Long-term corrosion rate: what goes in it?

Short-term corrosion rate: what goes in it?

Worked: a CML read 0.600 in. new in 2010 and 0.540 in. in 2025 (invented numbers). Long-term rate?

Worked: the same CML read 0.565 in. in 2019 and 0.540 in. in 2025 (invented numbers), with a long-term rate of 0.004 in./yr. Short-term rate, and which one governs?

Which corrosion rate normally governs, and when can the inspector pick the other?

Your corrosion rate came out negative. What usually went wrong?

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2 / 12 · I. Thickness measurements, inspection intervals and vessel integrity (calculations)

Previous reading minus latest reading, divided by the years between those two readings.

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1 / 12 · I. Thickness measurements, inspection intervals and vessel integrity (calculations)

Initial thickness minus latest thickness, divided by the years between them.

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4 / 12 · I. Thickness measurements, inspection intervals and vessel integrity (calculations)

0.025 / 6 = about 0.0042 in./yr. It is the higher rate, so it normally governs.

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3 / 12 · I. Thickness measurements, inspection intervals and vessel integrity (calculations)

0.060 in. lost over 15 years = 0.004 in./yr.

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6 / 12 · I. Thickness measurements, inspection intervals and vessel integrity (calculations)

Usually a measurement problem: a reading off the CML, bad calibration, coating or couplant error, a lamination or doubling, or a wrong baseline. Investigate and re-measure; don't just flip the sign.

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5 / 12 · I. Thickness measurements, inspection intervals and vessel integrity (calculations)

The higher one. Another rate only with a stated reason, such as a process change that makes it more representative.

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7 / 12 · I. Thickness measurements, inspection intervals and vessel integrity (calculations)

Remaining life formula?

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8 / 12 · I. Thickness measurements, inspection intervals and vessel integrity (calculations)

Worked: t actual 0.540 in., t required 0.420 in., governing rate 0.005 in./yr (invented numbers). Remaining life?

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9 / 12 · I. Thickness measurements, inspection intervals and vessel integrity (calculations)

In remaining life, is t required the nominal thickness or the original corrosion allowance?

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10 / 12 · I. Thickness measurements, inspection intervals and vessel integrity (calculations)

Worked: t actual 0.500 in., rate 0.004 in./yr, next inspection in 5 years (invented numbers). Thickness to use for MAWP at that inspection?

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11 / 12 · I. Thickness measurements, inspection intervals and vessel integrity (calculations)

Joint category of a longitudinal shell seam?

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12 / 12 · I. Thickness measurements, inspection intervals and vessel integrity (calculations)

Joint category of a circumferential shell seam, or the joint to a 2:1 ellipsoidal head?

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8 / 12 · I. Thickness measurements, inspection intervals and vessel integrity (calculations)

0.120 / 0.005 = 24 years.

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7 / 12 · I. Thickness measurements, inspection intervals and vessel integrity (calculations)

(t actual minus t required) divided by the governing corrosion rate.

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10 / 12 · I. Thickness measurements, inspection intervals and vessel integrity (calculations)

0.500 minus 2 x 0.004 x 5 = 0.460 in. Take off twice the metal expected to be lost by then.

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9 / 12 · I. Thickness measurements, inspection intervals and vessel integrity (calculations)

Neither. It is the minimum thickness for the design or rerated pressure from the construction code formulas.

API 510 Section 7; ASME VIII-1 UG-27

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12 / 12 · I. Thickness measurements, inspection intervals and vessel integrity (calculations)

Category B. Categories say where a joint sits, not how it is welded.

ASME VIII-1 UW-3

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11 / 12 · I. Thickness measurements, inspection intervals and vessel integrity (calculations)

Category A. The circumferential joint joining a hemispherical head to the shell is also A.

ASME VIII-1 UW-3

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