

Vertical Cylinder volume formula

tankvolumecalc.com/formulas/vertical-cylinder/

Total volume, exact partial fill, derivation, worked example and a copy-ready fill table.

TOTAL VOLUME

$$V = \pi r^2 H$$

PARTIAL FILL AT LIQUID DEPTH H

$$V(h) = \pi r^2 h$$

Derivation

Every horizontal slice is the same full circle, so volume is exactly linear in depth — the one tank where gallons-per-inch is a single constant: $\pi r^2/231$ in inch units.

Worked example

Take $D = 48$ in, $H = 72$ in. Total capacity: 564 gal. At a stick reading of 28.8 in (40% of the 72 in maximum depth), the filled volume is 225.6 gal — 40% of capacity. Check it live on the calculator.

Fill ratio: % of depth → % of volume (any vertical cylinder (linear))

Depth	Volume
5%	5%
10%	10%
15%	15%
20%	20%
25%	25%
30%	30%
35%	35%
40%	40%
45%	45%
50%	50%
55%	55%
60%	60%
65%	65%
70%	70%
75%	75%
80%	80%
85%	85%
90%	90%
95%	95%

Need the full inch-by-inch table for specific dimensions? The dip chart generator prints it as a laminate-ready PDF.

FAQ

Q. What is the formula for a vertical cylinder volume?

Total: $V = \pi r^2 H$. Partial fill at depth h : $V(h) = \pi r^2 h$. Derivation and a worked example are above.

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Q. Is the fill-ratio table exact?

Yes — computed by the same engine as our calculators (any vertical cylinder (linear)), verified by the automated test suite described on the methodology page.

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Q. Can I use this in a spreadsheet?

Yes — the formulas are closed-form (acos and sqrt only). Copy the 5%-step table for quick interpolation, or implement the formula directly for exact values.

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