

Title	Weld stainless steel plate in downhand positions using the gas metal arc and flux cored arc welding processes		
Level	3	Credits	6

Purpose	<p>This unit standard is for people welding stainless steel in downhand positions to Class B of AS/NZS 1554.6 or equivalent, using the gas metal arc welding (GMAW) and flux cored arc welding (FCAW) processes.</p> <p>People credited with this unit standard are able to prepare to weld; and weld stainless steel in the downhand positions using the GMAW and FCAW processes; and inspect and repair GMAW and FCAW stainless steel plate welds.</p>
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Classification	Mechanical Engineering > Welding
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Available grade	Achieved
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Prerequisites	Unit 29651, <i>Demonstrate knowledge of health and safety when welding and thermal cutting</i> , or demonstrate equivalent knowledge and skills.
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Guidance Information

1 References

Health and Safety at Work Act 2015.

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

AS/NZS 1554.6:2012, *Structural steel welding – Welding stainless steels for structural purposes*.

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.

FCAW – Flux Cored Arc Welding.

GMAW – Gas Metal Arc Welding, also known as *Metal Inert Gas* (MIG) welding.

GMAW-P – Pulsed Power Gas Metal Arc Welding.

Industry standard – AS/NZS 1544.6 Class B, or equivalent.

Stainless steel – typically, the austenitic stainless steel grades AISI 304L and 316L, but may also include other materials such as the duplex stainless steels.

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

3 Related unit standards

This unit standard is one of a stainless steel welding set:

- Unit 22907, *Demonstrate and apply knowledge of welding aluminium and stainless steel* (Level 3); an introductory standard to provide foundation awareness for aluminium and stainless steel, generally delivered off job.
- Unit 2674, *Weld stainless steel plate in the downhand positions using the gas metal arc and flux cored arc welding processes* (Level 3); a progressive stainless steel specific industry standard.
- Unit 2676, *Weld stainless steel sheet to industry standard using the gas tungsten arc welding process* (Level 3); a progressive stainless steel specific industry standard.
- Unit 2687, *Weld stainless steel sheet and plate in all positions using the gas metal arc or flux cored arc welding process* (Level 4); a trade level stainless steel specific industry standard.
- Unit 2688, *Weld stainless steel tube using the gas tungsten arc welding process* (Level 4); a trade level stainless steel specific industry standard.

Outcomes and performance criteria

Outcome 1

Prepare to weld stainless steel in downhand positions using the GMAW and FCAW processes.

Performance criteria

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| 1.1 | Equipment is selected to meet welding procedure requirements. |
| | Range power source rating and duty cycle, wire feed system and gun, shielding gas supply, welding cables, work clamp. |
| 1.2 | Equipment is assembled and maintained ready for use in accordance with manufacturer's instructions. |
| | Range wire feed system; gun liner, nozzle and contact tip; shielding gas supply; welding cables; work clamp. |
| 1.3 | Stainless steel components are prepared and assembled in accordance with welding procedure. |
| | Range cleaning, providing root face where required, tack welding to correct alignment and preset. |
| 1.4 | Consumables are selected in accordance with welding procedure. |
| | Range electrodes are identified by specification and classification; shielding gases are identified by brand name and composition. |

Outcome 2

Weld stainless steel in downhand positions using the GMAW and FCAW processes.

Range evidence is required of six welds of 6-10mm plate thickness:
GMAW – tee weld, 2F position; butt weld, 1G position;
GMAW-P – butt weld, 1G position; tee weld, 2F position;
FCAW – tee weld, 2F position; butt weld, 1G position;
all tee joints to be angle sections to plate, to include welding into the corner.

Performance criteria

2.1 Workplace safety procedures are followed.

Range examples are – use of personal protective equipment, checking of equipment for faults, use of fume extraction equipment, elimination of risk of fire or explosion, protection from arc radiation.

2.2 Electrodes are stored and handled in accordance with manufacturer's specifications.

2.3 Welds are deposited on stainless steel to industry standard and in accordance with welding procedure.

2.4 Component damage is minimised and distortion is controlled during welding and handling in accordance with accepted industry practice.

2.5 Welds are cleaned in accordance with accepted industry practice.

Outcome 3

Inspect and repair GMAW and FCAW stainless steel plate welds.

Performance criteria

3.1 Weld imperfections are identified by visual examination and workshop tests.

Range examples of workshop tests are – nick break, fillet break-over, bend, macro examination. One workshop test is required for each weld from outcome 2.

3.2 Weld imperfections are compared to the permissible levels allowed by the industry standard.

3.3 Weld defects are repaired to industry standard.

Range evidence is required of at least one weld repair using GMAW and one using FCAW, involving the removal of the defect and rewelding.

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 2022
Revision	2	14 April 1997	31 December 2022
Revision	3	5 January 1999	31 December 2022
Review	4	4 April 2001	31 December 2022
Rollover and Revision	5	20 April 2006	31 December 2022
Review	6	22 May 2009	31 December 2022
Review	7	20 July 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>.

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.