

Thick cylinder

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A cylinder in which thickness of shell is greater than 1/15 of diameter of shell is known as thick cylinder.

Comparison of thick and thin cylinder

S no	Thin Cylinder	Thick Cylinder
1.	Thickness, $t < \frac{1}{15} \times \text{dia of shell}$	Thickness, $t > \frac{1}{15} \times \text{dia of shell}$
2.	Distribution of hoop stress is uniform across the section.	Hoop stress intensity is varying across the section. Minimum at the inner surface and maximum at the outer surface.
3.	Hoop stress intensity can be reduced by wire winding on the cylinder.	Hoop stress intensity can be reduced by shrinking one cylinder over another cylinder.

Intensity of hoop stress

By shrinking one cylinder over another cylinder, the intensity of hoop stress in thick cylinder can be reduced.

Thick cylinder stress

Stresses (radial pressure and hoop stress) in thick cylinder are evaluated by **Lame's equations**,

$$\text{Thick cylinders } f_r = \frac{b}{r^2} - a \quad \text{and } f_c = \frac{b}{r^2} + a$$

Thick spheres $f_r = \frac{2b}{r^3} - a$ and $f_c = \frac{b}{r^3} + a$