength
- (d) None of these

Ans: (c)

40. Which of the following can reduce the distortion in welding any assembly?

- (a) High welding current
- (b) Improper fit up
- (c) Welding in sequence
- (d) None of these

Ans: (c)

41. Choose the softest material among the following

- (a) Silicon Carbide
- (b) Aluminium Oxide
- (c) White Cast iron
- (d) Talc

Ans: (d)

42. Machining in which of the following machines is most accurate?

- (a) Milling
- (b) Jig boring
- (c) Grinding
- (d) Lathe

Ans: (b)

43. For repeated measurements in a production line, the gauge used to check whether a dimension is within acceptable limits is

- (a) Vernier (b) Micrometer (c) Sine bar (d) Go-No Go

Ans: (d)

44. The resistance to wear is increased by

- (a) Surface hardening (b) Normalising (c) Annealing (d) None of these

Ans: a

45. is a good conductor of both heat and electricity

- (a) Leather (b) Wood (c) Aluminium (d) Nylon

Ans: (c). Other examples include copper, gold and silver

Note : Also silver, copper and gold

46. A non-metal which is a good conductor of electricity

- (a) Leather (b) Graphite (c) Aluminium (d) Nylon

Ans: (b)

Graphite is a form of carbon (allotrope of carbon) which is an element. In graphite, the carbon atoms are joined together and arranged in layers. The links between the carbon atoms in the layer are strong, but the links between the layers are weak. The layers easily slip over each other. That's why graphite in a pencil is soft and you can see a mark when you write with it on paper.

Graphite is a non-metal and it is the only non-metal that can conduct electricity.

Amongst all **thermal conductive** fillers, **graphite** merits special interest not only due to its high **thermal conductivity**, that is, $25-470 \text{ W m}^{-1} \text{ K}^{-1}$, but high **thermal stability**, exceptional chemical resistance and mechanical properties.

47. The best surface finish is obtained by

- (a) Grinding (b) Shaping (c) Honing (d) Turning

Ans: (c)

48. A pressure of 10 kg/cm^2 is acting on a piston of dia '10 m'. What is the force?

- (a) 785 kgf (b) 100 Newton (c) 10 kgf (d) None of these

Ans: (a)

49. The internal defects in a steel billet can be found by

- (a) Radiography /Ultrasonics (b) Hardness test
(c) Impact test (d) Visual Inspection

Ans: (a)

50. The types of gears used for getting a reduction ratio of about 1: 40 is

- (a) Bevel gears (b) Helical gears
(c) Spur gears (d) Worm and worm wheel

Ans: (d)

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