

Title	Join ferrous and non-ferrous metal components by torch brazing		
Level	3	Credits	6

Purpose	<p>This unit standard is for people who are required to join metal components for engineering maintenance and fabrication operations.</p> <p>People credited with this unit standard are able to demonstrate knowledge of torch brazing principles, prepare to torch braze metal components, join metals by torch brazing, assess and repair brazed joints in accordance with accepted industry practice, and complete brazing activities in accordance with workplace procedures.</p>
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Classification	Mechanical Engineering > Welding
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Available grade	Achieved
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Explanatory notes

1 References

Legislation relevant to this unit standard includes but is not limited to the: Health and Safety at Work Act 2015; Resource Management Act 1991; Hazardous Substances and New Organisms Act 1996.

2 Definitions

Accepted industry practice – refers to approved codes of practice – NZS4781:1973 and AS/NZS 2865:2001, and standardised procedures accepted by the wider welding industry as examples of best practice.

Ferrous and non-ferrous metals include steel, stainless steel, brass, copper,

Job requirements – variable specifications and/or standards required for brazed joints depending on the materials being brazed, joint strength requirements, fluid sealing requirements, the environment or worksite where brazing is being carried out.

PPE – Personal Protective Equipment – may include but is not limited to gloves, face mask, eye protection, clothing.

Safe work practices – are those detailed in the Worksafe New Zealand publication – Health and Safety in Welding; available at <http://www.worksafe.govt.nz/worksafe>.

Workplace procedures – procedures used by the organisation carrying out the work and applicable to the tasks being carried out. They may include but are not limited to – standard operating procedures, site safety procedures, equipment operating procedures, codes of practice, quality management practices and standards, procedures to comply with legislative and local body requirements.

3 Assessment information

This unit standard may be assessed in the workplace using naturally occurring evidence or in a simulated environment that demands performance equivalent to that required in the workplace.

Outcomes and evidence requirements

Outcome 1

Demonstrate knowledge of torch brazing principles.

Evidence requirements

- 1.1 The principles of brazing are described in accordance with accepted industry practice.
- Range fusion of the brazing alloy to metal, temperature requirements, heat requirements, brazing alloys, use of flux, capillary action, surface clearance limitations, joint strength.
- 1.2 Types of equipment and materials are described in terms of their use in different joint types.
- Range equipment and materials – gas types, gas equipment, torches and tips, brazing alloys, fluxes.
Joint types – ferrous to ferrous metals, non-ferrous to non-ferrous metals, ferrous to non-ferrous metals.
- 1.3 Hazards and associated risks with brazing are identified and control measures for their management are described in accordance with safe work practices.

Outcome 2

Prepare to torch braze metal components.

Evidence requirements

- 2.1 Work area is assessed, hazards and risks are identified, and necessary control measures implemented in accordance with safe work practices.
- Range compressed gas, fire, explosion, fumes, confined space, burns, visible light and infrared radiation, chemicals.
- 2.2 Brazing equipment is selected to meet job requirements.
- Range may include but is not limited to – gas, cylinders, regulators, flashback arrestors, hoses, torch, tip, fume extraction equipment, PPE.
- 2.3 Brazing equipment is assembled, checked, and made ready for use in accordance with workplace procedures.

- 2.4 Any equipment defects are identified and corrective actions taken in accordance with accepted industry practice and workplace procedures.
- 2.5 Metal components are prepared and assembled for brazing in accordance with accepted industry practice.
- Range shaped, cleaned, deburred, clearances established.
- 2.6 Brazing alloy is selected to meet job requirements.

Outcome 3

Join metals by torch brazing.

Range ferrous to ferrous, non-ferrous to non-ferrous, and ferrous to non-ferrous. One of each joint type is required.

Evidence requirements

- 3.1 Personal protective equipment is selected and worn in accordance with safe work practices.
- 3.2 Flame size and type are adjusted to meet job requirements.
- 3.3 Joints are made in accordance with accepted industry practice.
- Range application of heat, uniform temperature of components, application of flux, application of filler.
- 3.4 Completed joints are cleaned of oxides and flux residue in accordance with accepted industry practice.

Outcome 4

Assess and repair brazed joints in accordance with accepted industry practice.

Evidence requirements

- 4.1 Joint integrity is assessed against job requirements.
- Range assessment and test procedures may include but are not limited to – visual inspection, non-destructive testing, leak tests, bend tests, peel tests.
- 4.2 Joint quality is within the permissible levels allowed by job.
- Range melted base metal, lack of filler metal at joint edges, unfused filler metal, cracks, undercutting, pin-holes.
- 4.3 Brazing faults are identified and rectified in accordance with job requirements.
- Range evidence of two different types of faults.

Outcome 5

Complete brazing activities in accordance with workplace procedures.

Evidence requirements

- 5.1 Tools, equipment, and materials are accounted for and returned to storage.
- 5.2 Waste materials and left over parts are disposed of or processed.

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	16 February 2017	N/A

Consent and Moderation Requirements (CMR) reference	0013
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This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.

Please note

Providers must be granted consent to assess against standards (accredited) by NZQA, before they can report credits from assessment against unit standards or deliver courses of study leading to that assessment.

Industry Training Organisations must be granted consent to assess against standards by NZQA before they can register credits from assessment against unit standards.

Providers and Industry Training Organisations, which have been granted consent and which are assessing against unit standards must engage with the moderation system that applies to those standards.

Requirements for consent to assess and an outline of the moderation system that applies to this standard are outlined in the Consent and Moderation Requirements (CMR). The CMR also includes useful information about special requirements for organisations wishing to develop education and training programmes, such as minimum qualifications for tutors and assessors, and special resource requirements.

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.