

<b>Title</b>	<b>Demonstrate knowledge of pressure measurement systems used in industry</b>		
<b>Level</b>	<b>3</b>	<b>Credits</b>	<b>4</b>

<b>Purpose</b>	People credited with this unit standard are able to: <ul style="list-style-type: none"> <li>– demonstrate knowledge of pressure measurement devices;</li> <li>– describe pressure calibration equipment;</li> <li>– calibrate pressure transmitters and gauges; and</li> <li>– describe methods of pressure instrument installation.</li> </ul>
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<b>Classification</b>	Industrial Measurement and Control > Industrial Measurement and Control - Theory
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<b>Available grade</b>	Achieved
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### Guidance Information

- 1 Reference  
ANSI/ISA-51.1-1979 (R1993) *Process Instrumentation Terminology*; and all subsequent amendments and replacements.
- 2 Definition  
*Industry requirements* – includes all asset owner requirements; manufacturers' specifications; enterprise requirements which cover documented workplace policies, procedures, specifications, and business requirements; and quality management requirements relevant to the assessment being carried out.

### Outcomes and performance criteria

#### Outcome 1

Demonstrate knowledge of pressure measurement devices.

#### Performance criteria

- 1.1 Describe common mechanical pressure devices with reference to operating principles and construction materials of components.  
  
 Range      bourdon (C type, helical, spiral), bellows, diaphragm, capsule, pressure switch.
- 1.2 State typical pressure ranges for each device.  
  
 Range      gauge pressure, absolute pressure, vacuum, differential pressure.

- 1.3 Describe operating principles and main components used in pneumatic pressure transmitters.

Range force balance, relay, all components, 20-100kPa.

- 1.4 Describe operating principles and main components used in electronic pressure transmitters.

Range capacitance, strain gauge, vibrating wire, 4-20mA, block diagram.

## **Outcome 2**

Describe pressure calibration equipment.

Range reference to construction, operating principles, pressure ranges.

## **Performance criteria**

- 2.1 Describe manometers.

Range U tube, single limb, inclined tube, mercury, water, oil.

- 2.2 Describe air test equipment.

Range precision gauge, precision regulator.

- 2.3 Describe hydraulic test equipment.

Range comparator, deadweight tester, force balance.

- 2.4 Describe dedicated electronic precision pressure calibration equipment.

- 2.5 Describe vacuum test equipment.

Range manometer, vacuum pump.

- 2.6 Describe nitrogen bottle test equipment.

Range precision gauge, precision regulator.

## **Outcome 3**

Calibrate pressure transmitters and gauges.

Range vacuum transmitter, low pressure transmitter, pressure switch, pressure gauge.

**Performance criteria**

3.1 Select test equipment according to the accuracy and range of the device.

Range deadweight, manometer, air test equipment, dedicated test equipment.

3.2 Explain and follow safe work procedures.

Range isolation, filled systems, chemical (oxygen or oil), pressure, mercury.

3.3 Calibrate transmitters and gauges using adjustments appropriate to the equipment.

Range zero, span, linearity, head correction.

3.4 Identify types and causes of typical measurement errors.

3.5 Record test results in accordance with industry requirements.

**Outcome 4**

Describe methods of pressure instrument installation.

**Performance criteria**

4.1 Describe isolation seals used on pressure gauges and transmitters.

Range liquid, gas, sanitary, vacuum.

4.2 Define mounting methods and special applications.

Range liquid, steam, vapour, gas, diaphragm seals, liquid fill, snubbers.

4.3 Describe instrument 4-20 mA loop wiring and earthing requirements.

Range screened cable, single common earth point, resistance limits, loading limits, radio frequency interference (RFI).

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**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	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>.