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Direct Strains of Diagonal Formulas

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List of 11 Direct Strains of Diagonal Formulas

Direct Strains of Diagonal

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

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

[Open Calculator !\[\]\(a870788d6ed9b8fd294b7654a8c8526b_img.jpg\)](#)

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

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

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

[Open Calculator !\[\]\(c50c8b7b2cc2cf9ff925edec0ee94c0d_img.jpg\)](#)

$$\text{ex } 0.306557 = \frac{0.017 \cdot 11\text{MPa}}{0.61\text{MPa}}$$

3) Poisson's Ratio using Modulus of Rigidity

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

[Open Calculator !\[\]\(f60b7a900783ac3fd531bfd9c111be6d_img.jpg\)](#)

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



4) Shear Strain in Diagonal given Tensile Strain for Square Block

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

[Open Calculator !\[\]\(cbe80b694ebd74fcfe136a095b608235_img.jpg\)](#)

$$\text{ex } 0.034 = (2 \cdot 0.017)$$

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

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

[Open Calculator !\[\]\(3e2231b1ad3ca8da8658228c00dd08e0_img.jpg\)](#)

$$\text{ex } 0.004091 = \frac{0.3 \cdot 0.15\text{MPa}}{11\text{MPa}}$$

6) Tensile Strain in Diagonal given Shear Strain for Square Block

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

[Open Calculator !\[\]\(0d5ec72f61334709c3fc9450209b754f_img.jpg\)](#)

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

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

$$\text{fx } \varepsilon_{\text{tensile}} = \frac{\sigma_t}{E_{\text{bar}}}$$

[Open Calculator !\[\]\(b64b40baaee5acddc1eab8538ba84754_img.jpg\)](#)

$$\text{ex } 0.013636 = \frac{0.15\text{MPa}}{11\text{MPa}}$$



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

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

[Open Calculator !\[\]\(e78f798d4ea5c530c9db49e7d26e6b95_img.jpg\)](#)

$$ex \quad 0.017727 = \left(\frac{0.15\text{MPa}}{11\text{MPa}} \right) \cdot (1 + 0.3)$$

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

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

[Open Calculator !\[\]\(05be7c7a8995decd503647c99211f7c2_img.jpg\)](#)

$$ex \quad 0.017333 = \frac{0.52\text{MPa}}{2 \cdot 15\text{MPa}}$$

10) Total Tensile Strain in Diagonal of Square Block

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

[Open Calculator !\[\]\(fe3aebe81acea8d45108cd2768939da7_img.jpg\)](#)

$$ex \quad 0.017727 = \left(\frac{0.15\text{MPa}}{11\text{MPa}} \right) \cdot (1 + 0.3)$$

11) Young's Modulus using Modulus of Rigidity

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

[Open Calculator !\[\]\(899d8b7697d64725bf017d3296cfcf1b_img.jpg\)](#)

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





Variables Used

- **E** Young's Modulus Bar (Megapascal)
- **E_{bar}** Modulus of Elasticity Of Bar (Megapascal)
- **G** Modulus of Rigidity of Bar (Megapascal)
- **ε_{diagonal}** Tensile Strain In Diagonal
- **ε_{tensile}** Tensile Strain
- **σ_t** Tensile Stress on Body (Megapascal)
- **σ_{tp}** Permissible Tensile Stress (Megapascal)
- **ν** Poisson's Ratio
- **η** Shear Strain
- **τ** Shear Stress in Body (Megapascal)











Constants, Functions, Measurements used

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



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