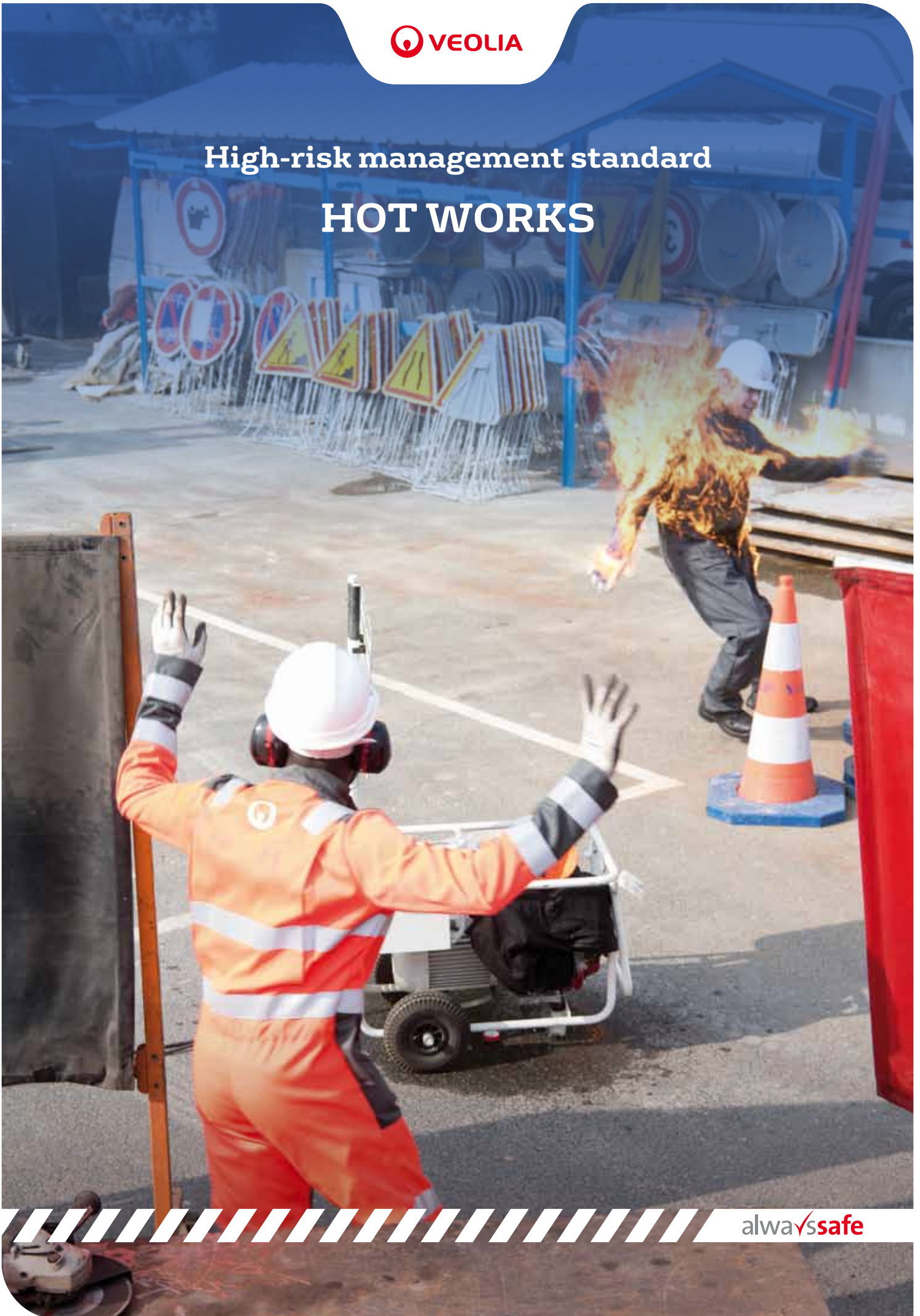
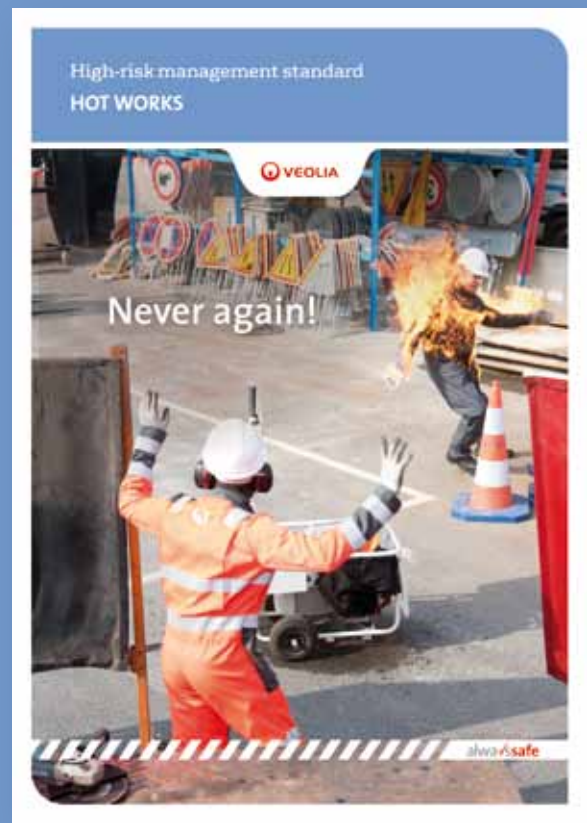


High-risk management standard

HOT WORKS





Over the past few years, several accidents occurring on Veolia sites and on sites where Veolia was operating highlighted the importance of tackling risks linked to hot work operations. More generally, industry statistics say that hot works are responsible for 1 out of 3 fires. This standard is intended to ensure that all measures are taken to prevent and control the risk of exposure to the identified hazards.

SCOPE:

This document applies to all activities and sites of Veolia.

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1.0 > Definitions

Fire and explosion are the most important hazards associated with hot works. Health impacts must also be taken in account as toxic components are often present in some materials (e.g., heavy metals). The hazard of flying sparks is to be considered as well.

Tasks considered as hot works operations are any work that can be a source of ignition of flammable material (open flame, spark, heat...) or that is by itself (without presence of flammable material in the workplace) a fire hazard. The following activities are classified as hot works:

- Welding.
- Grinding.
- (Flame) cutting.
- Brazing.
- Hot seal work.
- Spark-producing operation.
- Or other open flame work.

The hot works standard applies to all Veolia personnel and contractors performing any welding, soldering, grinding, (flame) cutting, brazing, hot seal work or other open flame work on all the sites where Veolia has control and responsibility of the work (on public road, on the property of Veolia or any of its subsidiary sites, on customer or third party sites for work under Veolia responsibility). On customer sites where Veolia is operating, Veolia personnel must apply either Veolia procedure or the client's procedure.

Outside a designated and specially designed and equipped area (such as a maintenance workshop), all hot work operations require a risk assessment and the definition of safety measures that must be formalized by the signature of a "Hot Work Permit" by the senior Veolia operation manager (or one of his delegates).

For hot work operations performed in confined spaces, specific attention must be given to the risk assessment (additionally refer to the "Confined Spaces" standard).

2.0 > Main hot work operation hazards

The main hazards of hot work operations are:

- Fire & explosion.
- Airborne contaminants - toxic smokes (e.g., fluorine compounds, zinc, lead, beryllium).
- Flying sparks.

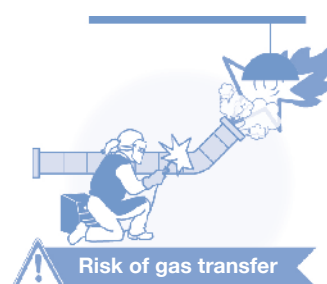
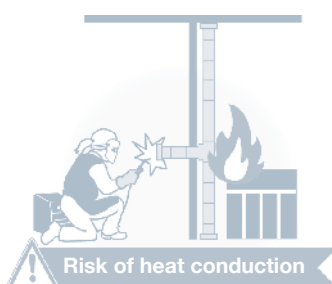
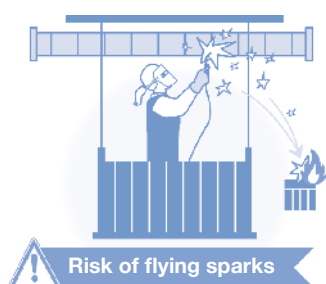
2.0.1 – Fire & explosion

Fire and explosion are the main hazards related with hot works and can be triggered in different ways; risk assessment is therefore mandatory.

The risk assessment has to consider whether the hot work operation takes place within or close to areas where hazardous explosive atmospheres may occur (ATEX). The risk assessment has to identify stored flammable (e.g., solvents and paints) or combustible materials around the

hot work operation area (consider also floors below and above, and walls / doors). Combustible materials may be insulated (inside a panel), combustible coating (on each side of a wall / panel), wood, plastics, resins, expanded foams, paints, oil or dust.

Examples of hot work activities



- > All small containers, pipes or tanks around the hot work operations have to be taken into account in the risk assessment.

Those in charge of hot work permit (establishing or signing) on industrial customer's sites must be trained to understand the specific hazards linked to the customer's processes. Please refer to the "Confined Spaces" standard.

2.0.2 – Airborne contaminants

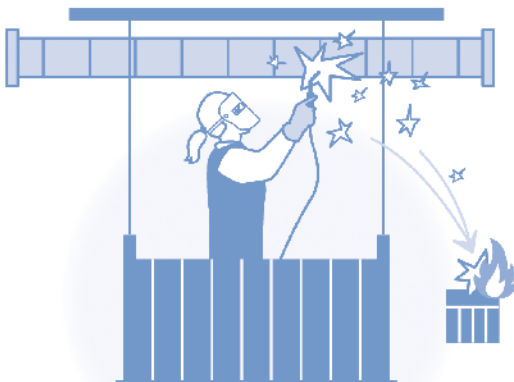
Due to the presence of hazardous substances (e.g., coating) or heavy metals (zinc, lead, cadmium, or mercury) in materials used to weld

or in objects to be welded, cut or heated, hot work operations can be the source of toxic smokes.

2.0.3 – Other risks

Depending on the hot works, burns are likely to happen considering the exposure to high

temperature, flying sparks or electrical risks.



THE MAIN HAZARDS OF HOT WORK ARE FIRE, EXPLOSION, HAZARDOUS GASES, TOXIC FUMES AND FLYING SPARKS.

3.0 > Risk management

The risk assessment must assist in determining the control measures to be implemented. It must help to:

- Identify which workers and area are exposed at risk.
- Determine what sources and processes are causing that risk.
- Identify if and what kind of control measures should be implemented.
- Check the effectiveness of existing control measures.

Control measures must be ranked from the highest level of protection and reliability to the lowest. This ranking is known as the HIERARCHY OF CONTROL or RISK MANAGEMENT HIERARCHY.

You must always aim to eliminate a hazard that is the most effective control. If it is not practicable, the risk must be minimized by one or a combination of the following:

HIGHEST	ELIMINATION	Can the hot work operation be totally eliminated?	MOST
<div> <div>↑</div> <div>↓</div> <div>Health & safety protection</div> </div>	SUBSTITUTION	Can the hot work operation be replaced for a less hazardous method, material or system?	<div> <div>↑</div> <div>↓</div> <div>Reliability of control measures</div> </div>
	ENGINEERING	Can the hot work operation be done in a designated and fitted area?	
	ISOLATION	Can combustible materials be removed from the area? Can fire protections be put in place to limit fire risks? Can mechanical ventilation system be put in place to remove people from the hazards?	
	ADMINISTRATIVE CONTROLS	Is a supervisor designated? Is a hot work permit procedure in place and implemented? Is a fire watch procedure implemented?	
LOWEST	PERSONAL PROTECTIVE EQUIPMENT	Can fire extinguishers be used? Can PPE protect the workers from the hazard or risk?	LEAST



3.0.1 – Fire & explosion

The management of the hot work process and the consequent loss-prevention consist of minimizing or protecting combustibles in the vicinity, providing vigilance during and after the operation.

The hot work permit and the related risk assessment must not be just a formality. They are key elements in the prevention of fire or explosion risks. They have to be established before starting the hot work operations and on the location where the hot works will take place.

Except for areas especially conceived for hot work activities – designated areas –, a risk assessment must be carried out every time there are new hot work operations, every day or every shift for operations longer than one shift. For areas

especially conceived for hot work activities, the risk assessment has to be updated at least once a year. A safety visit to the working area must be carried out prior to the risk assessment.

“Protection” means mobile extinguishers and/or firefighting hoses must be available in the hot work area.

For areas where sprinkler type extinguishing systems exist, an emergency procedure must be implemented.

3.0.2 – Hazardous materials

During hot work operations and depending on which materials are used, the smoke productions can contain toxic materials (e.g., heavy metals). For that reason, hot work operations should be

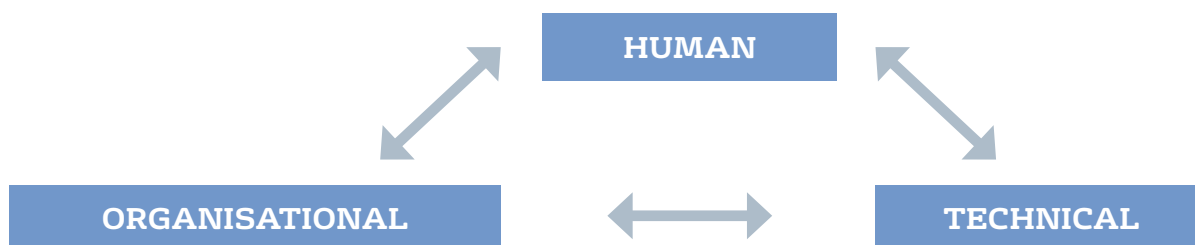
performed in a naturally ventilated area. If not possible (confined space, for example), a mechanical ventilation must be used.

3.0.3 – Other risks

Hot work operations can also emit hot flying sparks that can burn the skin or the eyes. Hot works operators must wear appropriate PPE (e.g., gloves, apron, and eye protections).

Welding arcs and flames emit intense visible, ultraviolet, and infrared radiations. UV radiation in a welding arc will burn unprotected skin just

like UV radiation in sunlight. This is true for direct exposure to UV radiation as well as radiation that is reflected from metal surfaces, walls, and ceilings. Thus to perform this kind of operation, workers must wear a welding helmet and welding shells must be installed.



4.0 > Requirements

Application

This high-risk management standard applies to all hot work operations.

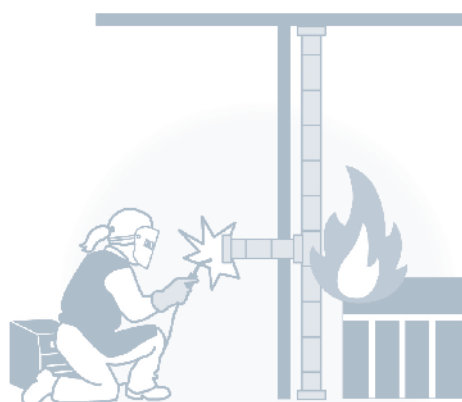
This standard applies to all managers, employees, contractors, visitors or any other person working on the scope of Veolia business undertakings and operations.

This standard applies in addition to requirements prescribed by prevailing legislation, codes of practice, international standards and health & safety recommendations from manufacturers and risk prevention organisations and bodies.

Preliminary requirements

Use of the word “**must**” within this standard means a requirement is mandatory.

Use of the word “**should**” within this standard means the primary intent is that the requirement is mandatory but specific circumstances may mean implementation of the requirement is not reasonably practicable.



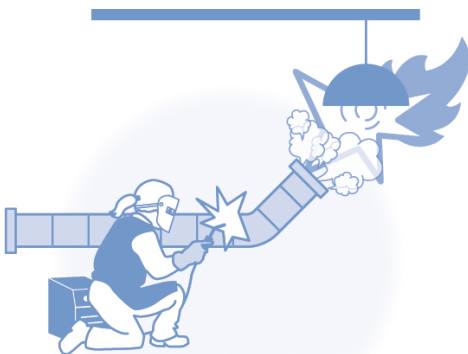
THIS STANDARD APPLIES TO ALL MANAGERS, EMPLOYEES, CONTRACTORS, VISITORS OR ANY OTHER PERSON WORKING ON THE SCOPE OF VEOLIA.

4.0.1 – Human requirements

1. A hot work supervisor must be appointed to each Veolia site where such works are performed.
2. Supervisors must be trained in hot work hazards, preventive measures and emergency procedures. Operators must be trained and qualified.
3. During hot work activities, a competent supervisor must perform a safety visit to ensure that the initial settings and conditions are maintained.
4. Safety visits must include work behaviour observations and any need for additional specific training must integrate the results of those observations.

4.0.2 – Organisational requirements

1. Hot works must be done only if no other suitable/safer means can be found to achieve the desired result.
2. When possible, objects to be welded, cut or heated must be moved to a **safe and well ventilated area** (e.g., a hot work designated area).
3. When hot works are performed outside a designated area, a **hot work permit** must be required.
4. **The hot work permit must be valid for the day and the operation for which it is issued. Jobs requiring more than one day** need a separate permit for each day. If, at any time, the conditions under which the permit was issued change, hot work operations must be stopped until conditions return to those under which the permit was issued. Hot work permits must be kept for at least one year as they might be required by the insurance companies.



ANYONE PERFORMING HOT WORK MUST HAVE COMPLETED A SUITABLE HEALTH & SAFETY TRAINING PROGRAMME.

5. **Hot works must be authorized by a hot work supervisor and must be prohibited** in the following locations and situations: unauthorized areas, in case of explosive atmospheres, and on pipes or other metal in contact with combustible materials.
6. **Hot works must not be performed** on used drums, barrels, tanks or other containers until they have been thoroughly cleaned and plant management has definitively determined there are no flammable or combustible materials present.
7. Sprinkler system protection should not be shut off or impaired while hot work is performed unless an impairment procedure is approved by a competent supervisor. Where hot work is performed close to sprinklers, non-combustible barriers or damp cloth guards must shield the individual sprinkler heads and must be removed when the work is completed. If the work extends over several days, the shields must be removed at the end of each workday.
8. **Risk assessment** must be completed and hot work area must be inspected by the hot work supervisor prior to conducting any hot work.
9. **Atmospheric checks** for Lower Explosive Level (LEL) must be conducted whenever there is a reasonable potential for flammable atmospheres to be present in the hot work area.
10. Before hot work operations, the **area must be secured**, namely:
 - The floor, drums, barrels, tanks or other containers must be cleaned.
 - Combustible and/or flammable materials must be removed.
 - Combustibles that cannot be moved (including cover floors, walls) must be protected with fire resistant shields.
 - Explosive atmosphere must be eliminated; If not possible, hot works must be prohibited.
 - Doors must be closed and openings in the floor and walls must be covered.
11. Refer to “Lock-out/Tagout” and/or “Confined Spaces” standards when applicable.
12. An **impairment procedure** must be established and implemented for automatic fire detection or protection.
13. If an area cannot be made fire safe (or in a confined space), the hot work operation should not be performed alone. A fire guard must be appointed and established for the full duration of the work.
14. **Hot work area must be checked at least once two hours after the end of the hot work** and the hot work permit has to be signed after for validation.
15. **Signage must be displayed** to alert and instruct others in the area about hot work operations and inform that the use of eye protection and other required PPE is mandatory.
16. A **management of change** procedure must be in place for changes of processes, equipment or safety devices with impact on the hot works safety. **Technical and/or organisational changes to a hot work must be subjected to a review of the existing risk assessment.**
17. A system must be provided requiring formal reporting and investigation of breaches associated with hot works.

4.0.3.- Technical requirements

1. **Materials used for hot work operations and for protection** (resistive tarpaulins, curtains...) must be maintained and checked periodically.
2. **Appropriate fire extinguisher equipment must be readily available.**
3. Employees conducting hot work operations must **wear proper protective equipment and clothing** (gloves, eye protections, helmets or hand shields, respiratory protection, natural fibre clothes...).
4. When hot work operations are performed **within a confined space or a space where maximum allowable concentrations for toxic substances** could be exceeded, mechanical ventilation must be implemented.
5. Whenever possible, **fire-resistant screens or curtains/shields** must be used around welding areas to protect passing people from flying sparks or glare.



TECHNICAL REQUIREMENTS INCLUDE THOSE RELATED WITH THE MATERIALS USED FOR THE PROTECTION OF THE WORK SITE, THE MEANS FOR FIRE EXTINGUISHING AND THE USE OF PPE.

5.0 > Glossary

Authorized: means authorized by Veolia management to engage in hot work operations in a specified location.

Combustible materials: solid, liquid or gas that can burn reacting with a flame or a spark, in contact with hot spot, heat or any other ignition sources (e.g., wood, expanded foam, plastics, paper, cardboard, paints, oil, ethanol, propane, hydrogen, LPG).

Competent person: a person who has acquired the knowledge and skills to carry out the task through training or experience. Competency is a combination of these attributes that enables a worker to identify both the risks arising from a situation and the measures needed to deal with them.

Confined Space: a space that is large enough and configured so that an employee can bodily enter and perform assigned work, and has limited means for entry or exit, and is not designed for continuous employee occupancy.

Designated Hot Work Area : a permanent location designed and/or approved for Hot Work operations such as a maintenance shop or detached outside location that is of non-combustible construction, essentially free of combustible and flammable contents, suitably segregated from adjacent areas (welding curtains or non-combustible walls), well ventilated and fitted with local exhaust ventilation.

Fire Guard: Assigned staff responsible for ensuring that safe conditions are maintained during hot work operations, for watching for fires in all exposed areas during and for a specified period of time following cessation of hot work operations, and for responding to incipient stage fires.

Hot Work: Any work involving burning, welding, riveting, or similar fire-producing operations, as well as work which produces a source of ignition, such as drilling, abrasive blasting, and space heating.

Hot Work Supervisor: Person appropriately trained who is qualified and authorized by Veolia management to issue hot work permits.

Incipient Stage Fire: A fire in the incipient or beginning stage and which can be controlled or extinguished by portable fire extinguishers, or Class II stand pipe or small hose systems without the need for protective clothing or breathing apparatus.

Lock-out/Tag-out: Lock-out/Tag-out is a safety procedure which is used to protect employees involved in service and maintenance activities against the unexpected start-up of machines or equipment, or the release of stored energy that could cause injuries.

Maximum Allowable Concentration: Occupational exposure limits of toxic substances according to local/national regulations.

Permit: A document issued by a qualified person for the purpose of authorizing a specific activity (i.e. hot work).

Permit-Required Area: An area that is made fire safe by removing or protecting combustibles from ignition sources.

Qualified person: One who is **BOTH** competent **AND** in possession of a recognized degree, certificate, or professional standing.

APPENDIX 1 > Applicability and compliance assessment

> REQUIREMENTS	C	NC
HUMAN		
1. A hot work Supervisor must be appointed to each Veolia site where such works are performed.		
2. Supervisors must be trained in hot work hazards, preventive measures and emergency procedures. Operators must be trained and qualified.		
3. During hot work activities, a competent supervisor must perform a safety visit to ensure that the initial settings and conditions are maintained.		
4. Safety visits must include work behaviour observations and any need for additional specific training must integrate the results of those observations.		
ORGANISATIONAL		
1. Hot work must be done only if no other suitable/safer means can be found to achieve the desired result.		
2. When possible, objects to be welded, cut or heated must be moved to a safe and well ventilated area (e.g., a hot work designated area).		
3. When hot works are performed outside a designated area, a hot work permit must be required.		
4. The hot work permit must be valid for the day and the operation for which it is issued. Jobs requiring more than one day need a separate permit for each day. If, at any time, the conditions under which the permit was issued change, hot work operations must be stopped until conditions return to those under which the permit was issued. Hot work permits must be kept for at least one year as they might be required by the insurance companies.		
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11. Refer to “Lockout/Tagout” and/or “Confined Spaces” standards when applicable.		
12. An impairment procedure must be established and implemented for automatic fire detection or protection.		
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15. Signage must be displayed to alert and instruct others in the area of hot work operations and inform that the use of eye protection and other required PPE is mandatory.		
16. A management of change procedure must be in place for changes of processes, equipment or safety devices with impact on the hot works safety. Technical and/or organisational changes to a hot work must be subjected to a review of the existing risk assessment.		
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