

Title	Demonstrate knowledge of flow measurement systems used in industry		
Level	3	Credits	4

Purpose	People credited with this unit standard are able to: <ul style="list-style-type: none"> – demonstrate knowledge of flow measuring devices; – describe flowmeter calibration check procedures; – plot flowmeter and associated equipment characteristic graphs; and – demonstrate knowledge of methods of flowmeter installation.
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Classification	Industrial Measurement and Control > Industrial Measurement and Control - Theory
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Available grade	Achieved
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Guidance Information

None.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of flow measuring devices.

Performance criteria

- 1.1 Describe common differential pressure primary flow elements and compare their features.
- Range orifice plate, venturi, pitot tube, annubar, flow nozzle.
- 1.2 Describe differential pressure transmitters and ancillary equipment used with the primary flow element.
- Range square root extractor, integrator, 3 valve manifold.
- 1.3 Describe flowmeters using the velocity principle and compare their features.
- Range electromagnetic, vortex, turbine.
- 1.4 Describe general flowmeters and compare their features.
- Range rotameter (variable area), target.

- 1.5 Describe operating principles and uses of positive displacement quantity flowmeters.
- Range uses – water, petrol, gas;
types – nutating disc, oval gear, rotary piston, bellows.
- 1.6 Describe operating principles and features of dedicated mass flowmeters.
- Range coriolis, thermal dispersion.
- 1.7 Describe and compare operating principles, flow range, and characteristics of open channel flowmeters.
- Range weirs, vee notch, rectangular, submerged, flumes, venturi, parshall.

Outcome 2

Describe flowmeter calibration check procedures.

Performance criteria

- 2.1 Describe methods of checking calibration for flowmeters.
- Range flowmeters – electromagnetic, turbine, mass flowmeter;
calibration equipment – dedicated, flow rig, frequency counter,
reference flowmeter.
- 2.2 Describe meter provers used for calibration of high accuracy positive displacement flowmeters.
- 2.3 Outline orifice plate sizing principles.
- Range differential pressure, flowrate, density, temperature, pipe size,
computer software.

Outcome 3

Plot flowmeter and associated equipment characteristic graphs.

Performance criteria

- 3.1 Plot differential pressure versus flow characteristic for a differential pressure flow element.
- Range one of – orifice plate, venturi, pitot tube.
- 3.2 Plot input versus output characteristic of associated equipment.
- Range one of – square root extractor, integrator.

3.3 Plot output signal versus flow graph of velocity flow meter.

Range one of – turbine, electromagnetic, vortex.

3.4 Plot level versus flow graph for either weir or flume.

Outcome 4

Demonstrate knowledge of methods of flowmeter installation.

Performance criteria

4.1 Explain, with the aid of sketches, the installation requirements for orifice plates, differential pressure transmitters, and three-valve manifolds.

Range evidence of one method of measurement is required, involving either gas, steam, or liquid.

4.2 Identify and define orifice plate formats and applications.

Range eccentric, concentric, segmented, bleed holes.

4.3 Identify electromagnetic flowmeter tube earthing requirements.

4.4 Explain instrument 4-20mA loop wiring and earthing requirements.

Range screened cable, single common earth point.

Planned review date	31 December 2021
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Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	31 October 1995	31 December 2013
Revision	2	30 October 1997	31 December 2013
Revision	3	3 April 2001	31 December 2013
Review	4	22 June 2001	31 December 2013
Review	5	19 May 2008	31 December 2019
Review	6	28 November 2013	N/A
Rollover and Revision	7	28 June 2018	N/A

Consent and Moderation Requirements (CMR) reference	0003
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This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.

Comments on this unit standard

Please contact The Skills Organisation reviewcomments@skills.org.nz if you wish to suggest changes to the content of this unit standard.