Transverse Shrinkage of a Butt Weld

Estimated transverse shrinkage of a butt weld from the weld cross-sectional area, plate thickness and root opening, and the total for several welds across a member.

Method: Transverse shrinkage S = 0.2A_w/t + 0.05d (Blodgett, Design of Welded Structures, James F. Lincoln Arc Welding Foundation, 1966, sec. 7.7)

Input parameters

Unit system: SI

Parameter	Value	Unit
Weld cross-sectional area	120.00	mm²
Plate thickness	12.000	mm
Root opening	2.0000	mm
Number of similar welds in line	1.0000	

Calculated results

Parameter	Value	Unit
Shrinkage per weld	2.1000	mm
Total shrinkage	2.1000	mm

Notes for this case

- Empirical estimate for steel butt welds; restraint reduces shrinkage and raises residual stress. Allow for shrinkage in fit-up (presetting or extra length).

Formula and method

$$S = 0.2\frac{A_w}{t} + 0.05d$$

Variables

A_w	Weld cross-sectional area	m²
t	Plate thickness	m
d	Root opening	m
n	Number of similar welds in line	-
S	Shrinkage per weld	m
S_{tot}	Total shrinkage	m

Method and standards

Blodgett's empirical relation.

Assumptions and limits

- Steel butt welds.

References

• Transverse shrinkage S = 0.2A_w/t + 0.05d (Blodgett, Design of Welded Structures, James F. Lincoln Arc Welding Foundation, 1966, sec. 7.7)

Report details

Report reference	FCC-XJ2Q-QP8M (the same inputs always give the same reference)
Generated	17 November 2026, 19:44 UTC
Calculator	Transverse Shrinkage of a Butt Weld
Method last reviewed	13 November 2026
Software release	FireCAD Calc, release of 17 November 2026
Release checks	2 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/materials/welding/weld-transverse-shrinkage

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.