



Cutting and Welding Tasks Standard Operating Procedure

1. Purpose

To ensure the safety of all persons conducting cutting and welding tasks using cutting and welding equipment in all conditions and environments (i.e., confined space, wet, dusty, poorly lit, etc.).

2. Scope

Applicable to all hot work conducted at Central Coast Region Operated Facilities. The procedure is specifically intended to protect persons and property from injury or damage when cutting or welding is performed. The procedure is applicable to employees, volunteers, contractors and any other person who may have a requirement to cut, heat or weld on site.

3. Designated Hot Work Areas

There are specific areas on site that have been nominated as Designated Hot Work Areas. When hot work is required, where possible and practicable the task shall be moved to a Designated Hot Work Area. Prior to commencing work in these areas all workers shall inspect the area to ensure no hazardous flammables have been introduced to the designed work areas.

The following areas are Designated Hot Work Areas at Central Coast Region Operated Facilities:

- Equipment Workshop at Rowallan Park Campsite
- Old Tractor Shed at Rowallan Park Campsite
- TBA at Seeonee Park Campsite
- TBA at Lake Awoonga Campsite

Any hot work being performed outside these areas will require permission from the ARC Campsites prior to commencement of work.

4. Cutting & Welding in Hazardous Areas

4.1 Hazardous Areas

Hazardous areas at Central Coastal Region Operated Facilities are defined (but not limited to) as follows:

- a. Hot work associated with fuel, oil, associated pipelines, and their immediate surrounds
- b. Inside any confined space
- c. Hot work in areas in and about equipment where excess lubricants may accumulate from time to time
- d. Any area where a worker cannot identify if there is a potential hazard or is unsure of the potential risk of a hazard
- e. Wet conditions



If an inspection of the work area cannot confirm that the area within 15m of the work area is free from all hazards, the task must be considered as Hazardous Hot Work.

4.2 Permission

Where possible and practicable, any cutting and welding tasks should be moved to a non-hazardous area.

If it is not possible to move work to a Designated Hot Work Area the person completing the work must receive permission from the ARC Campsites prior to the commencement of work (formal risk assessment may be required).

5. Inspections

Regular inspections of welding equipment will be undertaken to ensure that the equipment is in a safe condition and operating correctly.

The frequency of these inspections shall be as per AS1674.2 Clause 5.1.1: at least once every 3 months for transportable equipment and at least 12 months for fixed equipment.

Items of equipment to be inspected shall be at a minimum; cylinder regulators, flashback arrestors, hoses, couplings, clamps, torches and tips, work return leads and connections, welding leads and connections, electrode holders, VRDs and output circuit safety switches.

Inspections and repairs relating to the electrical safety of the equipment will be performed by Competent Electrical Personnel.

Inspections and repairs relating to the mechanical and operational safety of the equipment will be performed by a Competent Person.

All gas equipment will be audited at twelve monthly intervals by OEM inspector allowing rectification and reporting of noncompliance issues.

6. Safety Checks & Procedures

Safety checks and procedures as outlined and as specified in the Australian Standards shall be carried out whenever welding is to be undertaken.

Refer to the following Australian Standards:

- a. AS 1674.1-1997 (R2016) Safety in welding and allied processes – Fire precautions
- b. AS 1674.2-2007 Safety in Welding and allied processes – Electrical

7. Regulators & Gauges

Only to be used for OEM's specifications preventing the potential for serious or even fatal injuries and property damage. The use of incorrect regulators/gauges to those specified would also contravene with the requirements of the Australian Standard AS 4839-2001. The safe use of portable and mobile oxy – fuel gas systems for welding, cutting, heating and allied processes.



8. Restricted Work

The following work is not permitted on site unless a Formal Risk Assessment has been conducted and authorisation received from the Region Commissioner.

- a. Hot work on pressure vessels and their associated pipelines.
- b. Hot work on vehicle fuel tanks or other containers and associated pipe work, which have held fuel and/or oil.
- c. Repairs or modifications to structures or cranes where design approval is required.
- d. Any area where a worker cannot identify if there is a potential hazard or is unsure of a potential risk of a hazard.
- e. Roll Over Protection System / Falling Object Protection System (ROPS / FOPS).

9. Welding, Cutting or Hot Work on Containers which have held Combustibles

No welding, cutting or hot work is permitted on containers which have previously held combustible substances.

10. General Requirements

- a. Refer AS1674.2 Electrical Welding Safety for detailed guidance
- b. Outer clothing should be non-flammable and dry
- c. Suitable screening must be used to protect personnel in the vicinity from welding radiation and the effects of arc and spark nuisance
- d. Where working in multiple level areas, the lower areas are to be barricaded and signed
- e. Welding with the work suspended from an electric powered hoist or crane is prohibited
- f. Use a flint gun when igniting cutting / welding apparatus.
- g. Pressure drop checks to be carried out on all gas heating or cutting systems after set up prior to use.
- h. Thermal flash back arrestors to be used with all fuel gases.
- i. Cylinder valves shall be tightly closed when not in use or where cutting activities are stopped for a period.
- j. Ensure hoses are always run neatly to avoid causing slip/trip hazard. Position hoses to avoid being directly hit by sparks. Never coil surplus hose, as a fire in a coiled hose is very difficult to extinguish.
- k. All power, welding and gas leads must be removed from the immediate hot work area, and clear of access walkways, wet areas and transport routes and similar.



11. Electric Welding

These are over and above the General Requirements given in Section 10.

- a. Check welding leads and connectors for cuts, area of wear and exposed metal. Repair or replace prior to commencement. Connectors to be clean and tight. The return lead is to be fastened and close as possible to the welding location.
- b. Welding machines shall be switched off before connecting and disconnecting leads
- c. All the welding circuit shall be considered live including the return path
- d. Welders shall ensure that no part of their body is placed to constitute a return path for the passage of the welding current
- e. An insulated glove should always be used to handle electrodes. The electrode flux covering shall not be assumed to be an insulator. Gloves shall be kept dry
- f. The welding machine shall be switched off when not in use
- g. Welding leads shall be protected from damage. Damaged leads must not be used and shall be tagged 'OUT OF SERVICE'. Repairs to be undertaken by a competent person.
- h. All welding accessories shall be maintained in a safe and serviceable condition
- i. Gears, bearings, bushings, hoists, conduits, pipes etc. shall NOT form part of the work / return path
- j. Mobile welding machines must not be used as an access platform when welding
- k. The electrode lead consists of multiple sections. The first section (electrode holder section) should be fitted with a suitable insulated plug. The intermediate section may consist of several cable lengths to suit the requirement of the worksite. Each individual length must be in good condition and have insulated plugs both ends. The final section should have a terminal at one end and a corresponding insulated socket at the other. The length of this final section should be kept as short as possible to avoid voltage drop and the risk of cable damage
- l. The return lead should not be longer than the electrode lead
- m. When electric welding, ensure the correct safety equipment is used:
 1. Gloves
 2. Safety footwear
 3. Non-fraying clothing & welding jacket (if required)
 4. Hearing protection (as required)
 5. Respirator (as required)
 6. Additional Ventilation (as required)
 7. Correct Welding Helmet (fitted with appropriate shade lens)
 8. Safety Glasses worn under welding helmet
- n. When electric welding with a stick welding process, ensure that the electrode is removed from the electrode holder when not in use



12. Cutting

These are over and above the General Requirements given in Section 10.

- a. Ensure thermal cut off flash back arresters are fitted to all regulators on oxy, acetylene and propane cylinders. At minimum, standard flash back arrestors shall be fitted to hand pieces on the oxy, acetylene and propane cylinders. Should a flash back occur, replace the flash back arrestors immediately.
- b. Ensure there is a physical barrier of 3mm steel plate between the Oxy and Acetylene bottles at the height of the Acetylene regulator
- c. Regularly check oxy cutting, welding and or LP cutting equipment for leakage before starting cutting/welding process. Any leaks must be repaired or tagged 'OUT OF SERVICE' and replaced.
- d. Ensure that cylinders, hoses, fittings, regulators and cutting torches are kept free of oils, greases and other organic materials including coal dust.
- e. Immediately replace equipment if contaminated.
- f. Use correct gases, hoses and equipment in accord with suppliers' recommendations.
- g. Read the cylinder label. Seek experienced assistance if doubt exists.
- h. Always turn all gas supplies OFF after use.
- i. Ensure the area is adequately ventilated. If not, auxiliary ventilation must be provided. Do not use oxygen for ventilation purposes.
- j. Store cylinders in an upright position in a cool dry environment. Ensure cylinders are restrained from falling.
- k. Full cylinders shall not be mixed; i.e. fuel gases must be separated from other gases.
- l. Ensure cylinders and hoses are clear of the process and not subject to heat or damage.
- m. If a cylinder ever becomes damaged immediately shut down the equipment. Tag the cylinder out of service and report the incident to your immediate supervisor.
- n. Open cylinders slowly.
- o. Never decant gases from one cylinder to another.
- p. Always ensure the correct regulators are used for their respective gases.
- q. Gases and cylinders are made for specific applications. Never use gases or cylinders for other than these specific applications. Acetylene cylinders must always remain in the upright position.
- r. Gas ignitions can occur from using the wrong equipment.
- s. Do not install or repair oxygen, acetylene, LPG manifolds or pipelines. A certified tradesman (Gas Ticketed) shall install and test this type of equipment.
- t. Leakages are dangerous and shall be isolated, tagged and notified to relevant supervisor.
- u. Ensure clear access to gas cylinders for prompt shut off in emergency.
- v. When transporting cylinders the following must be observed:
 - I. Acetylene cylinders must not be laid down.
 - II. All gauges are to be removed from cylinders unless they are transported in secured cradles.
 - III. Oxygen bottles never to be stood in an upright position when travelling if the top of the bottle extends past the protective rail of the tray of the transport vehicle.



- w. In accordance with Department of Resource Industries recommendations, the following points are to be observed when using LPG equipment:
- Pre-heat burners must be a commercially manufactured and approved type i.e. no site made units permitted.
 - LPG regulators with hose failure valve (or equivalent) to be fitted to LPG cylinders.

13. Storage of Cylinders

All cylinders shall be stored in accordance with AS4332. The Storage and handling of gases in cylinders and AS1596 the storage and handling of LP gas.

All cylinders shall be kept upright and secured on a stable footing to prevent falling. Cylinders shall be kept away from sources of heat, electrical circuits and oil or grease.

Cylinders shall be returned to a safe storage area once cutting or welding operations are completed and kept isolated.

Oxygen cylinders must be stored more than 3m from fuel sources. A segregation panel between fuel and oxygen bottles may achieve this segregation provided the panel is at least 1m taller than the tallest cylinder and the panel has a FRL of at least 120/120/120.

14. Transportation of Cylinders

Cylinders shall be secured in an upright position during transportation and retained to a rigid support.

Regulators must not be attached to cylinders during transportation. Cylinder valve caps should be fitted to cylinders during transportation.

15. Audit and Review

The individual Standard Operating Procedure will be reviewed:

- Three yearly.
- When triggered by any event or findings that identify improvements in the controls that effectively manage the identified hazards.

16. Definitions

Competent Person – Person assessed as being able to perform a task.

Personal Protective Equipment (PPE) – Clothing equipment and/or substances which, where worn or used correctly, protects part or all of the body from foreseeable risks of injury or disease in the workplace.

Lower Explosive Limit (LEL) – In relation to a flammable contaminant, is the concentration of the contaminant in air below which the ignition/propagation of a flame does not occur or contact with an ignition source

Responsible Person – A person who has the demonstrated skills and knowledge required to perform a task to a standard.



Rule – A rule is a rule or Regulation made for the carrying out of requirements of the Workplace Health and Safety Act.

Shall and Should – The word “shall” is to be understood as mandatory and the word “should” as non-mandatory advised or recommended.

SOP – Standard Operating Procedure

Upper Explosive Levels (UEL) – In relation to a flammable contaminant, is the concentration of the contaminant in air above which the propagation of a flame does not occur on contact with an ignition source

17. Document Information

17.1 Reference Information

Reference information, listed in **Table 17-1** below, is information that is directly related to the development of this document or referenced from within this document.

Reference
Queensland Branch Scouting Instructions
QLD Government: Welding processes Code of Practice 2013
AS 1674.1-1997 (R2016) Safety in welding and allied processes – Fire precautions
AS 1674.2-2007 Safety in Welding and allied processes – Electrical
AS/NZS 1995:2003 (R2017) Welding cables
AS 60974.1-2006 Arc welding equipment - Welding power sources (IEC 60974-1:2000, MOD)

Table 17-1 - Reference Information

17.2 Change Information

Full details of the document history are recorded in the document control register, by version. A summary of the current change is provided in **Table 17-2** below.

Version	Date	Review Team	Details of Change
1.0	01/04/2017	Dougal McWhinney	Document created

Table 17-2 - Reference Information