Corrosion Rate and Remaining Life from Thickness

Corrosion rate from two wall thickness readings and the time between them, in mm/y and mpy, and the remaining life down to the minimum required thickness.

Method: Thickness-based corrosion rate (inspection practice)

Input parameters

Unit system: SI

Parameter	Value	Unit
Earlier thickness reading (or original thickness)	12.700	mm
Latest thickness reading	10.900	mm
Years between the readings	6.0000	
Minimum required thickness From the design code calculation for pressure and structural loads.	7.2000	mm

Calculated results

Parameter	Value	Unit
Corrosion rate (mm per year)	0.30000	
Corrosion rate (mils per year)	11.811	
Remaining life (years)	12.333	
Metal lost between the readings	1.8000	mm

Formula and method

$$CR = \frac{t_1 - t_2}{\Delta y} \qquad CR_{mpy} = \frac{CR}{0.0254} \qquad RL = \frac{t_2 - t_{min}}{CR} \qquad \Delta t = t_1 - t_2$$

Variables

t_1	earlier thickness	m
t_2	latest thickness	m
Δy	years between	years
t_{min}	minimum required thickness	m
CR	corrosion rate	mm/y
CR_{mpy}	corrosion rate	mils/y
RL	remaining life	years
Δt	metal lost	m

Method and standards

Linear corrosion between readings at the same location; 1 mil = 0.0254 mm.

Assumptions and limits

- Uniform corrosion; pitting needs other methods.
- The remaining life has no safety factor. Inspection codes usually set the next inspection at a fraction of the remaining life (often half); follow the code that applies to the equipment.

References

- Thickness-based corrosion rate (inspection practice)

Report details

Report reference	FCC-KV1A-PTMF (the same inputs always give the same reference)
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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/materials/corrosion/corrosion-rate-remaining-life

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.