# **Important Shear Stress in I Section Formulas PDF**





#### 1.5) Distance of Upper Edge of Flange from Neutral Axis Formula 🕝





#### 1.6) Inner Depth of I-section given Shear Stress in Lower Edge of Flange Formula 🕝

#### Formula

Example with Units

Evaluate Formula 🕝

Evaluate Formula (

Evaluate Formula

Tornula		
$d = \sqrt{D^2 - \frac{8 \cdot I}{F_s} \cdot \tau_{beam}}$	$8012.4902 \mathrm{mm} = \sqrt{9000 \mathrm{mm}^2 - \frac{8 \cdot 0.00168 \mathrm{m}^4}{4.8 \mathrm{kN}} \cdot 6 \mathrm{MPa}}$	

### 1.7) Moment of Inertia of I section given Shear Stress in Lower Edge of Flange Formula 🕝

Formula	Example with Units	
$I = \frac{F_{s}}{8 \cdot \tau_{beam}} \cdot \left( D^{2} - d^{2} \right)$	$0.0081{}_{\rm m^{4}} = \frac{4.8{}_{\rm kN}}{8\cdot 6{}_{\rm MPa}} \cdot \left(9000{}_{\rm mm}{}^{2} - 450{}_{\rm mm}{}^{2}\right)$	

### 1.8) Moment of Inertia of Section for I-section Formula



#### 1.9) Outer Depth of I section given Shear Stress in Lower Edge of Flange Formula 🕝 👘

FormulaExample with Units
$$D = \sqrt{\frac{8 \cdot I}{F_s} \cdot \tau_{beam} + d^2}$$
 $4123.4088 \, \text{mm} = \sqrt{\frac{8 \cdot 0.00168 \, \text{m}^4}{4.8 \, \text{kN}} \cdot 6 \, \text{MPa} + 450 \, \text{mm}^2}$ 

#### 1.10) Outer Depth of I-section given Shear Stress in Flange Formula 🕝





### 1.12) Shear Force in Lower Edge of Flange in I-section Formula 🕝

Formula	Example with Units	Evaluate Formu
$F_{s} = \frac{8 \cdot I \cdot \tau_{beam}}{D^{2} - d^{2}}$	$0.9981 \text{kN} = \frac{8 \cdot 0.00168 \text{m}^4 \cdot 6 \text{MPa}}{9000 \text{mm}^2 \cdot 450 \text{mm}^2}$	















#### 2.18) Width of Section given Shear Stress at Junction of Top of Web Formula 🕝

Formula	Example with Units	Evaluate Formula
$B = \frac{\tau_{\text{beam}} \cdot 8 \cdot I \cdot b}{F_{\text{s}} \cdot \left(D^2 - d^2\right)}$	$1.4555\text{mm} = \frac{6\text{MPa}\cdot 8\cdot 0.00168\text{m}^4\cdot 7\text{mm}}{4.8\text{kN}\cdot \left(9000\text{mm}^2 \cdot 450\text{mm}^2\right)}$	

# Variables used in list of Shear Stress in I Section Formulas above

- Aaby Area of Section above Considered Level (Square Millimeter)
- b Thickness of Beam Web (Millimeter)
- **B** Width of Beam Section (*Millimeter*)
- **d** Inner Depth of I Section (Millimeter)
- **D** Outer Depth of I section (Millimeter)
- **F**<sub>S</sub> Shear Force on Beam (Kilonewton)
- Moment of Inertia of Area of Section (Meter4)
- **y** Distance from Neutral Axis (Millimeter)
- **ÿ** Distance of CG of Area from NA (*Millimeter*)
- $\tau_{\text{beam}}$  Shear Stress in Beam (Megapascal)
- τ<sub>max</sub> Maximum Shear Stress on Beam
  (Megapascal)

### Constants, Functions, Measurements used in list of Shear Stress in I Section Formulas above

- Functions: sqrt, sqrt(Number) A square root function is a function that takes a non-negative number as an input and returns the square root of the given input number.
- Measurement: Length in Millimeter (mm) Length Unit Conversion ल
- 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: Second Moment of Area in Meter<sup>₄</sup> (m<sup>₄</sup>) Second Moment of Area Unit Conversion 裙



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