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# Transverse Fillet Weld Formulas

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# List of 16 Transverse Fillet Weld Formulas

## Transverse Fillet Weld

### 1) Allowable Load per mm Length of Transverse Fillet Weld

$$fx \quad P_a = 0.8284 \cdot h_l \cdot \tau_{max}$$

Open Calculator 

$$ex \quad 1387.404\text{N/mm} = 0.8284 \cdot 21.2\text{mm} \cdot 79\text{N/mm}^2$$

### 2) Force Acting given Shear Stress-induced in Plane that is Inclined at angle theta

$$fx \quad P_d = \frac{\tau \cdot h_l \cdot L}{\sin(\theta) \cdot (\sin(\theta) + \cos(\theta))}$$

Open Calculator 

$$ex \quad 26.871\text{kN} = \frac{6.5\text{N/mm}^2 \cdot 21.2\text{mm} \cdot 195\text{mm}}{\sin(45^\circ) \cdot (\sin(45^\circ) + \cos(45^\circ))}$$

### 3) Leg of Weld given Allowable Lod per mm Length of Transverse Fillet Weld

$$fx \quad h_l = \frac{P_a}{0.8284 \cdot \tau_{max}}$$

Open Calculator 

$$ex \quad 21.0563\text{mm} = \frac{1378\text{N/mm}}{0.8284 \cdot 79\text{N/mm}^2}$$



#### 4) Leg of Weld given Maximum Shear Stress-induced in Plane

$$fx \quad h_l = 1.21 \cdot \frac{P_a}{\tau_{max}}$$

[Open Calculator !\[\]\(cbe80b694ebd74fcfe136a095b608235\_img.jpg\)](#)

$$ex \quad 21.10608mm = 1.21 \cdot \frac{1378N/mm}{79N/mm^2}$$

#### 5) Leg of Weld given Shear Stress-induced in Plane

$$fx \quad h_l = P_d \cdot \sin(\theta) \cdot \frac{\sin(\theta) + \cos(\theta)}{\tau \cdot L}$$

[Open Calculator !\[\]\(3e2231b1ad3ca8da8658228c00dd08e0\_img.jpg\)](#)

$$ex \quad 21.19921mm = 26.87kN \cdot \sin(45^\circ) \cdot \frac{\sin(45^\circ) + \cos(45^\circ)}{6.5N/mm^2 \cdot 195mm}$$

#### 6) Length of Weld given Maximum Shear Stress-induced in Plane

$$fx \quad L = 1.21 \cdot \frac{P}{h_l \cdot \tau_{max}}$$

[Open Calculator !\[\]\(0d5ec72f61334709c3fc9450209b754f\_img.jpg\)](#)

$$ex \quad 194.1289mm = 1.21 \cdot \frac{268.7kN}{21.2mm \cdot 79N/mm^2}$$



## 7) Length of Weld given Shear Stress-induced in Plane that is inclined at Angle theta

$$\text{fx } L = P_d \cdot \sin(\theta) \cdot \frac{\sin(\theta) + \cos(\theta)}{\tau \cdot h_1}$$

[Open Calculator !\[\]\(e78f798d4ea5c530c9db49e7d26e6b95\_img.jpg\)](#)

$$\text{ex } 194.9927\text{mm} = 26.87\text{kN} \cdot \sin(45^\circ) \cdot \frac{\sin(45^\circ) + \cos(45^\circ)}{6.5\text{N/mm}^2 \cdot 21.2\text{mm}}$$

## 8) Length of weld given Tensile Stress in Transverse Fillet Weld

$$\text{fx } L = \frac{P_t}{0.707 \cdot h_1 \cdot \sigma_t}$$

[Open Calculator !\[\]\(05be7c7a8995decd503647c99211f7c2\_img.jpg\)](#)

$$\text{ex } 195.7779\text{mm} = \frac{165.5\text{kN}}{0.707 \cdot 21.2\text{mm} \cdot 56.4\text{N/mm}^2}$$

## 9) Maximum Shear Stress-induced given Allowable Load per mm length of Transverse Fillet Weld

$$\text{fx } \tau_{\max} = \frac{P_a}{0.8284 \cdot h_1}$$

[Open Calculator !\[\]\(fe3aebe81acea8d45108cd2768939da7\_img.jpg\)](#)

$$\text{ex } 78.46451\text{N/mm}^2 = \frac{1378\text{N/mm}}{0.8284 \cdot 21.2\text{mm}}$$



### 10) Maximum Shear Stress-induced in Plane that is Inclined at Angle theta



$$fx \quad \tau_{\max} = 1.21 \cdot \frac{P}{h_1 \cdot L}$$

[Open Calculator](#)

$$ex \quad 78.64707\text{N/mm}^2 = 1.21 \cdot \frac{268.7\text{kN}}{21.2\text{mm} \cdot 195\text{mm}}$$

### 11) Permissible Tensile Strength for Double Transverse Fillet Joint



$$fx \quad \sigma_t = \frac{P}{1.414 \cdot L \cdot L}$$

[Open Calculator](#)

$$ex \quad 4.997457\text{N/mm}^2 = \frac{268.7\text{kN}}{1.414 \cdot 195\text{mm} \cdot 195\text{mm}}$$

### 12) Shear Stress-Induced in Plane that is inclined at Angle theta to Horizontal



$$fx \quad \tau = P_d \cdot \sin(\theta) \cdot \frac{\sin(\theta) + \cos(\theta)}{h_1 \cdot L}$$

[Open Calculator](#)

$$ex \quad 6.499758\text{N/mm}^2 = 26.87\text{kN} \cdot \sin(45^\circ) \cdot \frac{\sin(45^\circ) + \cos(45^\circ)}{21.2\text{mm} \cdot 195\text{mm}}$$

### 13) Tensile Force on Plates given Tensile Stress in Transverse Fillet Weld



$$fx \quad P_t = \sigma_t \cdot 0.707 \cdot h_1 \cdot L$$

[Open Calculator](#)

$$ex \quad 164.8424\text{kN} = 56.4\text{N/mm}^2 \cdot 0.707 \cdot 21.2\text{mm} \cdot 195\text{mm}$$



14) Tensile Stress in Transverse Fillet Weld 

$$fx \quad \sigma_t = \frac{P_t}{0.707 \cdot h_l \cdot L}$$

Open Calculator 


$$ex \quad 56.62499\text{N/mm}^2 = \frac{165.5\text{kN}}{0.707 \cdot 21.2\text{mm} \cdot 195\text{mm}}$$

15) Tensile Stress in Transverse Fillet Weld given Leg of Weld 

$$fx \quad \sigma_t = \frac{P_t}{0.707 \cdot h_l \cdot L}$$

Open Calculator 

$$ex \quad 56.62499\text{N/mm}^2 = \frac{165.5\text{kN}}{0.707 \cdot 21.2\text{mm} \cdot 195\text{mm}}$$

16) Thickness of Plate given Tensile Stress in Transverse Fillet Weld 

$$fx \quad t = \frac{P_t}{L \cdot \sigma_t}$$

Open Calculator 

$$ex \quad 15.04819\text{mm} = \frac{165.5\text{kN}}{195\text{mm} \cdot 56.4\text{N/mm}^2}$$








## Variables Used

- $h_l$  Leg of Weld (Millimeter)
- $L$  Length of Weld (Millimeter)
- $P$  Load on Weld (Kilonewton)
- $P_a$  Load per Unit Length in Transverse Fillet Weld (Newton per Millimeter)
- $P_d$  Load on Double Transverse Fillet Weld (Kilonewton)
- $P_t$  Load on Transverse Fillet Weld (Kilonewton)
- $t$  Thickness of Transverse Fillet Welded Plate (Millimeter)
- $\theta$  Weld Cut Angle (Degree)
- $\sigma_t$  Tensile Stress in Transverse Fillet Weld (Newton per Square Millimeter)
- $\tau$  Shear Stress in Transverse Fillet Weld (Newton per Square Millimeter)
- $\tau_{\max}$  Maximum Shear Stress in Transverse Fillet Weld (Newton per Square Millimeter)



## Constants, Functions, Measurements used

- **Function:** **cos**,  $\cos(\text{Angle})$   
*Cosine of an angle is the ratio of the side adjacent to the angle to the hypotenuse of the triangle.*
- **Function:** **sin**,  $\sin(\text{Angle})$   
*Sine is a trigonometric function that describes the ratio of the length of the opposite side of a right triangle to the length of the hypotenuse.*
- **Measurement:** **Length** in Millimeter (mm)  
*Length Unit Conversion* 
- **Measurement:** **Force** in Kilonewton (kN)  
*Force Unit Conversion* 
- **Measurement:** **Angle** in Degree ( $^{\circ}$ )  
*Angle Unit Conversion* 
- **Measurement:** **Surface Tension** in Newton per Millimeter (N/mm)  
*Surface Tension Unit Conversion* 
- **Measurement:** **Stress** in Newton per Square Millimeter (N/mm<sup>2</sup>)  
*Stress Unit Conversion* 





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- [Butt Welds Formulas](#) 
- [Parallel Fillet Welds Formulas](#) 
- [Transverse Fillet Weld Formulas](#) 

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