Tube Wall Thinning Rate and Remaining Life

Thinning rate from two wall-thickness surveys and the remaining life until a minimum thickness (entered by the user from the design code).

Method: Linear extrapolation of two surveys; minimum thickness from the applicable design code; entered by the user

Input parameters

Unit system: SI

Parameter	Value	Unit
Thickness at first survey	5.0000	mm
Thickness at second survey	4.6000	mm
Time between surveys	2.0000	a
Minimum allowed thickness	3.8000	mm

Calculated results

Parameter	Value	Unit
Thinning rate	0.20000	mm/a
Remaining life	4.0000	a

Notes for this case

- Linear extrapolation: erosion and corrosion rates change with fuel, velocity and soot blowing. Re-survey before the predicted date.

Formula and method

$$\dot{t} = \frac{t_1 - t_2}{\Delta t}, \quad L = \frac{t_2 - t_{min}}{\dot{t}}$$

Variables

t_1	Thickness at first survey	m
t_2	Thickness at second survey	m
Δt	Time between surveys	s
t_{min}	Minimum allowed thickness	m
$\dot{t}$	Thinning rate	m/s
L	Remaining life	s

Method and standards

Linear extrapolation of the thinning between two surveys at the same points to the minimum thickness. A tube already at or below the minimum is shown with zero remaining life.

Assumptions and limits

- Constant rate.
- Ultrasonic readings carry an uncertainty (often around ±0.1 mm); when the loss between surveys is small the rate is uncertain, and a note says so.

References

- Linear extrapolation of two surveys; minimum thickness from the applicable design code
- entered by the user

Report details

Report reference	FCC-RYPG-VNNW (the same inputs always give the same reference)
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Calculator	Tube Wall Thinning Rate and Remaining Life
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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/boilers-power-plant/boiler-pressure-parts/wall-thinning-remaining-life

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.