Flowmeter Turndown and Accuracy over the Range

Turndown of a flowmeter from its maximum and minimum flows, and the error at a flow when accuracy is given as % of reading above a cut-off and % of span below.

Method: Definition of turndown; maker-style accuracy statements

Input parameters

Unit system: SI

Parameter	Value	Unit
Maximum flow of the meter	100.00	
Minimum flow of interest	5.0000	
Flow to check	10.000	
Accuracy as a share of reading	0.50000	%
Accuracy as a share of full scale (below the change-over)	0.10000	%

Calculated results

Parameter	Value	Unit
Turndown Q_max / Q_min	20.000	
Error at the flow (±)	0.10000	
Error as a share of the flow	1.0000	%
Change-over flow where both statements agree	20.000	

Notes for this case

- The larger of the two statements applies at each flow, the usual form of maker's accuracy statements.

Formula and method

$$TD = \frac{Q_{max}}{Q_{min}}, \quad e = \max(a_r Q,\ a_f Q_{max})$$

Variables

Q_{max}	Maximum flow of the meter	-
Q_{min}	Minimum flow of interest	-
Q	Flow to check	-
a_r	Accuracy as a share of reading	-
a_f	Accuracy as a share of full scale (below the change-over)	-
TD	Turndown Q_max / Q_min	-
e	Error at the flow (±)	-
e/Q	Error as a share of the flow	-
Q_x	Change-over flow where both statements agree	-

Method and standards

Definitions.

Assumptions and limits

- Two-part accuracy statement; with no %-of-reading part the change-over flow is not shown.

References

- Definition of turndown; maker-style accuracy statements

Report details

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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/instrumentation/signals-calibration/flowmeter-turndown-accuracy

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.