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Types of Stresses Formulas

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List of 14 Types of Stresses Formulas

Types of Stresses

1) Axial Push Acting on Body given Compressive Stress

Open Calculator

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

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

2) Compressive Strain on Body

Open Calculator

fx $$\varepsilon_{compressive} = \frac{\Delta L}{L_0}$$

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

3) Compressive Stress given Axial Push Acting on Body

Open Calculator

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

ex $$0.15625\text{MPa} = \frac{10\text{kN}}{64000\text{mm}^2}$$

4) Compressive Stress given Resisting Force

Open Calculator

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

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

5) Resisting Force given Compressive Stress

Open Calculator

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

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

6) Resisting Force given Tensile Stress

Open Calculator

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

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

7) Shear Resistance given Shear Stress

Open Calculator

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

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

8) Shear Strain given Transversal Displacement

Open Calculator

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

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

9) Shear Stress given Shear Resistance

Open Calculator

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

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

10) Tensile Load given Tensile Stress

Open Calculator

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

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

11) Tensile Strain on Body

Open Calculator

fx $$\varepsilon_{tensile} = \frac{\Delta L_{Bar}}{L_0}$$

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

12) Tensile Stress given Resisting Force

Open Calculator

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

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

13) Tensile Stress given Tensile Load

Open Calculator

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

ex $$0.150156\text{MPa} = \frac{9.61\text{kN}}{64000\text{mm}^2}$$

14) Transversal Displacement given Shear Strain

Open Calculator

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

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

Variables Used

- **A** Cross Sectional Area of Bar *(Square Millimeter)*
- A_{shear} Shear Area *(Square Millimeter)*
- $F_{resistance}$ Resistance Force *(Kilonewton)*
- H_{body} Height Of Body *(Millimeter)*
- L_0 Original Length *(Millimeter)*
- P_{axial} Axial Push *(Kilonewton)*
- P_{load} Tensile Load *(Kilonewton)*
- R_{shear} Shear Resistance *(Kilonewton)*
- **x** Transverse Displacement *(Millimeter)*
- **ΔL** Decrease in Length *(Millimeter)*
- ΔL_{Bar} Increase in Bar Length *(Millimeter)*
- $\varepsilon_{compressive}$ Compressive Strain
- $\varepsilon_{tensile}$ Tensile Strain
- σ_c Compressive Stress on Body *(Megapascal)*
- σ_t Tensile Stress on Body *(Megapascal)*
- η Shear Strain
- τ Shear Stress in body *(Megapascal)*

Constants, Functions, Measurements used

- Measurement: **Length** in Millimeter (mm)
  Length Unit Conversion
- Measurement: **Area** in Square Millimeter (mm²)
  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

Check other formula lists

- Direct Strains of Diagonal Formulas
- Elastic Constants Formulas
- Mohr's Circle Formulas
- Principal Stresses and Strains Formulas
- Relationship between Stress and Strain Formulas
- Strain Energy Formulas
- Thermal Stress Formulas
- Types of Stresses Formulas

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