

Title	Fabricate and repair aeronautical components by welding		
Level	4	Credits	42

Purpose	People credited with this unit standard are able to: demonstrate knowledge of weldable grade aeronautical materials that are compatible with the gas tungsten arc welding (GTAW) process; prepare to weld aeronautical materials; weld aeronautical materials; demonstrate knowledge of quality assurance processes for welding with the GTAW process; and carry out task completion activities.
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Classification	Aeronautical Engineering > Aircraft Structures
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Available grade	Achieved
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Guidance Information

- 1 All tasks must be carried out in accordance with enterprise procedures.
- 2 Definition
Enterprise 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 Welding processes can be carried out using gas tungsten arc and/or plasma arc.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of weldable grade aeronautical materials that are compatible with the GTAW process.

Performance criteria

- 1.1 Weldable grade aeronautical metals are identified.

Range alloy steels (e.g. 4130), aluminium alloys (5000 and 6000 series), stainless steels (300 and/or 400 series), heat resistance alloy (alloys of nickel and chrome, e.g. Inconel, titanium).

- 1.2 The properties and alloying elements of metals are described in terms of the effect on their weldability.

Range properties include but are not limited to – thermal expansion, thermal conductivity;
alloying elements include but are not limited to – iron, chromium, nickel, molybdenum.

Outcome 2

Prepare to weld aeronautical materials.

Performance criteria

- 2.1 Hazards associated with GTAW are identified prior to welding.

Range may include but is not limited to – arc radiation, electrical, fire and/or explosion, fumes and gases, compressed gas, confined space, chemical cleaning, pickling and passivating agents.

- 2.2 The functions of GTAW are described, and advantageous features for welding are identified.

Range features of GTAW – non-consumable tungsten electrode, direct current electrode negative, alternating current, high frequency, inert gas shielding, pulsed arc welding, crater out, slope up and slope down functions.

- 2.3 Task is determined by reviewing documentation and enterprise procedures.

Range fabricate, repair.

- 2.4 Component identity is confirmed with documentation by comparing serial and part numbers.

- 2.5 Work area is prepared, and resources are obtained and checked for serviceability or status.

Range may include but is not limited to – publications, materials, tools, safety equipment, environmental conditions established.

- 2.6 Parent metal is identified and prepared for welding.

Range cleaning, edge preparation, surface preparation (e.g. grinding, filing), preheating.

- 2.7 Equipment is set up and maintained.

Range power source, shielding gas supply, torch assembly, purge equipment.

Outcome 3

Weld aeronautical materials.

Range pipe, sheet metal.

Performance criteria

3.1 Welding is undertaken.

3.2 Welds are deposited in the horizontal, vertical, and/or overhead positions.

3.3 Welding procedures and sequences are identified and implemented to control welding distortion.

Range controls may include but are not limited to – avoiding over welding, fit-up, tacking, weld sequence.

3.4 Any weld imperfections are identified and repaired.

Outcome 4

Demonstrate knowledge of quality assurance processes for welding with the GTAW process.

Performance criteria

4.1 Methods of assessing weld quality are described.

Range visual examination, penetrant inspection, radiographic.

4.2 Quality assurance procedures, as applied to welded fabrication, are identified.

Range welder performance qualifications, weld inspection.

Outcome 5

Carry out task completion activities.

Performance criteria

5.1 Item is prepared for use, storage, or transit.

5.2 Completion activities specific to the task and work area are carried out.

Range may include but is not limited to – tool control, cleanliness, tidiness, return of publications, preparation for next activity, return of aircraft and systems to normal.

5.3 Leftover items, parts, and materials are disposed of.

Range may include but is not limited to – serviceable, unserviceable, surplus, waste, scrap, hazardous.

5.4 Documentation is completed.

Replacement information	This unit standard replaced unit standard 4035.
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Planned review date	31 December 2027
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Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	26 March 2007	31 December 2016
Review	2	18 June 2014	31 December 2021
Review	3	26 March 2020	N/A
Rollover and Revision	4	26 April 2024	N/A

Consent and Moderation Requirements (CMR) reference	0028
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This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.

Comments on this unit standard

Please contact Ringa Hora Services Workforce Development Council qualifications@ringahora.nz if you wish to suggest changes to the content of this unit standard.