Title	**Demonstrate knowledge of pressure vessels and pressure piping for fabrication trades**		
Level	**4**	**Credits**	**4**

Purpose	This unit standard is for use in training of engineering metal fabrication trades. People credited with this unit standard are able to demonstrate knowledge of the requirements and terminology used in pressure equipment manufacture; pressure vessels, boilers, heat exchangers, and pressure piping.

Classification	Mechanical Engineering > Engineering - Fabrication

Available grade	Achieved

Guidance Information

1 References
Health and Safety at Work Act 2015.
AS/NZS 1200:2015, *Pressure Equipment*.
Pressure equipment, cranes, and passenger ropeways - A general guide to the health and safety in employment (Pressure Equipment, Cranes and Passenger Ropeways) Regulations 1999 Wellington: Department of Labour, 1999. Available at: http://www.worksafe.govt.nz.

2 Definition
Accepted industry practice – approved codes of practice and standardised procedures accepted by the wider mechanical engineering industry sectors as examples of best practice.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of the requirements and terminology used in pressure equipment manufacture.

Performance criteria

1.1 The requirements for quality control during manufacture of pressure equipment are explained in accordance with accepted industry practice.

Range inspection and test plans, manufacturer's data report, material certificates.

1.2 Safety considerations and risks associated with pressure equipment are identified and the consequences of failure explained.

Range hydraulic equipment, pneumatic equipment.

1.3 The role of regulatory elements relating to manufacture and operation of pressure equipment is described with reference to safety.

Range regulatory elements – legislation, regulations, codes of practice, standards, Worksafe.

1.4 The application and purpose of using only certified and traceable materials in the manufacture of pressure equipment is explained.

1.5 The process of hydrostatic testing of pressure equipment is explained.

Outcome 2

Demonstrate knowledge of pressure vessels.

Performance criteria

2.1 Materials used in the construction of pressure vessels are described in terms of advantages and disadvantages for pressure vessel applications.

Range carbon, low alloy, stainless steel, aluminium.

2.2 Pressure vessel components and pressure relief devices are described with reference to their functions.

2.3 Methods of assembly for pressure vessel components are described.

Range circumferential and longitudinal seams; shell to shell of equal thickness and unequal thickness; shell to head; reinforcing pads to nozzle and shell; nozzles, components welded to the shell and head, including openings.

Outcome 3

Demonstrate knowledge of boilers.

Range water tube, fire tube.

Performance criteria

3.1 The construction and operation of a boiler is explained with reference to its components, their functions, and materials they are made of.

Range components – tubes, drums, furnace;
construction – shell construction, tube sheet construction.

3.2 The differences between water tube and fire tube boilers are identified and their purpose and operations compared.

3.3 The purpose of the name plate on a boiler and its contents are explained.

Outcome 4

Demonstrate knowledge of heat exchangers.

Performance criteria

4.1 The construction and operation of a shell and tube heat exchanger is explained.

Range components – tubes, tubesheet, heads, baffle plates.

4.2 Three different types of heat exchangers are identified and their purpose and operations compared.

4.3 The purpose of the name plate on a heat exchanger and its contents are explained.

Outcome 5

Demonstrate knowledge of pressure piping.

Performance criteria

5.1 Pressure piping parameters are determined from drawings for fabrication purposes.

Range parameters – type of material, fittings, valves, size, rating.

5.2 Hot and cold pressure pipe forming processes are described in accordance with accepted industry practice.

5.3 Common types of pressure pipe fittings and connections, and valves and pipe supports are described.

Range examples are – long radius (LR) elbows, short radius (SR) elbows, reducers, weld ‘O’ lets, flange ‘O’ lets, thread ‘O’ lets.

5.4 Pressure pipe connection types are described in accordance with accepted industry practice.

Range welded, threaded, slip-on flanges, weld neck flanges, expansion joints.

Planned review date	31 December 2022

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	17 July 2009	31 December 2022
Review	2	17 August 2017	N/A

Consent and Moderation Requirements (CMR) reference	0013

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

Comments on this unit standard

Please contact Competenz qualifications@competenz.org.nz if you wish to suggest changes to the content of this unit standard.