

Title	Repair non-ferrous metal components using welding processes		
Level	4	Credits	10

Purpose	<p>This unit standard covers repair of non-ferrous metal components by welding, using gas metal arc welding (GMAW) and gas tungsten arc welding (GTAW) processes.</p> <p>People credited with this unit standard are able to demonstrate knowledge of repair welding of non-ferrous metal components; prepare for repair welding of non-ferrous metal components; repair-weld non-ferrous metal components; and quality-assure repair welding of non-ferrous metal components.</p>
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Classification	Mechanical Engineering > Welding
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Available grade	Achieved
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Guidance Information

- 1 Reference

Health and Safety in Welding. Wellington: Department of Labour, 2006. Available from <http://www.worksafe.govt.nz/>.
- 2 Definitions

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

GMAW – Gas Metal Arc Welding; also referred to as *Metal Inert Gas* (MIG) welding.

GTAW – Gas Tungsten Arc Welding; also referred to as *Tungsten Inert Gas* (TIG) welding.

Non-ferrous metals – weldable aluminium alloys, copper and copper alloys, and magnesium and magnesium alloys.

Safe working practice – formal worksite or company safety policies, or the practices established by *Health and Safety in Welding* or similar codes.

Welding procedure – written work instruction providing all the necessary technical detail for a specific welding application.

Workplace procedures – procedures used by the organisation carrying out the work and applicable to the tasks being carried out. Examples are – standard operating procedures, safety procedures, equipment operating procedures, codes of practice, quality management practices and standards, procedures to comply with legislative and local body requirements.

- 3 Recommended for entry
Unit 2675, *Weld aluminium to industry standard in downhand positions using the gas metal arc welding process*; and Unit 2677, *Weld aluminium to industry standard in the downhand positions using the gas tungsten arc welding process*.
- 4 Scope of use
This unit standard does not qualify people to determine that welding is the preferred method of repair, particularly for critical components. A suitably qualified person such as a welding engineer or metallurgist should directly supervise the repair of critical components.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of repair welding of non-ferrous metal components.

Performance criteria

- 1.1 Methods of identifying parent metals are described in accordance with workplace procedures.
- Range methods – workshop tests, identification of component manufacturer, material analysis; workshop tests include but are not limited to – button weld test, tab weld test, spark test, resistance to filing test.
- 1.2 Factors influencing the choice of repair method and process are identified, and their practical implications stated.
- Range factors include – types of failure, possible fabrication of new or replacement parts, weld type and location, distortion control.

Outcome 2

Prepare for repair welding of non-ferrous metal components.

Performance criteria

- 2.1 Work area is assessed for hazards associated with repair welding and all necessary precautions taken in accordance with safe working practice.
- Range electric shock, arc and flame radiation, fire, explosion, fumes and gases, heat, confined space, compressed gas, chemicals from cleaning methods and from prior service environment of components.
- 2.2 A welding process is selected and assessed for repair welding.
- Range welding processes – GMAW, GTAW.
- 2.3 Equipment is selected and assembled to suit the repair welding process.

2.4 Parent metal is prepared for welding in accordance with welding procedure.

Range preparation includes – cleaning, edge preparation, surface preparation.

2.5 Consumables are selected in accordance with repair welding procedure.

Outcome 3

Repair-weld non-ferrous metal components.

Range evidence is required of five repair welds, including aluminium alloys using GMAW and GTAW, and either copper or magnesium alloys using GTAW.

Performance criteria

3.1 Safety procedures are followed and personal protective equipment is worn in accordance with safe working practice.

3.2 Weld metal is deposited in accordance with welding procedure.

3.3 Welds are cleaned in accordance with accepted industry practice.

Outcome 4

Quality assure repair welding of non-ferrous metal components.

Performance criteria

4.1 Methods of assessing weld quality are identified and the process explained in accordance with workplace procedures.

Range visual examination, penetrant inspection, magnetic particle inspection, workshop tests.

4.2 Defective repair welds are identified by visual examination and workshop tests.

4.3 Repair procedure is documented for future traceability in accordance with workplace procedures.

Planned review date	31 December 2022
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Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	30 November 1994	31 December 2018
Revision	2	14 April 1997	31 December 2018
Revision	3	5 January 1999	31 December 2018
Review	4	4 April 2001	31 December 2018
Rollover and Revision	5	20 April 2006	31 December 2018
Review	6	22 May 2009	31 December 2022
Review	7	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.