

# Important Types of Stresses Formulas PDF



## Formulas Examples with Units

### List of 14 Important Types of Stresses Formulas

#### 1) Axial Push Acting on Body given Compressive Stress Formula

Formula

$$P_{\text{axial}} = \sigma_c \cdot A$$

Example with Units

$$9.9968 \text{ kN} = 0.1562 \text{ MPa} \cdot 64000 \text{ mm}^2$$

Evaluate Formula 

#### 2) Compressive Strain on Body Formula

Formula

$$\epsilon_{\text{compressive}} = \frac{\Delta L}{L_0}$$

Example with Units

$$0.1 = \frac{500 \text{ mm}}{5000 \text{ mm}}$$

Evaluate Formula 

#### 3) Compressive Stress given Axial Push Acting on Body Formula

Formula

$$\sigma_c = \frac{P_{\text{axial}}}{A}$$

Example with Units

$$0.1562 \text{ MPa} = \frac{10 \text{ kN}}{64000 \text{ mm}^2}$$

Evaluate Formula 

#### 4) Compressive Stress given Resisting Force Formula

Formula

$$\sigma_c = \frac{F_{\text{resistance}}}{A}$$

Example with Units

$$0.15 \text{ MPa} = \frac{9.6 \text{ kN}}{64000 \text{ mm}^2}$$

Evaluate Formula 

#### 5) Resisting Force given Compressive Stress Formula

Formula

$$F_{\text{resistance}} = \sigma_c \cdot A$$

Example with Units

$$9.9968 \text{ kN} = 0.1562 \text{ MPa} \cdot 64000 \text{ mm}^2$$

Evaluate Formula 

#### 6) Resisting Force given Tensile Stress Formula

Formula

$$F_{\text{resistance}} = \sigma_t \cdot A$$

Example with Units

$$9.6 \text{ kN} = 0.15 \text{ MPa} \cdot 64000 \text{ mm}^2$$

Evaluate Formula 

#### 7) Shear Resistance given Shear Stress Formula

Formula

$$R_{\text{shear}} = \tau \cdot A_{\text{shear}}$$

Example with Units

$$1.6 \text{ kN} = 200 \text{ MPa} \cdot 8 \text{ mm}^2$$

Evaluate Formula 



## 8) Shear Strain given Transversal Displacement Formula

Formula

$$\eta = \frac{x}{H_{\text{body}}}$$

Example with Units

$$24 = \frac{38400 \text{ mm}}{1600 \text{ mm}}$$

Evaluate Formula 

## 9) Shear Stress given Shear Resistance Formula

Formula

$$\tau = \frac{R_{\text{shear}}}{A_{\text{shear}}}$$

Example with Units

$$200 \text{ MPa} = \frac{1.6 \text{ kN}}{8 \text{ mm}^2}$$

Evaluate Formula 

## 10) Tensile Load given Tensile Stress Formula

Formula

$$P_{\text{load}} = \sigma_t \cdot A$$

Example with Units

$$9.6 \text{ kN} = 0.15 \text{ MPa} \cdot 64000 \text{ mm}^2$$

Evaluate Formula 

## 11) Tensile Strain on Body Formula

Formula

$$\epsilon_{\text{tensile}} = \frac{\Delta L_{\text{Bar}}}{L_0}$$

Example with Units

$$0.45 = \frac{2250 \text{ mm}}{5000 \text{ mm}}$$

Evaluate Formula 

## 12) Tensile Stress given Resisting Force Formula

Formula

$$\sigma_t = \frac{F_{\text{resistance}}}{A}$$

Example with Units

$$0.15 \text{ MPa} = \frac{9.6 \text{ kN}}{64000 \text{ mm}^2}$$

Evaluate Formula 

## 13) Tensile Stress given Tensile Load Formula

Formula

$$\sigma_t = \frac{P_{\text{load}}}{A}$$

Example with Units

$$0.1502 \text{ MPa} = \frac{9.61 \text{ kN}}{64000 \text{ mm}^2}$$

Evaluate Formula 

## 14) Transversal Displacement given Shear Strain Formula

Formula

$$x = \eta \cdot H_{\text{body}}$$

Example with Units

$$38400 \text{ mm} = 24 \cdot 1600 \text{ mm}$$






Evaluate Formula 



## Variables used in list of Types of Stresses Formulas above





- **A** Cross Sectional Area of Bar (Square Millimeter)
- **A<sub>shear</sub>** Shear Area (Square Millimeter)
- **F<sub>resistance</sub>** Resistance Force (Kilonewton)
- **H<sub>body</sub>** Height Of Body (Millimeter)
- **L<sub>0</sub>** Original Length (Millimeter)
- **P<sub>axial</sub>** Axial Push (Kilonewton)
- **P<sub>load</sub>** Tensile Load (Kilonewton)
- **R<sub>shear</sub>** Shear Resistance (Kilonewton)
- **x** Transverse Displacement (Millimeter)
- **ΔL** Decrease in Length (Millimeter)
- **ΔL<sub>Bar</sub>** Increase in Bar Length (Millimeter)
- **ε<sub>compressive</sub>** Compressive Strain
- **ε<sub>tensile</sub>** Tensile Strain
- **σ<sub>c</sub>** Compressive Stress on Body (Megapascal)
- **σ<sub>t</sub>** Tensile Stress on Body (Megapascal)
- **η** Shear Strain
- **τ** Shear Stress in body (Megapascal)

## Constants, Functions, Measurements used in list of Types of Stresses Formulas above

- **Measurement: Length** in Millimeter (mm)  
*Length Unit Conversion* 
- **Measurement: Area** in Square Millimeter (mm<sup>2</sup>)  
*Area Unit Conversion* 
- **Measurement: Pressure** in Megapascal (MPa)  
*Pressure Unit Conversion* 
- **Measurement: Force** in Kilonewton (kN)  
*Force Unit Conversion* 
- **Measurement: Stress** in Megapascal (MPa)  
*Stress Unit Conversion* 



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