

Title	Demonstrate knowledge of health and safety when welding and thermal cutting		
Level	2	Credits	3

Purpose	<p>This unit standard is for people working with welding and thermal cutting equipment in the mechanical engineering, fabrication, or welding trades. It is expected that the knowledge will be supplemented as required by additional training in the use of specific equipment in the workplace.</p> <p>People credited with this unit standard are able to demonstrate knowledge of the following when welding or thermal cutting: immediate safety hazards and long term health hazards; personal protective equipment (PPE); safe use of equipment; the dangers and safety precautions in confined spaces; and the dangers, control methods, and extraction of fumes.</p>
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Classification	Mechanical Engineering > Engineering Core Skills
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Available grade	Achieved
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Recommended skills and knowledge	Unit standard 21911, <i>Demonstrate knowledge of safety on engineering worksites</i> or equivalent skills and knowledge.
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Guidance Information

1 References

Health and Safety at Work Act 2015 and supporting Regulations.
Accident Compensation Corporation and Worksafe New Zealand. *Metal Industry Guidelines for Safe Work*. (Wellington: ACC, 2007). Available from http://www.acc.co.nz/PRD_EXT_CSMP/idcplg?IdcService=GET_FILE&dID=3023&dDocName=PRD.

Department of Labour (2006). *Health and Safety in Welding*. Available from <http://www.business.govt.nz/worksafe/information-guidance/all-guidance-items/welding-health-and-safety-in/welding-dol10157.pdf>.

Welding Technology Institute of Australia. (2013). Technical note number 7 – Health and Safety in Welding. Available from Heavy Engineering Research Association (HERA). Manukau City, Auckland.
http://www.hera.org.nz/Category?Action=View&Category_id=1065.

2 Definitions

Accepted industry practice refers to approved codes of practice and standardised procedures accepted by the wider mechanical engineering industry sectors as examples of best practice.

Workplace procedures refers to procedures used by the organisation carrying out the work and applicable to the tasks being carried out. They may include but are not limited to – 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

Worksafe guidelines refer to the Metal Industry Guidelines for Safe Work, Health and Safety in Welding, and other relevant WorkSafe NZ publications.

3 Range

Examples of welding and thermal cutting equipment – Metal Inert Gas (MIG), Tungsten Inert Gas (TIG), and Manual Metal Arc (MMA) welding equipment; plasma and oxyacetylene cutting equipment.

4 Assessment information

Examples/evidence given must be within the context of mechanical engineering or fabrication and must meet Worksafe guidelines, and workplace procedures or accepted industry practice.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of immediate safety hazards and long term health hazards when welding or thermal cutting.

Performance criteria

- 1.1 Immediate safety hazards are identified and the effects they have on immediate health are described.

Range hazards include but are not limited to – noxious fumes such as those given off when welding cadmium, electric shock, suffocation, explosion, burns to self or others.

- 1.2 Long term health hazards are identified and the effects they have on health over time are described.

Range hazards include but are not limited to – fumes, noise, vibration, manual handling.

- 1.3 Safety precautions taken to eliminate or minimise hazards are described.

Range hazards include – fire and explosion, burns, fumes and toxic gases, electric shock, compressed gas, radiation (arc flash), noise, vibration, heat stress, fatigue.

Outcome 2

Demonstrate knowledge of personal protective equipment (PPE) used when welding or thermal cutting.

Performance criteria

2.1 The protection given by items of PPE, and when it should be worn is explained.

Range PPE – eye protection, hearing protection, footwear, gloves, aprons, skull caps, jacket or shoulder covers, respiratory protection equipment (RPE).

Outcome 3

Demonstrate knowledge of the safe use of welding and thermal cutting equipment.

Performance criteria

3.1 The safe use of compressed gas cylinders, regulators, valves, and hoses is described.

Range safe use includes but is not limited to – cylinder marking, storage and security against falls, use of regulators and valves, leaks, worn and burnt hoses, flash back arresters.

3.2 The safe use of electrical equipment is described.

Range safe use includes but is not limited to – current capacity, isolation, frayed or cracked leads, connectors or fittings, broken switches or cover plates, presence of water.

Outcome 4

Demonstrate knowledge of the dangers and safety precautions when welding or thermal cutting in confined spaces.

Performance criteria

4.1 Confined spaces are defined.

4.2 Hazards of welding or thermal cutting in confined spaces are described.

Range hazards include but are not limited to – toxic gases, suffocation, explosion.

4.3 Safety precautions when welding or thermal cutting in confined spaces are described.

Range safety precautions include but are not limited to – permits to work, ventilation, safety person, harness, prepared rescue plan.

Outcome 5

Demonstrate knowledge of the dangers, control methods, and extraction of fumes when welding or thermal cutting.

Performance criteria

5.1 The basic constituents of fumes are described.

Range basic constituents – airborne particles, gases.

5.2 The toxicity and effects of fumes given off by metals used in welding are stated.

Range metals include but are not limited to – aluminium, beryllium, cadmium, chromium, copper, iron, nickel, vanadium, zinc.

5.3 Factors that affect the generation of fumes are stated.

Range evidence is required of a minimum of eight factors.

5.4 Methods of exhaust ventilation are described and an example of their use stated.

Range methods of exhaust ventilation include – natural, mechanical dilution, local exhaust ventilation.

Replacement information	This unit standard was replaced by unit standard 33135.
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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	15 September 2016	31 December 2025
Review	2	26 January 2023	31 December 2025

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>.