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| **Title** | **Weld steel or stainless steel pressure pipe in all positions using the gas tungsten arc welding process** | | |
| **Level** | **4** | **Credits** | **12** |

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| **Purpose** | This unit standard is for people who are welding steel or stainless steel pressure pipe in all positions using the gas tungsten arc welding (GTAW) process.<br><br>People credited with this unit standard are able to: prepare to weld steel or stainless steel pressure pipe in all positions using the GTAW process; weld steel or stainless steel pressure pipe in all positions using the GTAW process; and inspect and repair GTAW pressure pipe welds. |

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| **Classification** | Mechanical Engineering > Welding |

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| **Available grade** | Achieved |

**Guidance Information**

1 Legislation and references
Legislation, regulations and/or industry standards relevant to this unit standard include but are not limited to the:
Health and Safety at Work Act 2015.
WorkSafe Good Practice Guide “Health and Safety in Welding”. Available at: https://www.worksafe.govt.nz/assets/dmsassets/WKS-13-Welding-GPG.pdf.
Weld Australia (formerly Welding Technology Institute of Australia (WTIA) Technical Note 7 – Health and Safety in Welding. Available at: Product Details Weld Australia Member Portal.

Industry Standard - ASME BPVC-IX:2021, *Boiler and Pressure Vessel Code, Section IX, Welding and brazing qualifications,* or equivalent. American Society of Mechanical Engineers, current version. Available from https://www.asme.org/.
Industry Standard - AS/NZS ISO 9606.1:2017 *Qualification testing of welders - Fusion welding - Part 1: Steels*, or equivalent. Available at: www.standards.govt.nz.
ISO 6947:2019, *Welding and allied processes – Welding positions.* Available at: www.standards.govt.nz.

Any new, amended or replacement Acts, regulations, standards, codes of practice, guidelines, or authority requirements or conditions affecting this unit standard will take precedence for assessment purposes.

2 Definitions

*Accepted industry practice* – approved codes of practice and standardised procedures accepted by the engineering industry as examples of best practice.
*GTAW* – Gas Tungsten Arc Welding, also referred to as *Tungsten Inert Gas (TIG) Welding*.
*Industry standard* – ASME BPVC-IX:2021, AS/NZS ISO 9606.1:2017, or equivalent.
*Manufacturer's instructions* – instructions provided by manufacturers of substances, equipment, and machinery. These instructions may include details on safe and correct handling, use and storage of substances and/or details on substance properties. Examples are labels on substance containers, product data sheets, and operator's manuals.
*NDE* – Non-Destructive Examination, also referred to as *Non-Destructive Testing (NDT).*
*Stainless steel* – typically, the austenitic stainless steel grades AISI 304L and 316L, but may also include other materials such as the duplex stainless steels.
*Steel* – weldable low-carbon unalloyed (carbon-manganese) steels or low alloyed steels for pressure pipe or pressure vessel applications.
*Welding procedure specification (WPS)* – written specification providing all the necessary technical details for a specific welding application meeting the requirements of the appropriate industry standard.
*Workplace procedures* – organisation policies and procedures that are documented in memo, electronic, or manual format and available in the workplace, and are consistent with manufacturer's requirements. They may include but are not limited to – standard operating procedures, site specific procedures, site safety procedures, equipment operating procedures, quality assurance procedures, product quality specifications, references, approved codes of practice, housekeeping standards, environmental considerations, on-site briefings, supervisor's instructions, and procedures to comply with legislative and local body requirements relevant to the industry sector.

3 Assessment information

Evidence presented for assessment against this unit standard must be consistent with safe working practices and be in accordance with legislative requirements and workplace procedures and meet accepted industry practice. This includes but is not limited to the knowledge, use and maintenance of relevant tools and equipment.

4 Recommended skills and knowledge

It is recommended that people seeking credit for this unit standard first hold credit for Unit 2688, *Weld stainless steel tube using the gas tungsten arc welding process*, or equivalent skills and knowledge.

## Outcomes and performance criteria

### Outcome 1

Prepare to weld steel or stainless steel pressure pipe in all positions using the GTAW process.

**Performance criteria**

1.1 Equipment is selected to meet WPS requirements.

Range power source rating and duty cycle, torch, shielding gas supply, welding cables, work clamp.

1.2 Equipment is assembled, set up, and maintained ready for use in accordance with manufacturer's instructions.

Range torch, tungsten electrode, nozzle, collet, and cap; shielding gas supply; welding cables; work clamp.

1.3 Pipe is prepared and assembled in accordance with WPS, and purging gas connected as required.

Range preparation and assembly are limited to – cleaning, edge preparation, tack welding to correct alignment.

1.4 Consumables are selected in accordance with WPS.

Range filler metal is identified by specification and classification; shielding gases are identified by brand name and composition.

**Outcome 2**

Weld steel or stainless steel pressure pipe in all positions using the GTAW process.

Range three welds;
pipe – 50 mm diameter schedule 40 pipe;
welding positions – 2G, 5G, and 6G positions (ISO 6947 PC, PH, H-L045).

**Performance criteria**

2.1 Workplace safety procedures are followed.

Range 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, protection from electrocution.

2.2 Welds are deposited on pipe to industry standard and in accordance with WPS.

2.3 Preheat and inter pass temperatures are measured to ensure compliance with WPS.

2.4 Welds are cleaned in accordance with accepted industry practice.

**Outcome 3**

Inspect and repair GTAW pressure pipe welds.

**Performance criteria**

3.1 Weld imperfections are identified by visual examination or from an NDE report.

Range one visual examination for each weld from Outcome 2 is required.

3.2 Weld imperfections are evaluated using acceptance levels in industry standard.

3.3 A root weld defect is removed, rewelded and repaired in accordance with WPS and to industry standard.

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| **Planned review date** | 31 December 2027 |

**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 | 17 August 2017 | 31 December 2025 |
| Review | 8 | 26 January 2023 | N/A |

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| **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 Hanga-Aro-Rau Manufacturing, Engineering and Logistics Workforce Development Council qualifications@hangaarorau.nz if you wish to suggest changes to the content of this unit standard.