Hot-work (for welding and allied processes)

Information Sheet

Purpose

The purpose of this Information sheet is to provide guidance to meet the requirements of the University's Hazard Management Chapter, the Code of Practice for Welding Processes and Australian Standard 1674.1 "Safety in welding and allied processes".

If your area conducts welding activities you should also refer to the following Codes of Practice

- Managing risks of hazardous chemicals in the workplace – Code of Practice
- Managing noise and preventing hearing loss at work – Code of Practice
- Confined spaces – Code of Practice

Q1 What is "Hot-work"?

Hot-work is any activity that includes grinding, welding, thermal or oxygen cutting or heating, and other related heat-producting or spark-producing operations, for example welding or other sources of ignition near a hazard.

For the purposes of this information sheet outdoor activities such as 4 wheel driving and harvesting are not hot-work. For these activities please refer to the Hazard Management chapter and Off-campus activity FAQ and follow the processes outlined for managing the hazards and eliminating/minimising the risk.

Q2 Does this hot-work FAQ apply to welding workshops (welding booth) specifically designed for hot-work?

Yes. When the hot-work constitutes a fire or explosion hazard then the requirements of the AS 1674.1 "Safety in welding and allied processes" apply.

This includes the requirement for:

- any flammable and combustible liquids to be stored in accordance with AS 1940 "The storage and handling of flammable and combustible liquids";
- fire extinguishers to be located in accordance with AS 1674.1 (Section 5) "Fire protection";
- all provisions of AS 1674.1 Sections 2 "General precautions" and Section 3 Hazardous areas" to be met, if the hot work is being conducted in a "hazardous area" (see note below). This includes the requirement to appoint a "Responsible Officer" (see note below), the nomination of a firewatcher and the completion of a hot-work permit (see Appendix A "Hot-work – Permit to Work template" of this FAQ); and
- monitoring to ensure that the requirements of the standard(s) are being met.

For all other hot-work activities in a welding workshop, that are not undertaken in a hazardous area or when the hot work constitutes a fire or explosion hazard, the activity is to managed in accordance with the Hazard Management Handbook chapter and authorised by the Supervisor/person in control of the activity/area prior to commencement.

Note: Hazardous area (as described in AS 1674.1)

An area in which flammable liquids, vapours or gases, combustible liquids, dusts or fibres, or other flammable or explosive substances may be present. For additional information on the classification of hazardous areas refer to AS 2430 Part 1: Explosive gas atmospheres; Part 2: Combustible dusts; Part 3: specific occupancies. A normally safe area, into which a tank, container or equipment containing flammable combustible liquids, gases or vapours has been brought, may also become a hazardous area.

Note: Responsible officer (as described in AS 1674.1)

A person having a satisfactory knowledge of the fire, explosion and toxicity hazards associated with hot work in hazardous areas and who is adequately trained and experienced in the testing procedures and precautions necessary for the elimination of any risk involved

Q3 What needs to be done before performing hot-work activities?

Prior to the commencement of hot-work a Responsible officer (see note below) is to be appointed to be responsible for:

- the safe completion of the activity (i.e.from start to finish);
- completing a thorough inspection of the site;
- completing a risk assessment, in accordance with the Hazard Management Handbook chapter;
- identifying if there are any flammable or combustible liquids, gases, vapours, dusts, fibres or substances) within 15m from the hot-work, and conducting a test for the presence of flammable gas and flammable vapour above/in/ adjacent to the hot-work in accordance with AS 1674.1. (The detectors used for the testing are required to comply with AS 2275.1 and AS 2275.2 and the person conducting the test must be skilled in its operation, limitations and maintenance);
- issuing a hot-work permit which complies with the requirements of AS 1674.1 (see an example of a Hot-work permit Appendix A);
- ensuring a firewatcher is appointed and stationed in the area near the hot work for the purpose of safeguarding personnel and equipment where required by the hot-work permit; and
- ensuring the control measures identified on the risk assessment are in place, to prevent any fire, explosion, injury or other danger developing during the performance of the hot-work.

(Note: The appointed Responsible officer has the authority to enforce the requirements of AS 1674.1 "Safety in welding and allied processes" with respect to employees, contractors and other workers. A Responsible Officer has the satisfactory knowledge of the fire, explosion and toxicity hazards associated with hot-work in hazardous areas (i.e. any area in which flammable or combustible liquids, vapours, gases, dusts, fibres and/or explosive substances may be present) and is adequately trained and experienced in the testing procedures and precautions necessary for the management of any risk involved. The Responsible officer would normally be the person in the local area. If there isn't a person who is appropriately trained and experienced in this role then the activity should be out-sourced in accordance with the Contractor Safety Management handbook chapter.)

Q4 What are the potential hazards that need to be considered when completing a risk assessment?

Examples of the hazards that could be present and need to be specifically controlled may include (but not limited to):

- fire hazards (including the presence of flammable or combustible liquids, gases, vapours, dusts, fibres or substances) within 15 m from the hot-work;
- outdoor work near dry grass or bush;
- welding equipment which has not been maintained or does not meet the requirements of AS 1674.2 "Safety in welding and allied processes: Electrical.";
- changing circumstances during the progress of the hot-work (e.g. the outdoor work environment);
- inadequate ventilation in the hot-work area;
- contaminants produced from the hot-work operation;
- radiation (e.g. Electric arc and laser welding emit ultraviolet, visible light and infra-red radiation. Depending on the intensity, distance and duration of exposure, the effect of radiation could result in eye disorders and skin burns)
- unsuitable/no fire fighting equipment;
- the hot-work area is not isolated (e.g. others could enter the hot-work area)
- there is the potential for traffic movement in the area of work;
- the space above or below the hot-work area could pose a risk of fire or explosion;
- difficulty in accessing/egressing the hot-work area;
- proximity to electromagnetic fields (Electric arc welding activities produce strong electric and magnet fields. It should be noted that electromagnetic fields can disrupt the operation of pacemakers, permanent defibrillators or other medical devices which could cause the heart to stop or slow down);
- exposure to heat;
- exposure to noise (equipment for performing welding can generate varying levels and frequencies of noise);
- exposure to lead (e.g. when welding metals using flux, or welding on stell painted with leaded paints);
- risk of a fall from one level to another;
- inadequate/no Personal Protective Equipment;
- inadequate information/instruction/training provided to the worker;
- no access to equipment/detector to test for the presence of flammable gas and flammable vapour;
- working in a confined space;
- a total fire ban day. (A Total Fire Ban Day may be imposed by the Fire Service at any time of the year restricting the hot work activites, and other activities, you undertake which may result in igniting a fire. For details about what you can and cannot do during a fire ban please see the CFS Website. Restrictions vary across the state.)

Q5 Are there any requirements to manage fixed fire-protection installations (e.g. smoke and heat detectors) during welding activities?

Hot-work on or adjacent to fire-protection installations are to be carried out only after consideration has been given to the effect that the hot-work may have on the system and any need for alternative protection. It should be noted that smoke and heat detectors may operate by detecting heat, smoke or flames from welding operations. Checks should be made as to whether fire protection system should be isolated.

Please note– where fire protection systems have been isolated, a final check is to be made after the hot work has been completed, to ensure that these systems have been put back on line.

Q6 What qualifications and training is required to conduct hot-work?

In accordance with the Code of Practice "Welding processes" the provision of appropriate information/instruction/training is to be provided having regard to:

- the nature of the work;
- the nature of the risks associated with the work; and
- the control measures implemented.

Any instruction and training should be provided to workers by a proficient or competent/qualified person in accordance with the HSW Handbook chapter Provision of information, instruction and training.

All staff who conduct hot-work need to be identified on the Training Plan and must either have a proficiency (see note below) or qualification (eg. Welder certification, Engineering qualification) before undertaking any hot-work activity. The welder and any other person concerned with hot-work activities must also know how to use any fire protection equipment and extinguishing agents (e.g. extinguishers).

(Note: Proficiency = instruction provided on a one-on-one basis or as a group where the operator must demonstrate to their assessor that they are proficient to undertake the task. The proficiency is generally mapped against a Safe Operating Procedure, or could be via a log book or series of supervised training sessions.

Q7 What do I need to do to perform hot-work activities?

All workers must:

- be proficient or competent/qualified in accordance with the HSW Handbook chapter Provision of information, instruction and training;
- be authorised by the Responsible officer (see note below);
- be conversant with the control measures on the risk assessment and hot-work permit;
- not work alone;
- know where the fire protection equipment is located and how to use it;
- be provided with any assistance that is considered necessary by the Responsible officer;
- only undertake hot work during the period stated on the hot-work permit;
- obtain a new hot-work permit in the event the hot-work has ceased for a period of more than 2 hrs or extending beyond the currency of the permit;
- understand that ongoing testing and monitoring may be undertaken during the duration of hot-work, if required by the Responsible officer; and
- cease work if requested by the Responsible officer or if the activity is considered unsafe due to a change in the environment.

Note: Responsible officer

A staff member, normally in your area of work, who has the knowledge and authority to enforce the requirements of AS 1674.1 "Safety in welding and allied processes" with respect to employees, contractors and other workers. Including the satisfactory knowledge of the fire, explosion and toxicity hazards associated with hot-work in hazardous areas and who is adequately trained and experienced in the testing procedures and precautions necessary for the elimination of any risk involved.

Q8 What ventilation should I consider when conducting hot-work?

There are three main types of ventilation, local exhaust, forced dilution and natural dilution you should consider.

The choice of ventilation system should take into account:

- the amount and type of fumes and contaminants produced
- the proximity and loction of the welding process relative to the ventilation system
- the level of ventilation, natural or mechanical, both for the whole whorplace and the welding area – this will also depend on screens and particitions which may restrict cross-flow at the work area
- the proximity of the welder's breathing zone to the fume source.

For further information on ventilation systems refer to the SafeWork SA Code of Practice – Welding Processes.

Q9 What is the role of the Firewatcher if assigned by the Responsible officer on the hot-work permit?

In accordance with AS1674.1 a firewatcher is required to:

- be stationed in the area near the hot-work;
- not allow hot-work to proceed outside the area specified on the hot-work permit;
- remain on the job unless properly relieved by an authorised person;
- ensure that an appropriate extinguisher is located within 10m of the work area and is used (if required) in accordance with the recommendations of the manufacturer or supplier of the equipment;
- use Personal Protective Equipment (e.g. eye protection to protect against flashes where work involves arc welding, cutting or arc gouging);
- inspect adjoining compartments, if heat transfer is possible;
- maintain a continuous fire watch over the hot-work, paying attention to any changes in weather conditions (e.g. increased wind), whether any actions have been taken that may lead to a hazardous situation in the hot-work area;
- take immediate action to combat any outbreak of fire that may occur and alert the Responsible officer if not the Fire Watcher.

Note: Firewatching does not consist of periodic checks, but is a continuous and thorough inspection and presence in the area and its vicinity.

Q10 Are there any requirements for performing hot-work in confined spaces?

Hot-work in confined spaces shall be performed in accordance with WHS Regulations 62-77 the Code of Practice for Confined Spaces, Australian Standard 2865 "Confined Space" and AS 1674. An additional Permit to enter a Confined Space is also required.

(For further information and guidance on requirements for Confined Space entry, please refer to the Confined Space Information Sheet or local HSW Team.)

Q11 What are the requirements for hot-work equipment?

All hot-work equipment (e.g. cutting, heating, grinding and welding equipment) must be installed and used in accordance with AS 1674.1 and the other relevant standards referenced within AS 1674.1.

Q12 What Personal protective equipment (PPE) is to be used for hot-work activities?

The PPE is to be selected to minimise risk by ensuring that:

- the equipment is suitable for the nature of the work;
- it is of suitable size and fit and reasonably comfortable for the worker who is to use or wear it;
- it is maintained, repaired and replaced so that it continues to minimise risk to the worker who uses it, including by ensuring that the equipment is clean and hygienic, and in good working order.

Examples of PPE types, hazards and recommendations are outlined in the Code of Practice – Welding processes.

Q13 What action should be taken in the event of a fire emergency during hot-work?

In the event of a fire emergency all activities should cease immediately and all equipment turned off. If it is safe to do so, the fire should be extinguished and any combustibles which could escalate the emergency should be removed. Operators should alert the Responsible Officer as soon as possible. The Responsible Officer should ensure that a watch is maintained in the area of the fire until it is considered that re-ignition is not possible. They should also ensure that no further work is carried out until effective fire equipment is available for use (eg. Additional extinguishers obtained).

If the fire canot be extinguished immediately, the Responsible Officer should ensure that the Fire Service are notified (0) 000, in addition to Security (ext 35444) and the HSW Team.

Q14 How do I report an incident that is caused by hot-work activity?

Ensure circumstances contributing to the fire and the results from any subsequent investigation are recorded in accordance with the University's on-line Report a safety issue or incident process.

Q15 What is the process if a contractor is engaged to conduct the hot-work?

Contractors are to be engaged in accordance with the Contractor Safety Management Handbook chapter.

All contractors must also:

- have a Hot-Work and Permit to Work system in place which meets the requirements of AS 1674.1; and
- provide a copy of the completed Permit to Work to the University staff member who engaged their services together with all hazard management documentation (e.g. Job Safety Analysis/Risk Assessment).

If the work relates to Construction/capital work, Infrastructure must be contacted -
A Contract/Project Manager will be nominated and will manage the Induction and Hazard Management processes.
For further advice phone
North Terrace (831) 34008
Roseworthy Campus (831) 37657
Waite Campus (831) 37217
Capital Projects (831) – 35701 ITDS (831) 33000

(Construction/capital work includes any work carried out in connection with the construction, alteration, conversion, fitting-out, commissioning, renovation, repair, maintenance, refurbishment of a structure).

Q16 Do hot work requirements apply to barbeques (BBQs)?

The use of barbeques (BBQs) is not considered hot work (refer Question 1). However, event planners wanting to use BBQs need to comply with the requirements set out on the Event Safety Management webpage and seek authorisation from Infrastructure for their use on Campus (email Booking and Events Coordinator at facilities.booking@adelaide.edu.au).

Q17 Where do I obtain further information on hot-work?

If you require further information, please contact a member of the local HSW Team.

Referenced documents within AS 1674.1 can be accessed via the Standards library and include:

AS	Standard
1596	LP Gas – storage and handling
1674.2	Safety in welding and allied processes Part 2: Electrical
1851	Maintenance of fire protection equipment
1851.1	Part 1: Portable fire extinguishers and fire blankets
1851.3	Part 3: automatic fire sprinkler systems
1940	The storage and handling of flammable and combustible liquids
2118	Automatic fire sprinkler systems
2118.1	Part 1: Standard
2275	Combustible gas detection instruments for use in explosive atmospheres
2275.1	Part 1: General requirements for explosion protection of electrical apparatus and systems
2275.2	Part 2: Performance requirements
2430	Classification of hazardous areas
2430.1	Part 1: explosive gas atmospheres
2430.2	Part 2: Combustible dusts
2430.3	Part3: Specific occupancied
2444	Portable fire extinguisher and fire blankets – selection and location
2812	Welding, brazing and cutting of metals – Glossary of terms
2865	Safe working in a confined space
3190	Approval and test specification – Residual current devices (current-operated earth-leakage devices)
4332	The storage and handling of gases in cylinders
AS/NZS	
1020	The control of undesirable sttic electricity
WTIA	Welding Technology Institute of Australia Technical Note 7: Health and safety in welding Technical Note 20: Repair of steel piplines
Code of Practice	SafeWork SA - Welding Processes

Appendix A (Page 1 of 2)

HOT-WORK - PERMIT TO WORK (Template)

This template or equivalent template which meets the requirements of AS1674 "Safety in welding and allied processes" is to be completed for each Hot work activity.

The University Information Sheet for Hot-work should be read prior to completion of this form.

To be completed by the Responsible officer (Supervisor) for the hot work: **PERMIT NO.** _____

Time of the hot-work	This permit is valid from _____ am/pm on ___/___/___ to _____ am/pm on ___/___/____	
Location	Campus:	Building (or nearest):
	Specific location of the hot-work (e.g.room or area (describe):	

Description of the hot-work to be covered by this permit	

Equipment to be used (including PPE) eg, gloves, welders mask, shielding, and fire fighting equipment.	

Site Inspection and following checks have been made by the Responsible Officer	Yes	N/A
A hot-work Risk Assessment for the activity has been conducted in accordance with the Hazard Management HSW Handbook chapter and attached	☐	
Other work Permits identified completed and attached (e.g. Confined Spaces) if applicable	☐	☐
Fire detection systems have been isolated within the area for the duration of the hot-work (contact Campus Security ext 35990).	☐	☐
Services (electricity, gas, water, hydraulic) isolated if applicable	☐	☐
Warning signs and barricades are in place to prevent unauthorised entry	☐	☐
All persons involved with hot-work are proficient or competent and a copy of their instruction/training is on file	☐	☐
The Personal Protective Equipment identified on the Risk Assessment are in use	☐	
Spark/flash/protective screens are in place	☐	
Equipment is in good condition and conforms to required standards	☐	
Wind direction is satisfactory for hot-work to be done (if applicable)	☐	☐
Combustible materials have been removed from the area or made safe	☐	
• Any fire hazard (including the presence of flammable or combustible liquids, gases, vapours, dusts, fibres or substances) within 15 m from the hot-work has been identified and controlled	☐	☐
• Relevant hazards that may exist outside the area have been considered and protected appropriately	☐	
• Potential for a grass fire has been considered and immediate area cleared/soaked sufficiently to prevent a fire (if applic).	☐	☐
Emergency Systems are in place	☐	☐
• A firewatcher is required for the duration of the activity for the purpose of safeguarding personnel and equipment	☐	☐
• Fire equipment has been checked and is on stand-by at the work site	☐	
• All emergency numbers are clearly posted at the hot-work area	☐	☐
• Adequate first aid kit/s and/or facilities are readily available at the hot-work area	☐	☐
A safe entry to and exit from the hot-work area is available	☐	☐
Ventilation is adequate	☐	
Testing for the presence of flammable gas or vapour has been conducted within 15m of the hot-work and in any pipe, drum, tank, vessel and piece of equipment adjacent to or involved in the hot-work (results entered below)	☐	☐
The concentration of any flammable gas and flammable vapour is less than 5 percent of its lower explosion limit (LEL)	☐	☐
Drains, pits and depressions have been checked, isolated and sealed	☐	☐
Leaks from valve and pump glands, flanges and the like have been controlled	☐	☐
Contaminated ground has been covered	☐	☐
Pressure relief valves have been vented to safe areas	☐	☐
If hot-work will be undertaken within a building the chief warden/local area warden and local building occupants have been informed of the intended work (including notification that the Fire Systems have been isolated if applicable). (Refer to the Warden Register Spreadsheet for the names of Wardens or https://www.adelaide.edu.au/infrastructure/campus-services/emergency/register/)	☐	☐

Gas testing shall be conducted if required after conducting the Hot Work Risk Assessment (use separate sheet if necessary)

Equipment make and model	Serial No.	Date and time of last equipment test	Results of tests	Percentage L.E.L.	Is hot-work safe to proceed?	Initials of tester

The following conditions and precautions were observed:

.....

.....

The following Operators have been authorised and agree to abide by the conditions and precautions of this Permit

Persons undertaking the hot work	Supervisor (Responsible Officer)	
	Name of Operator(s):	
	Name of Fire Watcher (if required):	
	Signature of Fire Watcher:	

PERMIT AUTHORISATION

I have read the HSW FAQ for hot-work and understand my role and responsibilities for this activity and the conditions of this permit. The hot-work described on this permit is, in my opinion, safe to commence using all precautions described and that all persons nominated are adequately proficient/trained to undertake the work described in this permit. This permit is valid for the period nominated.

Supervisor (Responsible Officer).....

(print name) (signature) (Date/ Time)

THIS HOT-WORK PERMIT MUST BE DISPLAYED PROMINENTLY AT THE WORKSITE
UPON COMPLETION, CANCELLATION OR WITHDRAWAL OF THIS PERMIT
IT MUST BE RETURNED TO THE ORIGINAL POINT OF ISSUE

A new permit is required in the event of an emergency or where:

- the hot-work is to extend beyond the currency of the Permit, or
- the hot-work ceases for a period of more than 2 hours, or
- the work location changes.

PERMIT COMPLETION

The worksite has been inspected by me at the expiry/cancellation of this hot-work permit and declared safe for normal operations to resume. Contaminants have been disposed of appropriately and fire watch checks have been completed.

Supervisor (Responsible Officer).....

(print name) (signature) (date/ time)

PERMIT CANCELLATION/ WITHDRAWAL

This Hot-work Permit is hereby cancelled/withdrawn for the reason/s stated below:

.....

.....

Supervisor (Responsible officer).....

(print name) (signature) (date/ time)

The original copy of this document is to be filed and retained by the Supervisor (Responsible Officer) and a copy attached to the Risk Assessment
(Refer to the Hazard Management Handbook chapter for further information in regard to retention of records.)