

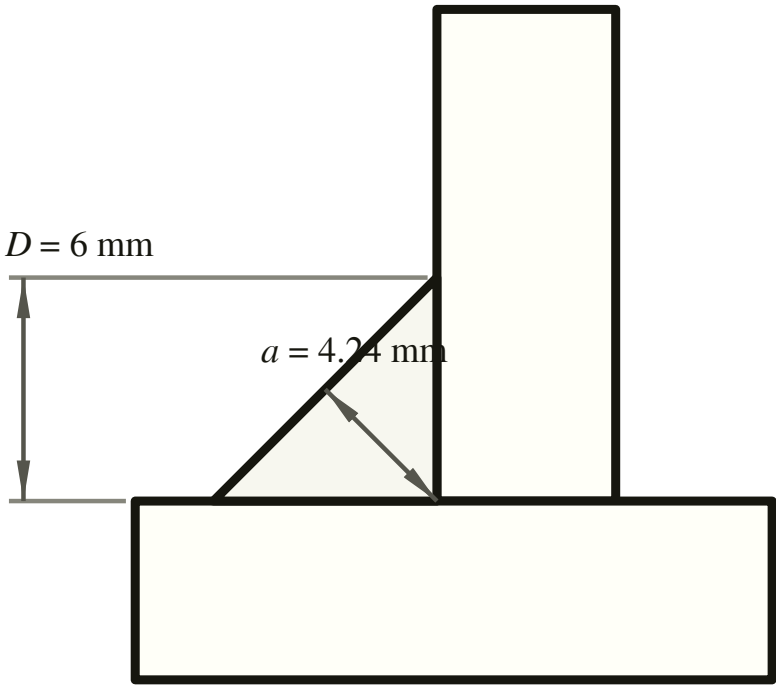
Weld capacity

Factored shear resistance of a fillet weld to CSA S16 Cl. 13.13.

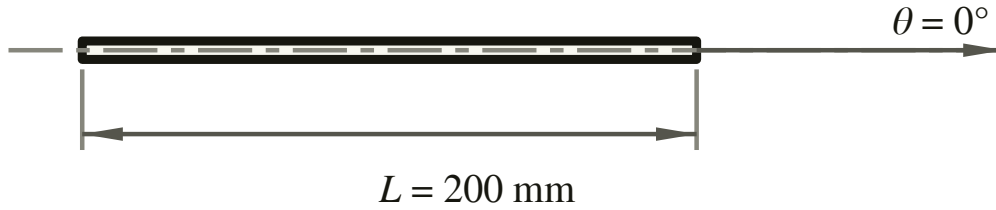
Inputs

Symbol	Value	Unit	Description
L	200	mm	Length of weld
D	6	mm	Leg size of weld
θ_{deg}	0		Angle between loading and weld axis, degrees
F_u	450	MPa	Least ultimate tensile strength of the joined components
electrode	E49XX 490 MPa		Weld electrode, matching the joined steel
oneside	No		Single-sided fillet weld connected to an element in tension

Figures



Fillet weld section: the leg as specified, the throat as calculated.



The weld run and the line of action, at the angle the enhancement uses.

Results

Quantity	Description	Value	Unit
A_w	Effective weld throat area	848.4	mm^2
V_{r1}	Base metal resistance, Cl. 13.13.2.1 (a), conservative extra check	242.4	kN
V_{r2}	Weld metal resistance, Cl. 13.13.2.2	186.6	kN
V_r	Governing factored shear resistance	186.6	kN

Derivation

$$\phi_w = 0.67$$

Resistance factor, weld | Cl. 13.13.1

$$\begin{aligned}\theta &= \text{radians } (\theta_{\text{deg}}) \\ &= \text{radians } (0) \\ &= 0\end{aligned}$$

$$\begin{aligned}A_m &= D \cdot L \\ &= 6 \text{ mm} \cdot 200 \text{ mm} \\ &= 1200 \text{ mm}^2\end{aligned}$$

$$\begin{aligned}A_w &= 0.707 \cdot A_m \\ &= 0.707 \cdot 1200 \text{ mm}^2 \\ &= 848.4 \text{ mm}^2\end{aligned}$$

$$\begin{aligned}V_{r1} &= 0.67 \cdot \phi_w \cdot A_m \cdot F_u && \text{Cl. 13.13.2.1 (a), conservative extra check} \\ &= 0.67 \cdot 0.67 \cdot 1200 \text{ mm}^2 \cdot 450 \text{ MPa} \\ &= 242.4 \text{ kN}\end{aligned}$$

$$\begin{aligned}k_{\theta} &= 1 + \frac{\sin(\theta)^{1.5}}{2} && \text{Cl. 13.13.2.2} \\&= 1 + \frac{\sin(0)^{1.5}}{2} \\&= 1\end{aligned}$$

$$\begin{aligned}V_{r2} &= 0.67 \cdot \phi_w \cdot A_w \cdot 490 \text{ MPa} \cdot k_{\theta} && \text{Cl. 13.13.2.2} \\&= 0.67 \cdot 0.67 \cdot 848.4 \text{ mm}^2 \cdot 490 \text{ MPa} \cdot 1 \\&= 186.6 \text{ kN}\end{aligned}$$

$$\begin{aligned}V_r &= \min(V_{r1}, V_{r2}) \\&= \min(242.4 \text{ kN}, 186.6 \text{ kN}) \\&= 186.6 \text{ kN}\end{aligned}$$