DP Level Transmitter Range (LRV, URV, Wet Leg)

Lower and upper range values of a differential pressure level transmitter for an open tank or a closed tank with a wet (filled) reference leg.

Method: Hydrostatics of the process and reference legs

Input parameters

Unit system: SI

Parameter	Value	Unit
Level span to measure	2.0000	m
Lowest level to measure, above the lower (high-side) tap	0.30000	m
Low-side connection	Wet (filled) reference leg	
Wet leg height above the lower tap	2.5000	m
Process liquid density	1,000.0	kg/m³
Wet leg fill density	1,000.0	kg/m³

Calculated results

Parameter	Value	Unit
Lower range value	-2,200.0	mmWC
Upper range value	-200.00	mmWC
Calibrated span	2,000.0	mmWC

Notes for this case

- With a wet leg the range is usually negative (suppressed or elevated zero); this is normal.

Formula and method

$$LRV = \rho_p g h_0 - \rho_l g H \qquad URV = \rho_p g (h_0 + h_s) - \rho_l g H \qquad \Delta p_s = URV - LRV$$

Variables

h_s	level span	m
h_0	lowest level above lower tap	m
leg	dry/open or wet leg	–
H	wet leg height	m
ρ_p	process density	kg/m³
ρ_l	leg fill density	kg/m³
LRV	lower range value	Pa
URV	upper range value	Pa
Δp_s	span	Pa
g	standard gravity	m/s²

Method and standards

Hydrostatic heads of the process and reference legs; the high side connected to the lower tap.

Assumptions and limits

- Constant densities; legs fully filled or empty as chosen.
- The vapour or gas density above the liquid is neglected. For boiler drums, where steam density matters, use the drum level DP compensation calculator.

References

- Hydrostatics of the process and reference legs

Report details

Report reference	FCC-JS16-YA1E (the same inputs always give the same reference)
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Calculator	DP Level Transmitter Range (LRV, URV, Wet Leg)
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Software release	FireCAD Calc, release of 17 November 2026
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/instrumentation/pressure-level/dp-level-transmitter-range

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.