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| **Title** | **Weld steel pressure pipe using the manual metal arc welding process with cellulosic electrodes** | | |
| **Level** | **4** | **Credits** | **20** |

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| **Purpose** | This unit standard is for people welding steel pressure pipe using the manual metal arc welding (MMAW) process with cellulosic electrodes (stovepipe welding).<br><br>People credited with this unit standard are able to: prepare to weld steel pressure pipe using the MMAW process with cellulosic electrodes; weld steel pressure pipe using the MMAW process with cellulosic electrodes; and inspect and repair 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 - AS/NZS 2885.2:2020, *Pipelines – Gas and liquid petroleum – part 2: Welding*, 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.
*Industry standard* – AS/NZS 2885.2 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.
*MMAW* – Manual Metal Arc Welding, also referred to as *Stick Electrode Welding*.
*NDE* – Non-Destructive Examination, also referred to as *Non-Destructive Testing (NDT).*
*Steel* – low-carbon unalloyed (carbon-manganese) steels or low alloyed steels as used in pipelines for water, gas, or oil.
*Stovepipe welding* – the welding of pipe using cellulosic MMAW electrodes with the vertical down technique.
*Welding procedure specification (WPS)* – written specification providing all the necessary technical detail for a specific welding application meeting the requirements of the appropriate industry standard.

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 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 2682, *Weld steel in the downhand positions to a general purpose industry standard using the manual metal arc welding process*, or equivalent skills and knowledge.
– Unit 2685, *Weld steel structures in all positions using the manual metal arc welding process* (Level 4), or equivalent skills and knowledge.

## Outcomes and performance criteria

### Outcome 1

Prepare to weld steel pressure pipe using the MMAW process with cellulosic electrodes.

### Performance criteria

1.1 MMAW power source characteristics and controls are selected for pressure pipe welding and WPS requirements.

Range rating, duty cycle, open circuit voltage, polarity, arc characteristic (dynamics) control, hot start control.

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

1.3 Steel pipe is prepared and assembled in accordance with WPS.

Range preparation and assembly are limited to – cleaning, providing root face where required, tack welding to correct alignment.

1.4 Cellulosic electrodes are selected in accordance with WPS.

**Outcome 2**

Weld steel pressure pipe using the MMAW process with cellulosic electrodes.

Range 3 welds;
welds include but are not limited to – 150 mm diameter Schedule 40 pipe in the 2G and 5G, or 6G positions (ISO 6947, PC, PH, H-L045).

**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, protection from electrocution.

2.2 Cellulosic electrodes are stored and handled in accordance with manufacturer's instructions.

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

2.4 Welds are cleaned in accordance with accepted industry practice.

**Outcome 3**

Inspect and repair welds.

**Performance criteria**

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

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

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

3.3 Weld defects are repaired in accordance with WPS and to industry standard.

Range evidence is required of at least one weld repair involving the removal of a defect, and rewelding 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 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 | 31 December 2025 |
| Review | 8 | 26 January 2023 | 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 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.