Important Torsion Equation of Circular Shafts Formulas PDF







10) Radius of Shaft using Shear Strain at Outer Surface of Shaft Formula 🕝

Formula	Example with Units
$R = \frac{\eta \cdot L_{shaft}}{\theta_{Circularshafts}}$	$111.3194\text{mm}\ =\ \frac{1.75\cdot 4.58\text{m}}{72\text{rad}}$

11) Radius of Shaft using Shear Stress induced at Surface of Shaft Formula 🕝

•		_
Formula	Example with Units	Evaluate Formula
$R = \frac{\tau \cdot L_{shaft}}{G_{Torsion} \cdot \theta_{Torsion}}$	$110.2139\text{mm}\ = \frac{180\text{MPa}\ \cdot\ 4.58\text{m}}{40\text{GPa}\ \cdot\ 0.187\text{rad}}$	

12) Shear Strain at Outer Surface of Circular Shaft Formula 🕝

Formula	Example with Units
$\mathbf{R} \cdot \boldsymbol{\theta}_{\text{Circularshafts}}$	$1.7293 = \frac{110 \mathrm{mm} \cdot 72 \mathrm{rad}}{1.7293}$
$\eta = \frac{L_{shaft}}{L_{shaft}}$	4.58 m



Evaluate Formula

Evaluate Formula

13) Shear Stress at Surface of Shaft using Shear Stress-induced at Radius 'r' from Center of Shaft Formula

Evaluate Formula 🦳

Evaluate Formula

Evaluate Formula 🦳

Evaluate Formula



14) Shear Stress induced at Radius 'r' from Center of Shaft Formula 🕝



15) Shear Stress induced at Radius 'r' from Center of Shaft using Modulus of Rigidity Formula



16) Shear Stress induced at Surface of Shaft Formula 🕝

Formula	Example with Units
$\tau = \frac{\mathbf{R} \cdot \mathbf{G}_{\text{Torsion}} \cdot \mathbf{\theta}_{\text{Torsion}}}{\mathbf{H}}$	$179.6507_{MPa} = \frac{110_{mm} \cdot 40_{GPa} \cdot 0.187_{rad}}{100_{mm} \cdot 100_{mm}}$
L _{shaft}	4.58 m

17) Value of Radius r using Shear Stress induced at Radius r from Center of Shaft Formula 🕝

Formula	Example with Units
$T_r \cdot R$	$0.1222m = \frac{200 \text{ MPa} \cdot 110 \text{ mm}}{10000000000000000000000000000000000$
$r = \tau$	0.1222m – <u>180</u> MPa

Variables used in list of Torsion Equation of Circular Shafts Formulas above

- Grorsion Modulus of Rigidity (Gigapascal)
- Lshaft Length of Shaft (Meter)
- **r** Radius from Center to Distance r (Meter)
- R Radius of Shaft (Millimeter)
- T_r Shear Stress at Radius r (Megapascal)
- θ_{Circularshafts} Angle of Twist for Circular Shafts (*Radian*)
- θ_{Torsion} Angle of Twist SOM (Radian)
- T Shear Stress in Shaft (Megapascal)
- η Shear Strain

Constants, Functions, Measurements used in list of Torsion Equation of Circular Shafts Formulas above

Measurement: Length in Meter (m), Millimeter (mm)

Length Unit Conversion 🕝

- Measurement: Pressure in Gigapascal (GPa) Pressure Unit Conversion
- Measurement: Angle in Radian (rad) Angle Unit Conversion
- Measurement: Stress in Megapascal (MPa)
 Stress Unit Conversion



 Important Torsional Rigidity and Polar Modulus Formulas C

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