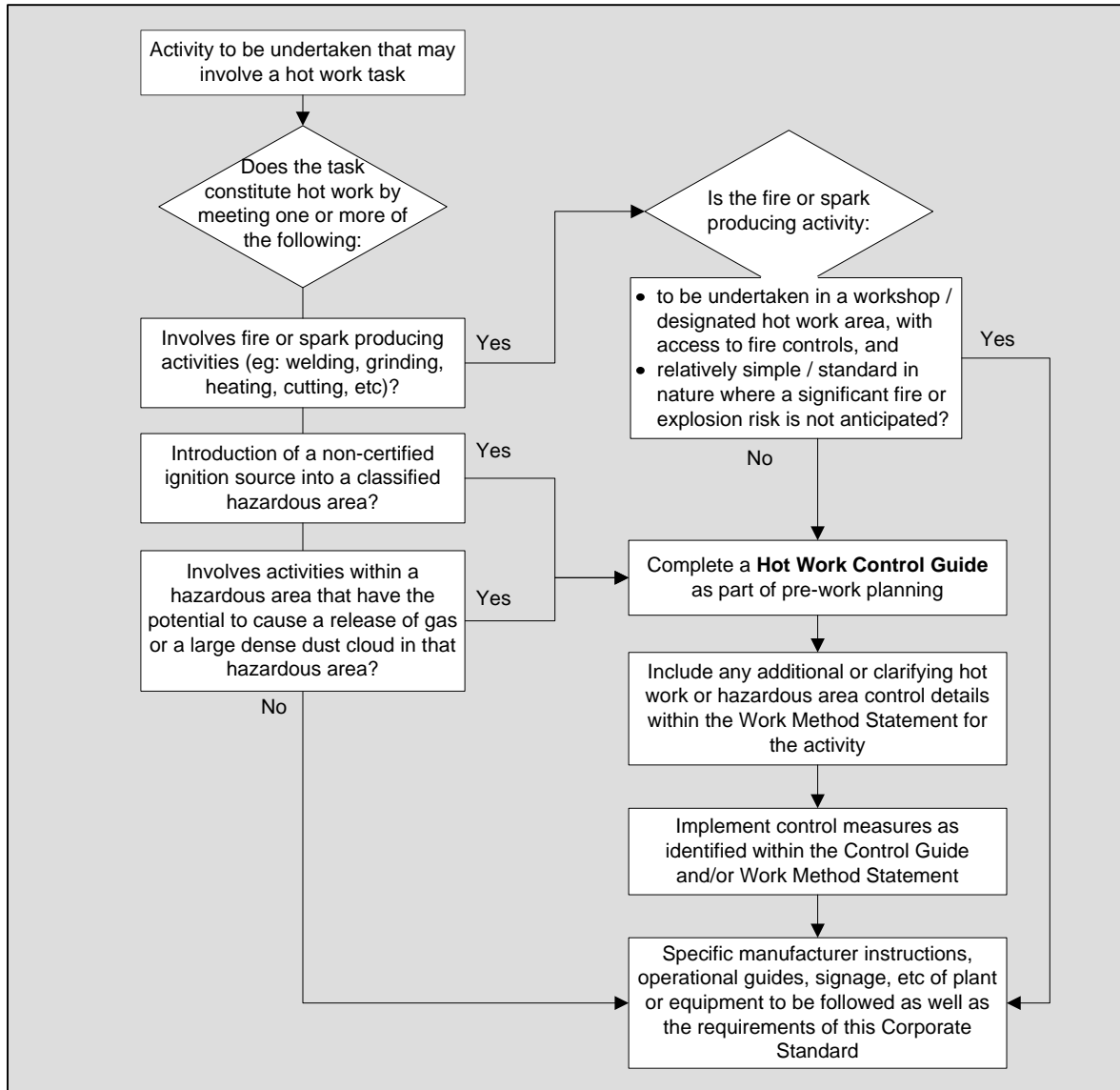


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Functional Flowchart



Objective

To detail the principles and process for managing hot work related hazards and the methods by which safe hot work controls are to be implemented.

Scope

This corporate standard applies to any work location where hot work is required within a SCL operated and/or maintained site.

- + + Note 1: It is not the intent of this corporate standard to address the specifics of the many related welding, brazing, cutting and gouging techniques that are included within the scope of hot work, but rather address the common fire and explosion hazards associated with the performance of hot work.
- + Note 2: Site specific welding and hazardous area procedures should also be referred to for additional welding and hazardous area related information and controls. See also the [Hazardous Areas Corporate Standard – Hummingbird # 625195](#).

Definitions

Competent person: A person who has through a combination of training, education and experience, acquired knowledge and skills enabling that person to perform correctly the specified task.

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 that 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 cause a release of gas in that hazardous area.
- activities within a hazardous area that have the potential to cause a large dense dust cloud in that hazardous area.

Note: Examples of the above include:

- welding, grinding, heating, thermal, friction or oxygen cutting,
- taking / using communication devices, combustion engines, torches, battery or mains powered tools in a hazardous areas,
- maintenance of a gas pipeline valve on-line that could create an explosive gas atmosphere,
- air-arc cutting a wear 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.

Note: Examples may include: naked flames, sparks, hot surfaces / particles, 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.

Workshop / designated hot work area: An area in which typical hot work tasks (such as welding, grinding, cutting, etc) may be undertaken safely and with confidence that:

- combustible or flammable items / fuels are well clear of the hot work task (consider 15m area around the hot work task),
- adequate fire response controls are easily accessible in the area,
- there is adequate ventilation, lighting, space and work surfaces to easily perform the hot work tasks without additional hazards being created,
- there is adequate shielding, floor / catch protection and PPE in the location to ensure the safety of those performing hot work tasks and those in close vicinity to the tasks.

- + + Note: Where a designated hot work area is established, the above criteria must be achieved.
- + Details/references to the designated hot work area are to be made within ATW Forms developed that involve relevant hot work tasks.

Responsibilities

OH&S Systems Manager

- + To maintain the currency and accuracy of the Hot Work Corporate Standard reflective of legislative and corporate change

Station / Site Manager

To monitor the implementation of the Hot Work Corporate Standard and allocate responsibilities and resources to ensure site-specific practices/procedures are developed to satisfy the Corporate Standard

ATW Coordinator

To ensure safe assessment, control implementation and overall safe hot work practices in accordance with this Corporate Standard and any site-specific procedures

Workers and Contracted Staff

To comply at all times with the requirements specified within this Corporate Standard and any site-specific procedures

Hazards

In regard to the performance of hot work tasks, simply by nature of the plant and activities involved, there is significant potential to cause serious injuries and death where safe working practices are not properly implemented. 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, and
- combustible and flammable materials.

Planning

Whenever possible on SCL sites hot work activities are to be planned for and performed within established workshops and at purpose built welding and allied process work stations. In this way, work can be done away from production plant and hazardous areas, and within workshops where specific fire, emergency and environmental issues can be more easily controlled.

Specific local and state authority fire bans, restrictions, etc during bushfire seasons, high winds or as defined by the authorities, are to be complied with and communicated to all personnel who may be undertaking hot works on site.

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

- appropriate means of access during plant outages;
- suitable times and timeframes for the welding activities;
- the necessary exclusion of personnel from work areas; and
- safe preparation of designated hot work areas, work environments and atmospheres.

++ Controls

+ Specific Hot Work Area Controls

Workshop areas in which hot work activities are undertaken are to be fitted out with the necessary gas, piping, manifold and regulator equipment to ensure safe gas supply.

+

+ Note: The above does not mandate the need for all workshops (particularly smaller types where portable welding sets are used) to be fitted out with in-situ gas piping. Also, a specific list of Australian Standards relating to hot work equipment is contained in Attachment 1.

Workshop / designated hot work areas are to contain adequate fire and emergency provisions such as fire extinguishers and fire detection systems and the accumulation of dust is to be avoided through regular clean-up and extraction. Placement, type and number of fire extinguishers within these areas are to be commensurate with the equipment used, the hot work activities undertaken and the requirements of AS 2444: *Portable fire extinguishers and fire blankets - Selection and location*.

Cylinder storage areas are to be well ventilated, away from sources of heat, and lighting in the area is to be certified in accordance with AS 2380.1. 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 (eg acetylene and oxygen),
- signage, such as "No Smoking or Naked Lights" is displayed where fuel gases are stored,
- there is a system of 'first in, first out' use (i.e. the cylinders that have been in storage for the longest period are to be used prior to newly purchased cylinders).

Prior to a hot work activity being initiated within a workshop / designated hot work area that is not standard and/or that is deemed to present some specific fire and explosion hazards for personnel, a *Hot Work Control Guide* is to be completed as deemed necessary by an ATW Coordinator.

Prior to a hot work activity being initiated on site or in and around production plant (outside of workshop / designated hot work areas), a *Hot Work Control Guide* is to be completed by an ATW Coordinator.

Note: As per the Hot Work definition, this also includes hazardous area access and work issues.

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 must be competent as specified by SCL supervisory personnel or as evident through the completion of specific trade/welding certificates.

Specific Australian Standards, as listed within *Attachment 1*, work shop safety manuals and equipment guides etc are also to be followed as applicable.

Note: This requirement may be satisfied through communicating task expectations during an ATW work activity, through the provision and verification of competency details within contractor documentation and through the provision of general advice via work supervisors or those who may issue hot work related equipment and apparatus on site.

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- + + 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 times during storage, transport and use and they are not to be positioned in an access way or traffic area. Also, gas cylinders are not to be transported within closed vehicles.

Fire and Explosion Controls

During hot work within workshops/designated hot work areas or through the hot work control guide process, precautions are to be taken to prevent fire and explosion risks created from:

- Ignition of explosives dust or gas 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 temperatures,
- Gas leakages, improper use of oxygen and unsafe equipment,
- Pierced or cut pressure hosing by sharp objects 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 or 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 actions prior to work.

Flash back arrestors, suitable for the types of equipment used are to be fitted into 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, (eg. coal dust, 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 gas detection meter is to be undertaken prior to working in hazardous areas where flammable gases / liquids (i.e. vapours) are located.

Those involved in hot work tasks are to generally inspect and consider the capability of materials, stands, etc to be used to support and hold components during hot work. Therefore, prior to and during work it can be identified and monitored that steel, sheeting and job piece supports are suitable and the likelihood of a fire or collapse can be minimised.

Precautions are to be taken wherever practicable to prevent sparks or flames from hot work tasks 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 floor boards, floor mats, covers or area exclusion through the use of barricades are required to be implemented.

- + + Fire extinguishes suitable for the types of tasks performed are to be located within the immediate vicinity (within 10m) of personnel performing hot work. This may be easily achieved by securing fire extinguishers to welding trolleys and mobile units and through the hanging of extinguishers on workshop walls.
- + A designated Safety Observer – Hot Work is to be used as a stand by person where deemed necessary and as identified within hot work control guides. Examples of specific activities where a Safety Observer – Hot Work may be used include:
 - Tasks or work locations where a significant fire could develop,
 - Work outdoors near vegetation and bushland,
 - Where combustibles are present in or adjacent to the work area that cannot be removed,
 - Hot work within confined spaces or hazardous areas.

As any use of an ignition source within a hazardous area is defined as part of the term hot work, a control guide must be completed for such tasks or access. Site specific hazardous area controls and signage requirements must also be implemented.

Contractor Management

Where contractor that may be unfamiliar with SCL's work processes are procured to undertake on-site hot work activities, relevant site specific information such as the following is to be communicated during pre-contract consultation, the site induction process or pre-work ATW Coordinator communication:

- Details regarding site specific rules and access restrictions,
- details regarding site specific hazardous areas and the need to adopt signage requirements,
- details about the specific hot work task(s) to be performed and any site 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 are 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 (ie inspection records, logs, etc).

During specific work activities, ATW Coordinators are to monitor the contractor's methods of work and the implementation of the proposed controls to ensure that SCL standards for managing hot work activities are achieved.

Training and Competency

All persons involved with hot work and welding activities including ATW Coordinators, hot work equipment operators and those assessing and inspecting finished welding and hot work standards are to be deemed competent to perform the various hot work planning roles and work activities. This may be evident through the verification of completed trade/welding certificates and training courses.

Note: Refer also to the [Safety Training Attendance Guideline – Hummingbird # 560126](#) for further information regarding training requirements.

Review

Reviewed when required or on a two yearly basis.

References

- + QLD Advisory Standard: Welding (WTIA Technical Note No. 7)
- WA Occupational Safety and Health Regulations 1996, Part 3, Division 9, Subdivision 3
- + WA *Code of Practice: Welding (WTIA Technical Note No. 7)*
- SA Occupational Health, Safety and Welfare Regulations 1995, Division 5.9
- + SA *Code of Practice: Welding (WTIA Technical Note No. 7)*
- NSW Occupational Health and Safety Regulations 2001, Part 7.3
- NSW *Code of Practice: Welding (WTIA Technical Note No. 7)*
- 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 2003 – Electrical
- AS 1966 Electric Arc Welding Power Sources Part 1 1985 – Transformer Type
- AS 1966 Electric Arc Welding Power Sources Part 2 1985 – Rotary Type
- AS 1966 Electric Arc Welding Power Sources Part 3 1990 – Plasma Arc Cutting and Welding Types
- AS 2380.1 Electrical Equipment for Explosive Atmospheres – Explosion Protection Techniques
- AS 2444 Portable Fire Extinguishers and Fire Blankets – Selection and Location
- AS/NZS 3195 *Approval and Test Specification – Portable Machines for Electric Arc Welding and Allied Processes 2002*

WTIA Welding Technology Institute of Australia (WTIA) Technical Note No.7 - Health and Safety in Welding

[Hazardous Areas Corporate Standard – Hummingbird # 625195](#)

[Safety Training Attendance Guideline – Hummingbird # 560126](#)

SCL Form - Hot Work Control Guide

Attachments

- Attachment 1 Australian Standard Listing
- Attachment 2 Audit Checklist

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Hot Work Related Australian Standards 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 1966.1	Electric Arc Welding Power Sources – Part 1: Transformer Type
AS 1966.2	Electric Arc Welding Power Sources – Part 2: Rotary Type
AS 1966.3	Electric Arc Welding Power Sources – Part 3: Plasma Arc Cutting and Welding Types
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/NZS 3195	Approval and Test Specification – Portable Machines for Electrical Arc Welding and Allied Processes
IEC 60974	Arc Welding Equipment
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

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Item	Status			Action Required	Responsible Person	Completed (Insert Date & Initials)
Hot Work Controls						
Workshop / designated hot work areas contain adequate fire and emergency provisions including extinguishers, hose reels, fire detection systems.	Yes <input type="checkbox"/>	No <input type="checkbox"/>	NA <input type="checkbox"/>			
Cylinder storage areas are well ventilated, away from sources of heat, fitted with compliant signage and lighting and maintained such that: <ul style="list-style-type: none"> 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. 	Yes <input type="checkbox"/>	No <input type="checkbox"/>	NA <input type="checkbox"/>			
Hot Work Control Guides have been completed for appropriate tasks as defined in <i>Sections 1, 7.1.4 & 7.1.5</i> .	Yes <input type="checkbox"/>	No <input type="checkbox"/>	NA <input type="checkbox"/>			
Where applicable, specific hazardous area controls and drawing reference numbers are included within completed control guides.	Yes <input type="checkbox"/>	No <input type="checkbox"/>	NA <input type="checkbox"/>			
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.	Yes <input type="checkbox"/>	No <input type="checkbox"/>	NA <input type="checkbox"/>			
Fire extinguishers (within inspection and test dates) are maintained and are easily available for personnel to take to specific on-site hot work locations.	Yes <input type="checkbox"/>	No <input type="checkbox"/>	NA <input type="checkbox"/>			
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.	Yes <input type="checkbox"/>	No <input type="checkbox"/>	NA <input type="checkbox"/>			
High energy, high impact (HEHI) – Hot Work Training delivered to relevant workers and recorded.	Yes <input type="checkbox"/>	No <input type="checkbox"/>	NA <input type="checkbox"/>			
Contractor Management						
Certification details for personnel who use or undertake specific welding apparatus / techniques verified and recorded prior to work commencing.	Yes <input type="checkbox"/>	No <input type="checkbox"/>	NA <input type="checkbox"/>			
Contractor documentation contains sufficient information regarding personnel, plant and hot work methods.	Yes <input type="checkbox"/>	No <input type="checkbox"/>	NA <input type="checkbox"/>			

Other / Further Details:

Signature of Person Conducting Inspection: _____

Copies Provided to: _____
(Print First & Last Names)