

Title	Demonstrate knowledge of control valves, actuators, and positioners		
Level	3	Credits	4

Purpose	People credited with this unit standard are able to demonstrate knowledge of: <ul style="list-style-type: none"> – control valves; – control valve sizing for liquid flow; – valve actuators; and – valve positioners.
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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 control valves.

Performance criteria

- 1.1 Define terms associated with control valve components.
Range trim (wetted parts), stem packing, yoke, plug, seat.
- 1.2 Describe control valve types and compare their features.
Range linear – single seated globe, double seated, saunders, cage guided, multi-orifice;
rotary – ball, butterfly, eccentric rotary plug.
- 1.3 Describe control valve inherent flow versus lift characteristics under constant pressure drop conditions.
Range linear, equal percentage, quick opening.
- 1.4 Describe control valve installed flow versus lift characteristics.

1.5 Explain the terms 'rangeability' and 'turndown' in the context of control valve operation.

1.6 Describe damage associated with control valves and describe causes.

Range erosion, corrosion, cavitation, flashing, wear.

Outcome 2

Demonstrate knowledge of control valve sizing for liquid flow.

Performance criteria

2.1 Calculate control valve sizes for liquid flow, based on valve sizing coefficients C_v (imperial), A_v (metric), or K_v (metric).

2.2 Calculate size of control valve, based on differential pressure and flow with the valve fully open.

Range differential pressure (pounds per square inch - psi); flow (US gallons per minute); C_v , A_v , or K_v .

Outcome 3

Demonstrate knowledge of valve actuators.

Performance criteria

3.1 Explain air operated control valve actuators.

Range diaphragm, single acting piston spring return, double acting, pressures, bench set.

3.2 Describe electrically operated control valve actuators.

Range motorised valves, solenoid valves.

3.3 Describe hydraulic and electro-hydraulic actuators and servo valves.

3.4 Compare features of control valve actuator types.

Range diaphragm, piston, operating pressures, size, electric, hydraulic.

Outcome 4

Demonstrate knowledge of valve positioners.

Performance criteria

4.1 Explain reasons for using control valve positioners.

Range stem friction, long transmission lines, split range control valves, characterising stem movement, change pressure range, double acting piston actuator.

4.2 Describe control valve positioners.

Range electro-pneumatic (4-20mA input), digital valve controllers, motion balance, force balance, double acting (5 port spool valve).

This unit standard is expiring. Assessment against the standard must take place by the last date for assessment set out below.

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	31 December 2027
Rollover and Revision	7	28 June 2018	31 December 2027
Review	8	30 January 2025	31 December 2027

Consent and Moderation Requirements (CMR) reference

0003

This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.