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

Purpose	This unit standard covers welding of steel structures in the downhand positions to NZS 4711:1984, AS/NZS 2980:2007, or equivalent, using the gas metal arc welding (GMAW) and flux cored arc welding (FCAW) processes. People credited with this unit standard are able to: prepare to weld steel in the downhand positions using the GMAW and FCAW processes; weld steel in the downhand positions using the GMAW and FCAW processes; and inspect and repair welds to industry standard.

Classification	Mechanical Engineering > Welding

Available grade	Achieved

Entry information	
Recommended skills and knowledge	Unit 2672, *Weld steel to a general purpose industry standard using the gas metal arc welding process*.

Explanatory notes

1 Welder qualification to an equivalent industry standard is acceptable evidence for the practical welding of this unit standard, provided the test pieces are of similar thickness and welded in the same positions.

2 References
AS/NZS 2980:2007, *Qualification of welders for fusion welding of steels*.
NZS 4711:1984, *Qualification tests for metal-arc welders*.
Health and Safety in Welding. Wellington: Department of Labour, 2006. Available from http://www.osh.govt.nz.

3 Definitions
FCAW – Flux Cored Arc Welding.
GMAW – Gas Metal Arc Welding, also referred to as *Metal Inert Gas* (MIG) welding.
Industry practice – refers to the safe and sound practices accepted by the fabrication industry.
Industry standard – refers to AS/NZS 2980:2007, NZS 4711:1984, or equivalent.
Safe working practice – refers to formal worksite or company safety policies, or the practices established by *Health and Safety in Welding* or similar codes.

Steel – refers to low-carbon unalloyed (carbon-manganese) steels or low alloyed steels, which are widely used for structural applications in industries such as road and rail transport, shipbuilding, machinery, and construction.
Welding procedure – refers to a written work instruction providing all the necessary technical details for a specific welding application.

Outcomes and evidence requirements

Outcome 1

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

Evidence requirements

1.1 Work area is assessed for hazards associated with the GMAW and FCAW processes and precautions taken in accordance with safe working practice.

Range electric shock, arc radiation, fire, explosion, fumes and gases, heat, confined space.

1.2 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.

1.3 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.

1.4 Steel is prepared and assembled in accordance with welding procedure.

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

1.5 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 steel in the downhand positions using the GMAW and FCAW processes.

Range material thickness – 10 to 12 mm;
GMAW – 1F, 2F, and 1G positions;
FCAW – 1F, 2F, and 1G positions.

Evidence requirements

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

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

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

2.4 Welds are cleaned in accordance with industry practice.

Outcome 3

Inspect and repair welds to industry standard.

Evidence requirements

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

Range workshop tests – nick break, fillet break-over, bend, macro examination;
evidence of two tests is required.

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

Replacement information	This unit standard was replaced by unit standard 30282 and unit standard 30283.

This unit standard is expiring. Assessment against the standard must take place by the last date for assessment set out below.

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	31 December 2022

Consent and Moderation Requirements (CMR) reference	0013

This CMR can be accessed at http://www.nzqa.govt.nz/framework/search/index.do.

Please note
Providers must be granted consent to assess against standards (accredited) by NZQA, before they can report credits from assessment against unit standards or deliver courses of study leading to that assessment.

Industry Training Organisations must be granted consent to assess against standards by NZQA before they can register credits from assessment against unit standards.

Providers and Industry Training Organisations, which have been granted consent and which are assessing against unit standards must engage with the moderation system that applies to those standards.

Requirements for consent to assess and an outline of the moderation system that applies to this standard are outlined in the Consent and Moderation Requirements (CMR). The CMR also includes useful information about special requirements for organisations wishing to develop education and training programmes, such as minimum qualifications for tutors and assessors, and special resource requirements.