Corrosion Rate from Coupon Weight Loss (ASTM G1)

Average corrosion rate of a test coupon in mm per year and mils per year from its mass loss, exposed area, exposure time and density (ASTM G1 form).

Method: ASTM G1: CR = K W/(A T D); K = 8.76 × 10^4 for mm/y with W in g; ...

Input parameters

Unit system: SI

Parameter	Value	Unit
Mass loss	0.052500	g
Exposed area	25.000	cm²
Exposure time	90.000	d
Metal density	7,860.0	kg/m³

Calculated results

Parameter	Value	Unit
Corrosion rate	0.010835	mm/a
Corrosion rate in mils per year	0.42659	

Notes for this case

- Average rate assuming uniform loss; inspect the coupon for pits, which the average hides.

Formula and method

$$CR = \frac{8.76 \times 10^4 \, W}{A \, T \, D}$$

Variables

W	Mass loss	kg
A	Exposed area	m²
T	Exposure time	s
ρ	Metal density	kg/m³
CR	Corrosion rate (shown in mm/a)	m/s
CR_{mpy}	Corrosion rate in mils per year	-

Method and standards

ASTM G1.

Assumptions and limits

- Uniform corrosion.
- The ASTM G1 constant 8.76 × 10^4 uses a 365-day year; the mm/a display uses the Julian year (365.25 d). The two differ by 0.07 %, which is negligible.

References

- ASTM G1: CR = K W/(A T D)
- K = 8.76 × 10^4 for mm/y with W in g
- A in cm²
- T in h
- D in g/cm³

Report details

Report reference	FCC-NHD0-3TCH (the same inputs always give the same reference)
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Calculator	Corrosion Rate from Coupon Weight Loss (ASTM G1)
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/materials/corrosion/corrosion-rate-weight-loss

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.