CS ENERGY PROCEDURE FOR

HOT WORK
CS-PTW-HAZ-01

Responsible Officer: Corporate PTW Administrator
Responsible Executive: Chief Executive Officer (CEO)

DOCUMENT HISTORY

Key Changes	Prepared By	Checked By	Approved By	Date
Rev 1 - Original Issue of Document	PTW Committee	PTW Committee		19/06/2000
Rev 2 - 3.2 amended to include reference to APTW & Attachment replaced by Form S0010	PTW Committee	PTW Committee		03/07/2008
Rev 3 - Draft Changes submitted to Corporate PTW Committee	PTW Committee	PTW Committee	A Brown	20/03/2007
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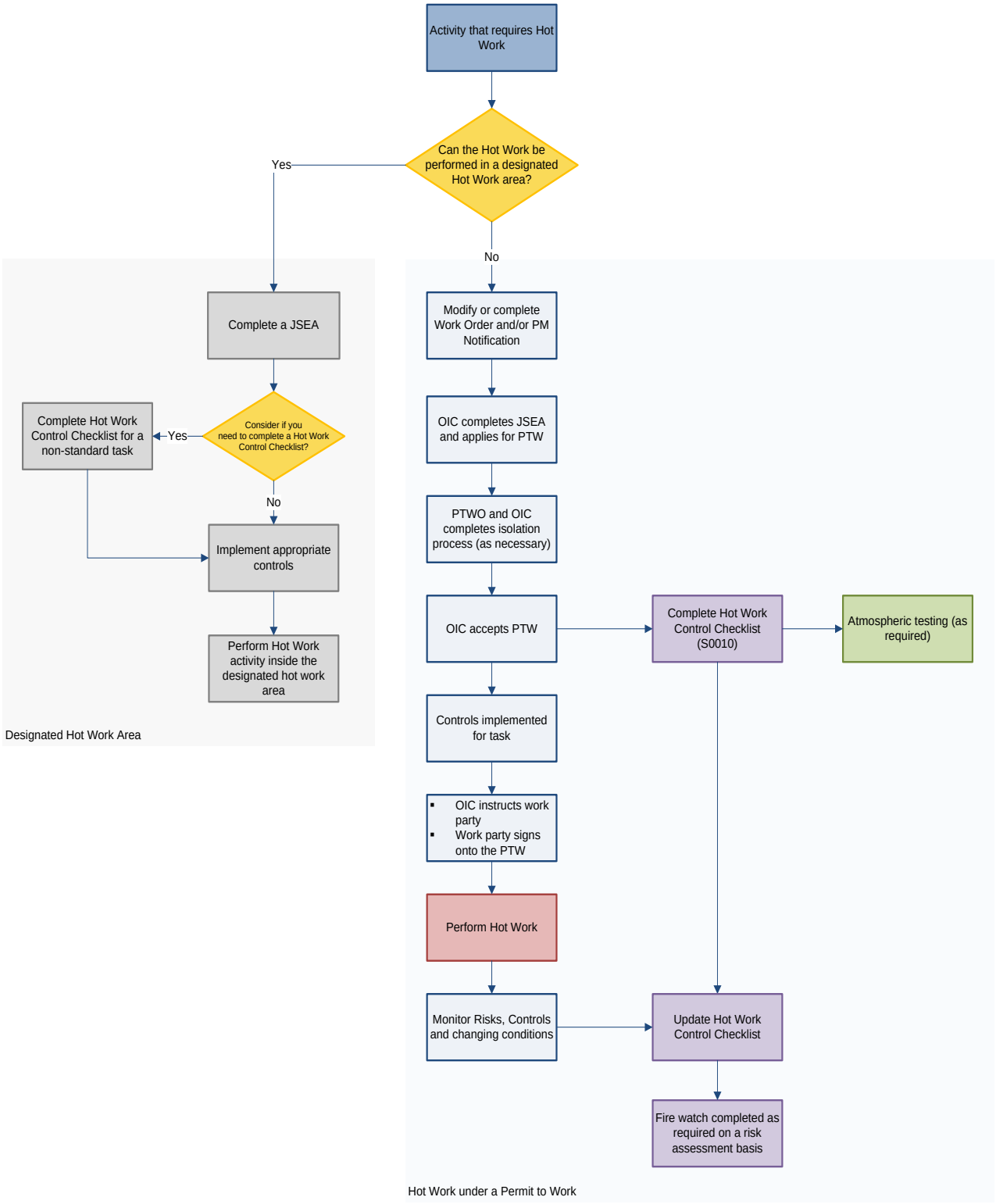
Rev 5 - Changes in conjunction with PTW Improvement Project	D Clarke	PTW Committee	D Cameron	30/03/2010
Rev 6 - Reformatted to NEW CS Energy	D Clarke	PTW Committee	A Brown	21/03/2012
Rev 7 - Reviewed and released with PTW Changes	D Clarke	PTW Committee H&S Taskforce	A Brown	03/09/2012
Rev 8 – Updated number of inconsistencies within content of Procedure	D Clarke	PTW Committee	A Brown	27/03/2013

CONTENTS

1 HOT WORK FLOWCHART



2 PURPOSE

The purpose of this procedure is to outline the process and responsibilities to manage hot work related hazards and the methods by which safe hot work controls are implemented to minimise the risk of injury from fire or explosion.

3 SCOPE

This procedure applies to all personnel; both employees and contractors, at all CS Energy sites undertaking hot work related activities, outside the maintenance workshops or other designated hot work areas. Hot work related activities include:

- Thermal cutting e.g. oxygen – acetylene, plasma cutting
- Welding process e.g. MIG, TIG and Arc
- Brazing/Soldering
- Hot friction devices e.g. grinders, abrasive cutters
- Use of electrical tools in a Hazardous Area

Note: it is not the intent of this Corporate Procedure to address the specifics of the many related welding, brazing, cutting and gouging techniques that are included within the scope of hot work related activities, but rather address the common fire and explosion hazards associated with the performance of hot work.

4 RESPONSIBILITIES AND ACCOUNTABILITIES

4.1 Corporate PTW Administrator

Corporate PTW Administrator is responsible for ensuring that:

- This procedure is reviewed on an as needs basis in conjunction with general coordination of the PTW system.

4.2 Site PTW Administrator

Ensure procedures are implemented to ensure all employees and contractors involved in hot work are trained and familiar with this procedure.

Ensure the risk assessment is carried out before approving a designated hot work area other than a workshop.

Perform audits and review of the PTW system (inc. compliance of Hot Work procedure).

4.3 Senior Permit to Work Officer

Ensure any hot work outside of a designated hot work area does not have the potential to impact on other Permit to Work jobs that are occurring on the plant (e.g. affects atmosphere of adjoining confined space work or embers dropping below onto combustibles below).

4.4 Supervisor

Where necessary, on behalf of the OIC, ensures a resource is available to complete any fire watch required. The Supervisor is to communicate with the OIC and/or Shift Supervisor as required during the progress of the hot work.

5 HAZARDS

Description In relation to hot work, a safe system must be implemented to control risks to health and safety arising from items such as, but not limited to:

- Flammable and explosive dust atmospheres;
- Flammable and explosive gas atmospheres;
- Flammable liquids, either spilt, residue or within process plant;
- Class A,B and C welding environments; and
- Combustible and flammable material.

6 DESIGNATED HOT WORK AREAS

A clearly identified area for which a risk assessment has been undertaken and approval has been received from the PTW Administrator stating the area is safe to carry out normal hot work processes.

Wherever it is possible on a CS Energy site, hot work activities should be performed within established workshops or authorised hot work areas and at purpose built welding and allied process work stations. In this way, hot work can be completed away from hazardous and plant areas, facilitating easier control of specific fire, emergency and environmental issues.

Where it is not possible, to perform hot work activities in designated hot work areas, the work must be performed under Permit to Work with a completed Hot Work Control Guide attached and controls in place.

6.1 Designated Hot Work Area Controls

6.1.1 Gas Supply

Workshop areas in which hot work activities are undertaken are to be fitted out with the necessary equipment to ensure safe gas supply (e.g. piping, manifold and regulator equipment). Note: a specific list of Australian Standards relating to hot work equipment is contained in Attachment 1.

6.1.2 Fire and Emergency Provisions

Hot work areas are to contain adequate fire and emergency provisions such as fire extinguishers and where appropriate and possible fire detection systems. The accumulation of dust is to be avoided through regular clean up and extraction. Placement, type and number of fire extinguishers within a workshop are to commensurate with the equipment used, the hot work activities undertaken and the requirements of AS/NZS 2444: Portable fire extinguishers and fire blankets – Selection and location.

6.1.3 Non standard hot work activity

Prior to a hot work activity being initiated within a designated hot work area that not standard and/or is deemed to present some specific fire and explosion hazard for personnel, a Hot Work Control Guide is to be completed in conjunction with a JSEA by the Supervisor/Tradesperson undertaking the task.

Prior to a hot work activity being initiated outside of a designated hot work area, a Permit to Work is to be applied for and a Hot Work Control checklist is to be completed by the designated OIC.

7 PERFORMING HOT WORK USING THE PTW SYSTEM

7.1 Planning the Hot Work

Prior to hot work activities commencing during major plant maintenance, overhauls or forced outages, planning is to be undertaken to ensure that the following are adequately considered:

- Appropriate means of access during plant overhauls and outages;
- Availability of appropriate resources to complete (inc. fire watch processes);
- Suitable times and timeframes for welding or other hot work activities;
- The necessary exclusion of personnel from work areas; and
- Safe preparation of work environments and atmospheres.

Any hot work outside of a designated work area will be managed under the PTW system.

The designated OIC is to be complete a JSEA for the task and apply for the PTW. A PTWO will receive the Work Clearance Application (WCA) and apply any necessary isolation (if required) for the planned task using a Work Clearance Document (WCD). Once the isolation process has been completed and checked, the OIC can receive the Permit to Work.

The OIC is to complete the Hot Work Control Checklist (printed from SAP with the PTW) before the hot work is undertaken.

No Hot Work is to be carried out outside a designated hot work area without a Permit to Work with a completed Hot Work Control Checklist and relevant controls implemented.

7.2 Hot Work Control Checklist

The OIC is to complete the Hot Work Control Checklist (S0010) (printed from SAP with the PTW) before the hot work is undertaken. The OIC is responsible to complete each section (if relevant) for the hot work activity:

- General Information
- Sources of ignition
- Special precautions and conditions
- Prior to work commencing checklist
- Initial gas testing
- Authorisation
- Post work checklist
- Fire watch

The Hot Work Control Checklist (S0010) is a dynamic document that will be required to be updated during the planning stage, when performing the hot work activity and when the work has been completed.

7.3 Controls for a Permit to Work that requires Hot Work

7.3.1 General Controls

- All workers undertaking hot work operations are to be instructed in the safe use and specific precautions required with all apparatus and tasks performed, and be competent as evident through the completion of specific trade/welding certificates. Specific Australian Standards, as list in Appendix 1, safe operating procedures, safety manuals and equipment guides are to be followed as applicable.
- If the scope of work changes under the Permit to Work which requires hot work to be undertaken where initially it did not, the Permit to Work is to be suspended (e.g. Alter-Isolation) and the special precaution 'hot work' added to the 'hazards' of the PTW. The S0010 Hot Work Control Checklist is to be completed for the job to ensure necessary controls are in place.
- All bottles, hoses and connections relating to welding apparatus which may be involved with hot work are to be checked to ensure that they are connected properly and ready for safe use prior to undertaking hot work activities.
- Gas cylinders which may be involved with welding apparatus related hot work are to be restrained and secured against movement at all time during storage, transport and use and they are not to be positioned in an access way or traffic area.

7.3.2 Fire and Explosion Controls

- During hot work activities (in and outside of designated hot work areas) precautions are to be taken to prevent fire and explosion risks created from:
    - Ignition of explosive gas or dust atmospheres;
    - Sparks and hot metallic particles and slag being generated that can cause combustion and smouldering of adjacent materials;
    - Electrode stubs that remain at high temperature;
    - Gas leakages, improper use of oxygen and unsafe equipment;
    - Pierced or cut pressure hosing by sharp object or burned hosing by sparks, flame or hot slag;
    - Heating of gas cylinders;
    - Welding and cutting containers and piping that contain unknown gases/substances capable of causing
    - ignition or explosion;
    - Burning or cutting through walls and partitions;
    - Poor electrical connections; and
    - Igniting metallic and non-metallic dusts capable of causing fire and explosions.

Note: the draining or opening of lines containing flammable substances and materials may also need to be supplemented by specific cleaning, rinsing and purging action prior to work.

- Flash back arrestors, suitable for the types of equipment used are to be fitted to both oxygen and fuel gas lines:
    - Between the blowpipe and hose; and
    - At the regulator outlet.
- As far as practicable, all flammable and combustible material, including remnants of fuel (e.g. coal, dust, and fuel oil), gases, liquids and solids are to be removed from the hot work area and anywhere

where an ignition source could be created as a result of the hot work. In addition, atmospheric testing using a certified device is to be undertaken prior to (and repeat/continual atmospheric testing where risk presents) working in hazardous areas where flammable gases/liquids (i.e. vapours) are located.

- Workers involved in hot work activities are to generally inspect and consider the capability of materials, stands or other support devices to elevate, support and hold components during hot work. Prior to and during work, identify or monitor the likelihood of fire or collapse can be minimised.
- Precautions are to be taken wherever practicable to prevent sparks or flames from hot work activities coming into contact with hoses and cylinders.
- Hot work activities at height are to be specifically monitored to ensure that hot particles and slag cannot cause injury, fire or explosion below.

Note: this requirement is particularly important for areas above grid mesh, personnel or other plant where controls such as ply boards, floor mats, covers or are exclusion through the use of barricades are required to be implemented.

- Fire extinguishers suitable for the types of task performed are to be located within the immediate vicinity (within 10m) of personnel performing hot work activities. This may be easily achieved by securing fire extinguishers to welding trolleys and mobile units or hanging extinguishers on walls.
- As any use of an ignition source within a hazardous area is defined as part of the term hot work; a Hot Work Control Checklist (s0010) must be completed for such tasks or access. Site specific hazardous area controls and signage requirements must also be implemented.

7.4 Atmospheric Testing Requirements

When performing hot work activities in a hazardous area or where flammable gases/liquids (e.g. vapours) are located there is a risk an explosive environment can be created.

Atmospheric testing using a certified device is to be undertaken prior to (and repeat/continual atmospheric testing where risk presents) working in hazardous areas where flammable gases/liquids (i.e. vapours) are located.

All atmospheric testing must be performed by a person trained in atmospheric testing and competent to use the certified atmospheric tester

In a high risk environment (e.g. enclosed plant – tanks, vessels, containers etc.) it is requirement to have continuous atmospheric testing in place.

Repeat atmospheric tests are to be documented in Section 5 of the Hot Work Control Checklist

7.5 Fire Watch

When performing hot work activities in areas where sparks may have spread to any other area of plant that contains flammable material/substances, it is a requirement to employ fire watch arrangements.

Fire watch requires an employee to check the area and surrounding areas to ensure there are no signs of smouldering, burning, flames or fire.

7.5.1 Fire Watch Requirements

- For low risk work there shall be an intermittent fire watch provided for 30 minutes after completion of hot works.
- For moderate risk work there shall be a 30 minute continuous fire watch after completion of hot works.
- For high/significant risk areas there shall be a continuous 60 minute fire watch after completion of hot works. Then for 3hrs afterwards there should be intermittent checks/fire monitoring as deemed necessary by risk assessment.

A risk assessment conducted by the OIC should determine the type of fire watch required after the work completed – 30 minute continuous or 60 minute continuous and the freq of intermittent checks after the 60 minute continuous for high risk areas.

If fire watch is required after normal site hours, the OIC or Supervisor is to plan for a resource to complete this task. The OIC or Supervisor may need to contact the Operations Shift Supervisor to organise a resource from Operations to conduct the fire watch activities.

The person conducting the fire watch is to document the inspection result in Section 8 of the Hot Work Control Checklist (S0010).

8 CYLINDER STORAGE AREAS

Cylinder storage areas are to be:

- well ventilated;
- away from sources of heat; and
- lighting in the area (certified in accordance with AS2308.1)

Furthermore, the storage area is to be maintained such that:

- All cylinders are stored vertically;
- All cylinders are adequately restrained and secured against movement;
- Full cylinders are segregated from empty cylinders;
- Fuel gases are segregated from oxygen cylinders (e.g. acetylene and oxygen);
- Signage, such as “No Smoking or Naked Lights” is displayed where fuel gases are stored; and
- There is a system of ‘first in, first out’ use (i.e. the cylinders that have been in storage for the longest period are used prior to newly purchased cylinders)

9 CONTRACTOR MANAGEMENT

Where contractors that may be unfamiliar with CS Energy procedures are procured to undertake hot work activities on site, relevant site specific information is to be communicated during pre-contract consultation, the site induction process and pre-work Supervisor/Site Contact/OIC communication. The following is to be communicated:

- Details regarding site specific rules and access restrictions;
- Details regarding site specific hazardous areas and the need to adopt signage requirements; and
- Details about the specific hot work task(s) to be performed and any sit specific hazards.

Prior to contractors being procured and confirmed to undertake work on site, information such as the following is to be verified as part of contractor management processes and pre-work consultation:

- Work experience, training and competency evidence to verify that contractors are capable of performing the work and conversant with industry hazards;
- Work procedures or work method statements that identify key high-risk tasks, hazards, and controls to be implemented; and
- Details listing the plant and equipment to be brought onto site with respect to Australian Standard compliance, inspection and maintenance details (i.e. inspection records, logs, etc.)

10 TRAINING AND COMPETENCY

All persons involved with hot work and welding activities are to be competent in the operation. Activities by OIC's, hot work equipment operators and those assessing, inspecting finished welding and hot work standards are to be deemed competent to perform the various hot work planning roles and work activities outlined in this corporate procedure.

11 HOT WORK INSPECTION CHECKLIST

Refer to Appendix 2 – Hot Work Inspection Checklist

The Hot Work Inspection checklist is a tool available to audit compliance with Corporate Hot Work Procedure.

Any Employee and/or Contractor can use the Hot Work Inspection Checklist to assist with compliance of this Corporate Procedure.

Completed Inspection Checklists are to be forwarded to the PTW Administrator for filing as evidence of compliance with the PTW System.

12 PTW AUDITING AND REVIEW PROCESS

Compliance with the Corporate Hot Work procedure will be reviewed in conjunction with the audit and review requirements of the PTW system as outlined in the Audit and Review Process for the PTW System procedure

13 PROCEDURE REVIEW

The Corporate Hot Work procedure will be reviewed on an as needs basis (e.g. following legislative change, new information, relevant incident, etc.)

14 DEFINITIONS

Term	Definition
Supervisor	A person who supervises and manages a business unit to complete work. In relation to hot work, a Supervisor must ensure/assist an OIC in ensuring there are sufficient resources to complete the work (inc. fire watch).
Lower Explosion Limit (LEL)	in relation to a flammable contaminant, the concentration [concentration (usually >10% LEL) of a gas or vapour in air capable of producing a flash of fire in presence of an ignition source (arc, flame, heat)] of the contaminant in air below which the propagation of a flame does not occur in contact with an ignition source
Designated Hot Work Area	A clearly identified area for which a risk assessment has been undertaken and approval has been received from the PTW Administrator stating the area is safe to carry out normal hot work processes.
JSEA	A Job Safety Environment Analysis used to identify the safety and environmental hazards, their risk and controls required for a work activity.
Competent Person	The person proposing the installation or removal of the modification (may be implementer)
Hazardous Area	An area in which an explosive atmosphere is present or may be expected to be present, in quantities such as to require special precautions for: ▪ Any access or activity that presents an ignition source, or ▪ The construction, installation and use of electrical equipment
Hot Work	Includes: ▪ Fire or spark producing activities the may increase the risk of fire or explosion; ▪ Introduction of a non-certified ignition source into a classified hazardous area; ▪ Activities within a hazardous area that have the potential to ca use a release of gas in that hazardous area; or ▪ Activities within a hazardous area that have the potential to cause large dense dust cloud in the hazardous area. Examples include: (a) Welding, grinding, heating, thermal, friction or oxygen cutting; (b) Taking/using communication devices, combustion engines, torches, battery or mains powered tools in a hazardous area; (c) Maintenance of a gas pipeline valve on-line that could create an explosive gas atmosphere; or (d) Air-arc cutting a liner creating a large dust cloud.
Ignition Source	Source of energy that has the potential to cause a fire or explosion when in the presence of air and a fuel/explosive atmosphere. Examples: *Naked flames, sparks, hot surfaces/particle, static electricity (i.e. nylon clothes), combustion engines, communication devices and phones, cameras, torches, battery or mains powered tools, battery chargers, batteries being charged, lightning, spontaneous chemical reactions*

15 REFERENCES

Reference No	Reference Title	Author
"B/D/11/19582"	Procedure - CS-PTW-01 - Permit to Work (PTW) Manual	Corporate PTW Committee
"B/D/11/36145"	Form - S0010 - Hot Work Control Checklist	Corporate PTW Committee
WTIA Technical Note No.7	QLD Advisory Standard: Welding	WTIA
AS 1674.1	Safety in Welding and Allied Processes Part 1 1997 – Fire Precautions	
AS 1674.2	Safety in Welding and Allied Processes Part 2 2007 – Electrical	
AS 2380.1	Electrical Equipment for Explosives Atmospheres – Explosion Protection Techniques	
AS 2444	Portable Fire Extinguishers and Fire Blankets – Selection and Location	
AS 3195	Approval and Test Specification – Portable Machines for Electric Arc Welding and Allied Processes 2002	
AS 60974.1	Arc Welding Equipment – Welding Power Sources	

16 APPENDIX

16.1 Appendix 1 – Hot Work Related Australian Standard Listing

Number	Title
AS/NZS 1336	Recommended Practices for Occupational Eye Protection
AS/NZS 1337	Eye Protectors for Industrial Applications
AS/NZS 1338	Filters for Eye Protectors – Part 1: Filters for Protection Against Radiation Generated in Welding and Allied Operations
AS 1674.1	Safety in Welding and Allied Processes – Part 1: Fire Precautions
AS 1674.2	Safety in Welding and Allied Processes – Part 2: Electrical
AS 1939	Degrees of Protection Provided by Enclosures for Electrical Equipment (IP Code)
AS/NZS 1995	Welding Cables
AS/NZS 2161.4	Occupational Protective Gloves – Part 4: Protection Against Thermal Risks (Heat and Fire)
AS 2444	Portable Fire Extinguishers and Fire Blankets – Selection and Location
AS 2812	Welding, Brazing and Cutting of Metals – Glossary of Terms
AS 2826	Manual Metal-Arc Welding Electrode Holders
AS/NZS 2865	Safe Working in a Confined Space
AS/NZS 3000	Electrical Installations
AS/NZS 3008.1.1	Electrical Installations – Selection of Cables – Part 1.1 Cables for Alternating Voltages up to and Including 0.6/1 kV – Typical Australian Conditions
AS/NZS 3100	Approval and Test Specification – General Requirements for Electrical Equipment
AS 60974 series	Arc Welding Equipment
AS 60974.1	Arc Welding Equipment – Welding Power Sources
AS 60974.6	Arc Welding Equipment – Limited duty portable arc welding and allied process power sources
WTIA (Tech Note 7)	Welding Technology Institute of Australia – Technical Note Number 7: Health and Safety in Welding
WTIA (Tech Note 22)	Welding Technology Institute of Australia – Technical Note Number 22: Welding Electrical Safety

16.2 Appendix 2 - Audit Checklist

Hot Work Inspection Checklist

STAY ON TOP OF YOUR GAME

Area Location/Operation: .....

Site: ..... Date: ...../...../..... Time: ..... :..... am/pm

Inspection Conducted By: .....

Condition Matrix	
Good	Indicates the item is in good condition and does not require attention. It complies with the relevant legislation and standards
Satisfactory	Indicates the item satisfies the legislative requirement however it is expected that the item will require attention in the future.
Requires Improvement (R/I)	Indicates the item requires improvement and does not currently satisfy legislation or the relevant standards. An action plan is needed to improve the status of this item
Not Applicable (N/A)	Indicates the item listed in the checklist bears no relevance to the area location being inspected.

Item	Condition	Comment and/or Action Required	Responsible Person
1. Access and Egress			
Workshop areas contain adequate fire and emergency provisions including extinguishers, hose reels, fire detection systems.	☐ Good ☐ Satisfactory ☐ R/I ☐ N/A		

Item	Condition	Comment and/or Action Required	Responsible Person
Cylinder storage areas are well ventilated, away from sources of heat, fitted with compliant signage and lighting and maintained such that: • cylinders are stored vertically (upright) and restrained against movement, • fuel cylinders are segregated from oxygen cylinders, • there is a first in, first out system for use.	☐ Good ☐ Satisfactory ☐ R/I ☐ N/A		
Hot Work Control Guides have been completed for appropriate tasks.	☐ Good ☐ Satisfactory ☐ R/I ☐ N/A		
Where applicable, specific hazardous area controls and drawing reference numbers are included within completed control guides.	☐ Good ☐ Satisfactory ☐ R/I ☐ N/A		
Flash back arrestors, suitable for the types of equipment used are fitted into both oxygen and fuel gas lines between the blowpipe and hose, and at the regulator outlet.	☐ Good ☐ Satisfactory ☐ R/I ☐ N/A		
Fire extinguishers (within inspection and test dates) are maintained and are easily available for personnel to take to specific on-site hot work locations.	☐ Good ☐ Satisfactory ☐ R/I ☐ N/A		

Item	Condition	Comment and/or Action Required	Responsible Person
2. Training and Competency of Personnel			
Certification details for personnel who use or undertake specific welding apparatus / techniques maintained as per corporate training and record keeping requirements.	☐ Good ☐ Satisfactory ☐ R/I ☐ N/A		
Hot Work Training delivered to relevant workers and recorded.	☐ Good ☐ Satisfactory ☐ R/I ☐ N/A		
3. Contractor Management			
Certification details for personnel who use or undertake specific welding apparatus / techniques verified and recorded prior to work commencing.	☐ Good ☐ Satisfactory ☐ R/I ☐ N/A		
Contractor documentation contains sufficient information regarding personnel, plant and hot work methods.	☐ Good ☐ Satisfactory ☐ R/I ☐ N/A		

NOTES: .....

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Signature of Person Conducting Inspection: .....

Copies Provided to: