Ceramic Drying and Firing Shrinkage: Green Size for a Fired Size

Plastic (green) and dry dimensions needed for a fired ceramic size from drying and firing shrinkage, with total linear and volume shrinkage.

Method: Compounding of drying and firing shrinkage

Input parameters

Unit system: SI

Parameter	Value	Unit
Fired dimension wanted	300.00	mm
Drying shrinkage (linear, on the plastic size)	6.0000	%
Firing shrinkage (linear, on the dry size)	8.0000	%

Calculated results

Parameter	Value	Unit
Plastic (green) dimension	346.90	mm
Dry dimension	326.09	mm
Total linear shrinkage (on plastic size)	13.520	%
Total volume shrinkage	35.323	%
Mould scale factor	1.1563	

Notes for this case

• Drying shrinkage is measured on the plastic size and firing shrinkage on the dry size, so they multiply: total = 1 − (1 − s_d)(1 − s_f). To fire a part to size the mould or die must be larger by L_p/L_f. Volume shrinks as the cube of the linear factor. Shrinkage varies with direction (pressing, extrusion) and with firing temperature: measure both on the production body.

Formula and method

$$L_d = \frac{L_f}{1 - s_f}, \quad L_p = \frac{L_d}{1 - s_d}, \quad s_t = 1 - (1 - s_d)(1 - s_f), \quad s_V = 1 - (1 - s_t)^3$$

Variables

L_f	Fired dimension wanted	m
s_d	Drying shrinkage (linear, on the plastic size)	-
s_f	Firing shrinkage (linear, on the dry size)	-
L_p	Plastic (green) dimension	m
L_d	Dry dimension	m
s_t	Total linear shrinkage (on plastic size)	-
s_V	Total volume shrinkage	-
L_p/L_f	Mould scale factor	-

Method and standards

Shrinkage.

Assumptions and limits

- Uniform isotropic shrinkage.

References

Compounding of drying and firing shrinkage

Report details

Report reference	FCC-QMXE-DBFD (the same inputs always give the same reference)
Generated	23 November 2026, 17:35 UTC
Calculator	Ceramic Drying and Firing Shrinkage: Green Size for a Fired Size
Method last reviewed	17 November 2026
Software release	FireCAD Calc, release of 22 November 2026
Release checks	3 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/chemical/ceramics-glass/ceramic-shrinkage-green-size

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.