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# Parallel Fillet Welds Formulas

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# List of 15 Parallel Fillet Welds Formulas

## Parallel Fillet Welds

### 1) Allowable Load in Parallel Fillet Weld per Unit Length

$$fx \quad P_{\text{all}} = 0.707 \cdot \tau \cdot h_1$$

Open Calculator 

$$ex \quad 569.5592\text{N/mm} = 0.707 \cdot 38\text{N/mm}^2 \cdot 21.2\text{mm}$$

### 2) Force in Parallel Fillet Weld given Shear Stress

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

Open Calculator 

$$ex \quad 111080.8\text{N} = 38\text{N/mm}^2 \cdot 195\text{mm} \cdot \frac{21.2\text{mm}}{\sin(45^\circ) + \cos(45^\circ)}$$

### 3) Leg of Parallel Fillet Weld given Shear Stress

$$fx \quad h_1 = \frac{P}{\tau \cdot L \cdot \cos\left(\frac{\pi}{4}\right)}$$

Open Calculator 

$$ex \quad 21.19984\text{mm} = \frac{111080\text{N}}{38\text{N/mm}^2 \cdot 195\text{mm} \cdot \cos\left(\frac{\pi}{4}\right)}$$



#### 4) Leg of Parallel Fillet Weld given Shear Stress and Weld Cut Angle

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

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

$$ex \quad 21.19984\text{mm} = 111080\text{N} \cdot \frac{\sin(45^\circ) + \cos(45^\circ)}{195\text{mm} \cdot 38\text{N}/\text{mm}^2}$$

#### 5) Leg of Parallel Fillet Weld given Throat of Weld

$$fx \quad h_l = \frac{h_t}{\cos\left(\frac{\pi}{4}\right)}$$

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

$$ex \quad 21.2132\text{mm} = \frac{15\text{mm}}{\cos\left(\frac{\pi}{4}\right)}$$

#### 6) Length of Parallel Fillet Weld given Shear Stress

$$fx \quad L = \frac{P}{\tau \cdot h_l \cdot \cos\left(\frac{\pi}{4}\right)}$$

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

$$ex \quad 194.9986\text{mm} = \frac{111080\text{N}}{38\text{N}/\text{mm}^2 \cdot 21.2\text{mm} \cdot \cos\left(\frac{\pi}{4}\right)}$$

#### 7) Length of Parallel Fillet Weld given Shear Stress and Weld Cut Angle

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

[Open Calculator !\[\]\(b64b40baaee5acddc1eab8538ba84754\_img.jpg\)](#)

$$ex \quad 194.9986\text{mm} = 111080\text{N} \cdot \frac{\sin(45^\circ) + \cos(45^\circ)}{21.2\text{mm} \cdot 38\text{N}/\text{mm}^2}$$




8) Maximum Shear Stress in Parallel Fillet Weld given Load 

$$\text{fx } \tau = \frac{P}{0.707 \cdot L \cdot h_1}$$

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

$$\text{ex } 38.00546\text{N/mm}^2 = \frac{111080\text{N}}{0.707 \cdot 195\text{mm} \cdot 21.2\text{mm}}$$

9) Shear Stress in Double Parallel Fillet Weld 

$$\text{fx } r = \frac{P_{dp}}{0.707 \cdot L \cdot h_1}$$

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

$$\text{ex } 188.1797\text{Pa} = \frac{0.55\text{N}}{0.707 \cdot 195\text{mm} \cdot 21.2\text{mm}}$$

10) Shear Stress in Parallel Fillet Weld 

$$\text{fx } \tau = \frac{P}{0.707 \cdot L \cdot h_1}$$

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

$$\text{ex } 38.00546\text{N/mm}^2 = \frac{111080\text{N}}{0.707 \cdot 195\text{mm} \cdot 21.2\text{mm}}$$


11) Shear Stress in Parallel Fillet Weld given Load 

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

[Open Calculator !\[\]\(899d8b7697d64725bf017d3296cfcf1b\_img.jpg\)](#)

$$\text{ex } 37.99972\text{N/mm}^2 = 111080\text{N} \cdot \frac{\sin(45^\circ) + \cos(45^\circ)}{195\text{mm} \cdot 21.2\text{mm}}$$



12) Shear Stress Parallel Fillet Weld 

$$fx \quad \tau = \frac{P}{L \cdot h_1 \cdot \cos\left(\frac{\pi}{4}\right)}$$

Open Calculator 

$$ex \quad 37.99972\text{N/mm}^2 = \frac{111080\text{N}}{195\text{mm} \cdot 21.2\text{mm} \cdot \cos\left(\frac{\pi}{4}\right)}$$

13) Tensile Force on Parallel Fillet Weld Plate given Shear Stress 

$$fx \quad P = \tau \cdot L \cdot h_1 \cdot 0.707$$

Open Calculator 


$$ex \quad 111064\text{N} = 38\text{N/mm}^2 \cdot 195\text{mm} \cdot 21.2\text{mm} \cdot 0.707$$

14) Throat of Parallel Fillet Weld 

$$fx \quad h_t = h_1 \cdot \cos\left(\frac{\pi}{4}\right)$$

Open Calculator 

$$ex \quad 14.99066\text{mm} = 21.2\text{mm} \cdot \cos\left(\frac{\pi}{4}\right)$$

15) Width of Plane in Double Parallel Fillet Weld 

$$fx \quad t' = \frac{h_1}{\sin(\theta) + \cos(\theta)}$$

Open Calculator 

$$ex \quad 14.99066\text{mm} = \frac{21.2\text{mm}}{\sin(45^\circ) + \cos(45^\circ)}$$









## Variables Used

- $h_l$  Leg of Weld (Millimeter)
- $h_t$  Throat Thickness of Weld (Millimeter)
- $L$  Length of Weld (Millimeter)
- $P$  Load on Parallel Fillet Weld (Newton)
- $P_{all}$  Allowable Load per unit Length of Weld (Newton per Millimeter)
- $P_{dp}$  Load on Double Parallel Fillet Weld (Newton)
- $r$  Shearing Stress (Pascal)
- $t'$  Plane Width in Double Parallel Fillet Weld (Millimeter)
- $\theta$  Weld Cut Angle (Degree)
- $\tau$  Shear stress in parallel fillet weld (Newton per Square Millimeter)



## Constants, Functions, Measurements used

- **Constant:** **pi**, 3.14159265358979323846264338327950288  
*Archimedes' constant*
- **Function:** **cos**,  $\cos(\text{Angle})$   
*Trigonometric cosine function*
- **Function:** **sin**,  $\sin(\text{Angle})$   
*Trigonometric sine function*
- **Measurement:** **Length** in Millimeter (mm)  
*Length Unit Conversion* 
- **Measurement:** **Pressure** in Newton per Square Millimeter (N/mm<sup>2</sup>)  
*Pressure Unit Conversion* 
- **Measurement:** **Force** in Newton (N)  
*Force Unit Conversion* 
- **Measurement:** **Angle** in Degree (°)  
*Angle Unit Conversion* 
- **Measurement:** **Surface Tension** in Newton per Millimeter (N/mm)  
*Surface Tension Unit Conversion* 
- **Measurement:** **Stress** in Pascal (Pa)  
*Stress Unit Conversion* 



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