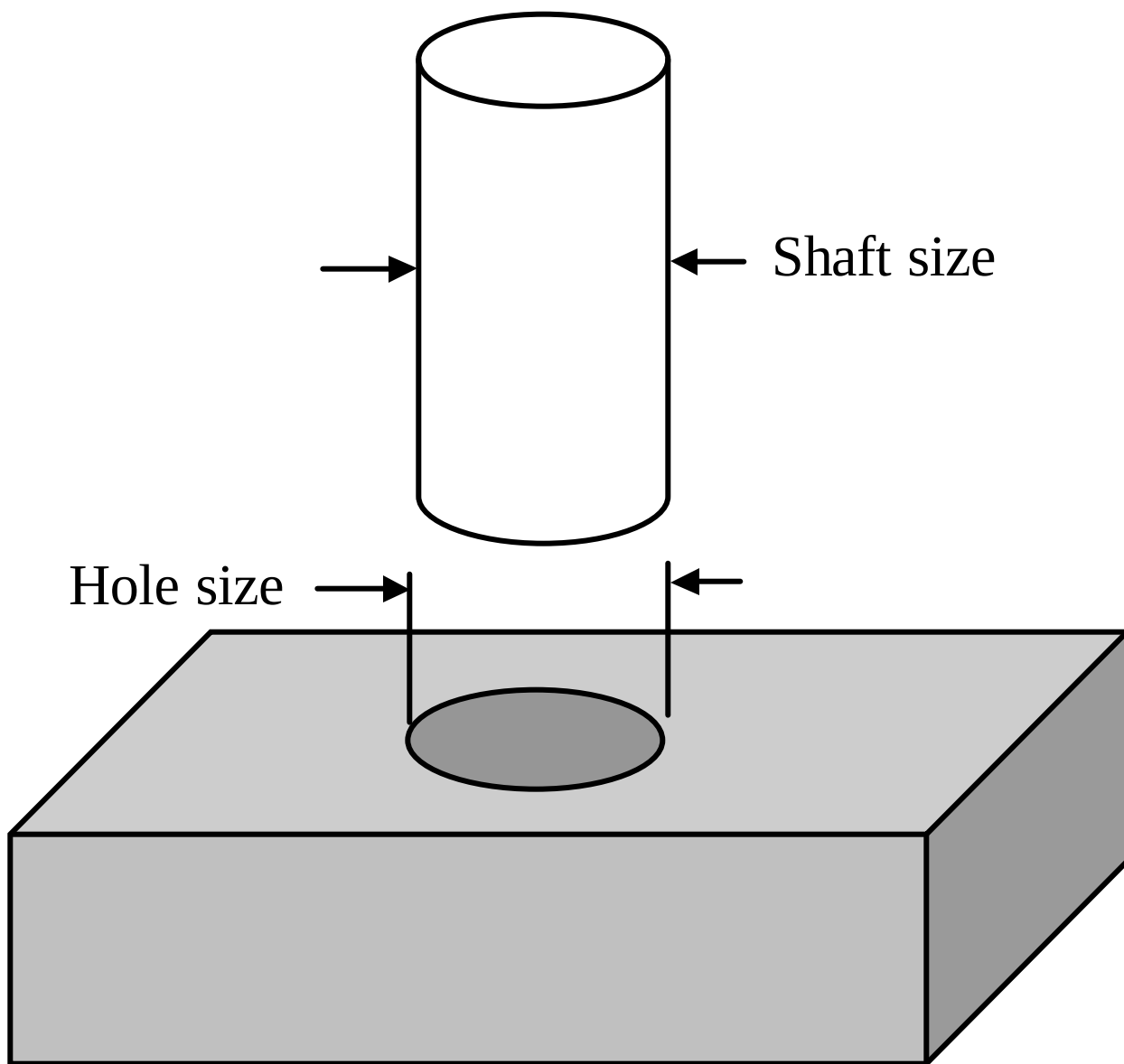


Fitting Parts Together

Standard fits are specified for an internal member that fits in an external member, as a shaft in a hole.

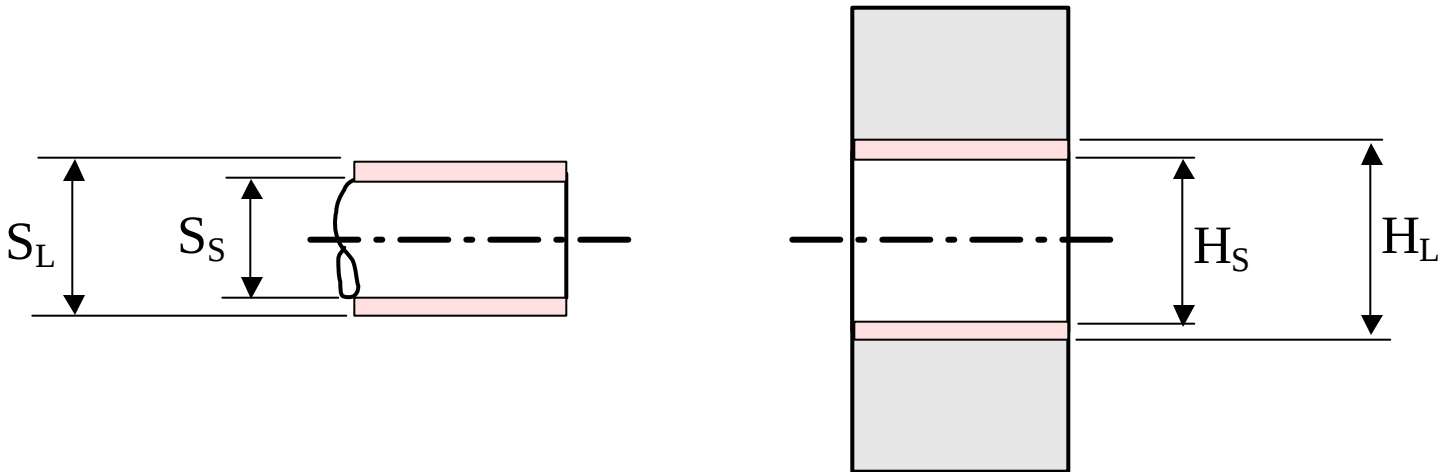


Clearance and Running (RC) Fits

- The inside member (shaft) is smaller than the outside component (hole).
 - These fits are used when motion is desired between the parts.
 - A gap is left between the parts to permit motion and for lubrication.
-
- ✓ RC3 Precision Running Fit
 - ✓ RC5 Medium Running Fit
 - ✓ RC8 Loose Running Fit

The tolerances must be chosen carefully to ensure proper operation regardless of the actual size of each mating part.

Clearance = Hole size – Shaft size



Max Clearance:

= Largest hole – Smallest shaft

= $H_L - S_S$

Min Clearance:

= Smallest hole – Largest shaft

= $H_S - S_L$

Example:

A shaft with a nominal diameter of 1/2 in is to be fit into a pulley. The shaft is to fit into the pulley bore with a medium running clearance fit. Specify standard dimensions for the shaft and pulley bore.

FIT:

NOMINAL SIZE:

HOLE TOLERANCE:

SHAFT TOLERANCE:

HOLE: Largest hole = $H_L =$
 Smallest hole = $H_S =$

SHAFT: Largest shaft = $S_L =$
 Smallest shaft = $S_S =$

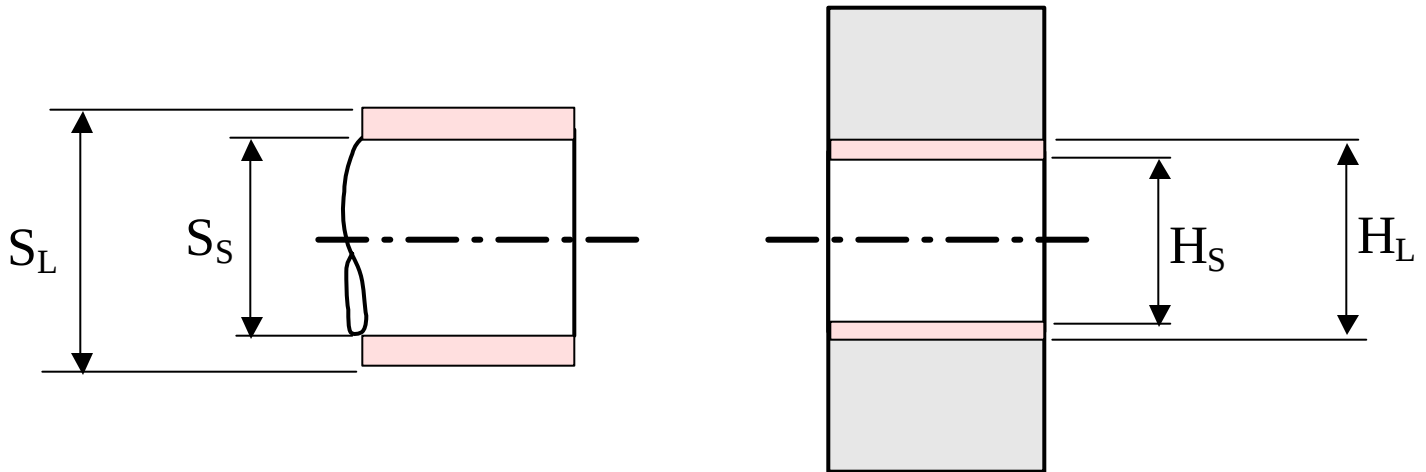
Min Clearance = $H_S - S_L =$

Max Clearance = $H_L - S_S =$

Interference (FN) Fits

- The inside member (shaft) is larger than the outside component (hole).
- These fits are used when no motion between the parts and a force or torque are transmitted through the joint.
- There is deformation of the parts and a pressure exists at the mating surface
 - ✓ FN1 Light Drive Fit
 - ✓ FN3 Heavy Drive Fit
 - ✓ FN5 Force Fit
- Parts are assembled by either a forcing the parts together using a press or by shrink fitting

Interference = Shaft size – Hole size



Max Interference:

= Largest shaft – Smallest hole

$$= S_L - H_S$$

Min Interference:

= Smallest shaft – Largest hole

$$= S_S - H_L$$

Example:

A bronze bushing has an inside diameter of 3.50 in and an outside diameter of 4.00 in. It is to be mounted on a solid steel shaft with a heavy force fit. Specify standard dimensions of for the shaft and sleeve.

FIT:

NOMINAL SIZE:

HOLE TOLERANCE:

SHAFT TOLERANCE:

HOLE: Largest hole = $H_L =$
 Smallest hole = $H_S =$

SHAFT: Largest shaft = $S_L =$
 Smallest shaft = $S_S =$

Min Interference = $H_L - S_S =$

Max Interference = $H_S - S_L =$