

# Important Direct Strains of Diagonal Formulas PDF

**Formulas**  
**Examples**  
**with Units**

## List of 11 Important Direct Strains of Diagonal Formulas

### 1) Modulus of Rigidity using Young's Modulus and Poisson's Ratio Formula ↻

**Formula**

$$G = \frac{E}{2 \cdot (1 + \nu)}$$

**Example with Units**

$$15 \text{ MPa} = \frac{39 \text{ MPa}}{2 \cdot (1 + 0.3)}$$

Evaluate Formula ↻

### 2) Poisson's ratio given tensile strain due to compressive stress in diagonal BD Formula ↻

**Formula**

$$\nu = \frac{\epsilon_{\text{diagonal}} \cdot E_{\text{bar}}}{\sigma_{\text{tp}}}$$

**Example with Units**

$$0.3066 = \frac{0.017 \cdot 11 \text{ MPa}}{0.61 \text{ MPa}}$$

Evaluate Formula ↻

### 3) Poisson's Ratio using Modulus of Rigidity Formula ↻

**Formula**

$$\nu = \left( \frac{E}{2 \cdot G} \right) - 1$$

**Example with Units**

$$0.3 = \left( \frac{39 \text{ MPa}}{2 \cdot 15 \text{ MPa}} \right) - 1$$

Evaluate Formula ↻

### 4) Shear Strain in Diagonal given Tensile Strain for Square Block Formula ↻

**Formula**

$$\eta = (2 \cdot \epsilon_{\text{diagonal}})$$

**Example**

$$0.034 = (2 \cdot 0.017)$$

Evaluate Formula ↻

### 5) Tensile strain in diagonal BD of square block ABCD due to compressive stress Formula ↻

**Formula**

$$\epsilon_{\text{tensile}} = \frac{\nu \cdot \sigma_t}{E_{\text{bar}}}$$

**Example with Units**

$$0.0041 = \frac{0.3 \cdot 0.15 \text{ MPa}}{11 \text{ MPa}}$$

Evaluate Formula ↻

### 6) Tensile Strain in Diagonal given Shear Strain for Square Block Formula ↻

**Formula**

$$\epsilon_{\text{diagonal}} = \left( \frac{\eta}{2} \right)$$

**Example**

$$0.017 = \left( \frac{0.034}{2} \right)$$

Evaluate Formula ↻



## 7) Tensile Strain in Diagonal of Square Block due to Tensile Stress Formula

Formula

$$\epsilon_{\text{tensile}} = \frac{\sigma_t}{E_{\text{bar}}}$$

Example with Units

$$0.0136 = \frac{0.15 \text{ MPa}}{11 \text{ MPa}}$$

Evaluate Formula 

## 8) Total Compressive Strain in Diagonal AC of Square Block ABCD Formula

Formula

$$\epsilon_{\text{diagonal}} = \left( \frac{\sigma_t}{E_{\text{bar}}} \right) \cdot (1 + \nu)$$

Example with Units

$$0.0177 = \left( \frac{0.15 \text{ MPa}}{11 \text{ MPa}} \right) \cdot (1 + 0.3)$$

Evaluate Formula 

## 9) Total tensile strain in diagonal BD of square block ABCD given modulus of rigidity Formula

Formula

$$\epsilon_{\text{diagonal}} = \frac{\tau}{2 \cdot G}$$

Example with Units

$$0.0173 = \frac{0.52 \text{ MPa}}{2 \cdot 15 \text{ MPa}}$$

Evaluate Formula 

## 10) Total Tensile Strain in Diagonal of Square Block Formula

Formula

$$\epsilon_{\text{diagonal}} = \left( \frac{\sigma_t}{E_{\text{bar}}} \right) \cdot (1 + \nu)$$

Example with Units

$$0.0177 = \left( \frac{0.15 \text{ MPa}}{11 \text{ MPa}} \right) \cdot (1 + 0.3)$$

Evaluate Formula 

## 11) Young's Modulus using Modulus of Rigidity Formula

Formula

$$E = 2 \cdot G \cdot (1 + \nu)$$

Example with Units

$$39 \text{ MPa} = 2 \cdot 15 \text{ MPa} \cdot (1 + 0.3)$$



Evaluate Formula 



## Variables used in list of Direct Strains of Diagonal Formulas above






- **E** Young's Modulus Bar (Megapascal)
- **E<sub>bar</sub>** Modulus of Elasticity Of Bar (Megapascal)
- **G** Modulus of Rigidity of Bar (Megapascal)
- **ε<sub>diagonal</sub>** Tensile Strain In Diagonal
- **ε<sub>tensile</sub>** Tensile Strain
- **σ<sub>t</sub>** Tensile Stress on Body (Megapascal)
- **σ<sub>tp</sub>** Permissible Tensile Stress (Megapascal)
- **ν** Poisson's Ratio
- **η** Shear Strain
- **τ** Shear Stress in Body (Megapascal)

## Constants, Functions, Measurements used in list of Direct Strains of Diagonal Formulas above

- **Measurement: Pressure** in Megapascal (MPa)  
*Pressure Unit Conversion* 
- **Measurement: Stress** in Megapascal (MPa)  
*Stress Unit Conversion* 



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