Pattern Size with Casting Shrinkage and Machining Allowance

Pattern dimension from the finished casting dimension with the metal's shrinkage allowance and machining allowance per face.

Method: Pattern = (finished + machining) × (1 + shrinkage) (foundry practice)

Input parameters

Unit system: SI

Parameter	Value	Unit
Finished dimension	400.00	mm
Shrinkage allowance Your foundry's figure: about 1 % for grey iron, 2 % for steel, 1.3 % for aluminium.	1.0000	%
Machining allowance per face	3.0000	mm
Machined faces on this dimension	2.0000	

Calculated results

Parameter	Value	Unit
Casting dimension (as cast)	406.00	mm
Pattern dimension	410.06	mm

Notes for this case

- Add draft angles separately; hindered contraction may need less shrinkage allowance.

Formula and method

$$L_c = L + n_f m, \quad L_p = L_c(1 + s)$$

Variables

L	Finished dimension	m
s	Shrinkage allowance	-
m	Machining allowance per face	m
n_f	Machined faces on this dimension	-
L_c	Casting dimension (as cast)	m
L_p	Pattern dimension	m

Method and standards

Allowances.

Assumptions and limits

- Free contraction.
- Outside dimensions only (machining adds material).
- Shrinkage applied as L_p = L_c(1 + s); some foundries use L_c/(1 − s), which differs by about s^2 (0.04 % at 2 %).

References

- Pattern = (finished + machining) × (1 + shrinkage) (foundry practice)

Report details

Report reference	FCC-9DJZ-MP53 (the same inputs always give the same reference)
Generated	17 November 2026, 19:45 UTC
Calculator	Pattern Size with Casting Shrinkage and Machining Allowance
Method last reviewed	12 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/mechanical/manufacturing/casting-shrinkage-allowance

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.