

OPS-SP-0003

Hot Work Policy

Including Welding, Cutting, and Brazing

Revision History				
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1 Purpose

The purpose of the Hot Work Procedure is to establish the minimum requirements for managing Hot Work operations, including welding, cutting, brazing, open-flame, and spark producing work. It ensures that safe conditions are provided for and maintained to protect personnel from the hazards present.

2 Scope

This policy applies to all employees, contractors, and visitors entering construction zones or conducting work on Ampirical projects. For purposes of this policy, “Hot Work” refers to welding, cutting, brazing, open-flame, and spark producing work activities. Energized work or work on live electrical is not considered part of Hot Work, and is addressed in the Electrical Safe Work Procedure.

3 Definitions

3.1 Designated Hot Work Area

- An area where Hot Work can take place without the use of a Hot Work Permit and meets the requirements described within the procedure.

3.2 Hot Work

- Welding, cutting, brazing, open-flame, and spark producing work activities. Energized work or work on live electrical is not considered part of Hot Work and is addressed in the Electrical Safe Work Procedure.

3.3 Hot Work Permit

- A permit utilized in combination with a Job Safety Analysis (JSA) that provides written authorization to perform Hot Work activities in Hot Work Permit Required Areas.

3.4 Hot Work Permit-Required Areas

- All areas where Hot Work will take place that does not comply with the requirements of a Designated Hot Work Area.

3.5 PPE

- Personal Protective Equipment

4 Responsibility

4.1 Supervisor

- Initiates Hot Work Permits
- Ensures all precautions for Hot Work, including a JSA, are in place before requesting permit authorization
- Oversees work and checks on job regularly to ensure requirements of the Hot Work Procedure are being adhered to
- Validates training/certifications of all employees for the tasks being performed including the Fire Watch

4.2 Ampirical Site Manager/Construction Manager/HSE Manager

- Acts as Permit Authorizer
- Reviews permit, JSA, and worksite and authorizes Hot Work to be performed

4.3 Fire Watch

- Constantly monitors the area to ensure permit requirements are being met
- Stops work if risks are identified until they are mitigated
- Utilizes extinguishing equipment if needed
- Performs no other duties except those of a Fire Watch

4.4 Employee/Visitor

- Follows all requirements of the Hot Work Permit and associated JSA
- Only performs tasks in which they are trained

5 Requirements

5.1 General Requirements

All Hot Work requires the use of a Hot Work Permit unless the work is performed in a Designated Hot Work Area. A JSA must be performed whether the work is in a Designated Hot Work Area or a Hot Work Permit-Required Area to identify, evaluate, and control the hazards associated with the work.

- Before Hot Work operations begin in a Hot Work Permit-Required Area the following conditions must be verified:
 - All areas and objects within a thirty-five (35) foot radius of any Hot Work activity location must be evaluated to ensure potential fire hazards are controlled
 - Floors must be clean and made of noncombustible material
 - Combustible floors must be wet down or covered with damp sand or fire-resistive/noncombustible materials or equivalent
 - All combustibles must be relocated at least thirty-five (35) feet from the worksite and potential ignition sources; if relocation is impractical, combustibles must be protected with fire-retardant covers or otherwise shielded with metal or fire-retardant guards or curtains
 - All flammable storage areas must be kept at least fifty (50) feet from Hot Work areas
 - Walls, pipes, ducts, and any other materials or equipment which may carry sparks or cause ignition must be evaluated to ensure potential fire hazards are controlled
 - Openings or cracks in walls or floors must be tightly covered to prevent passage of sparks and any combustible materials on the other side from being exposed to sparks or conductive heat
 - Fire extinguishers must be fully inspected, charged, operable, and ready for use
 - Atmospheric testing to ensure adequate ventilation when in a confined or enclosed space, or when there is reasonable concern
- The Hot Work Permit must include, at a minimum:
 - Date and length of time the permit is considered valid
 - A description of the location where Hot Work activities are to be conducted
 - Name(s) of the Hot Work Supervisor and personnel performing the Hot Work activity, including contract partners
 - Name(s) of the Fire Watch
 - A checklist of items to be considered for Hot Work
 - Personal protective equipment (PPE) for the task

- Air monitoring readings and results when required
- Signed acknowledgement of review and approval by an authorized person; this will be an Ampirical representative that assists in managing the site or work (Construction Manager, Site Safety Manager, similar role)
- Hot Work permits are valid for one shift only.

5.2 Fire Watch

A Fire Watch is required to be in place whenever Hot Work activities are performed in a Hot Work Permit-Required Area. The Fire Watch must remain in the area with appropriate fire extinguishing equipment for the duration of the Hot Work activities and remain for a minimum of thirty (30) minutes after completion for continued monitoring. Longer durations may be needed depending on if there are additional concerns. A Fire Watch must be trained in their duties, and may not perform any other tasks while performing Fire Watch duties.

5.3 Additional Requirements

- Hot work equipment must have a pre-use inspection performed and defective hot work equipment must be tagged and removed from service.
- Any electrical or electronic equipment used in the Hot Work area shall be intrinsically safe to avoid the risk of igniting a potentially hazardous atmosphere.
- Shielding must be used when possible to prevent hazards to nearby personnel.
- Exothermic welding or “cadwelding” must adhere to the following requirements:
 - Connect conductors and ground rods using approved connectors
 - Follow manufacturer instructions, ensuring proper mold alignment and condition along with a clean, dry, and secure bond
 - Do not use molds beyond the manufacturer's recommendations for amount of “shots” that can be performed
 - Ensure ground conductors are raised to avoid water, debris, and any other contaminants
 - At minimum, a three (3) foot extended striker is to be utilized to ignite the weld
 - A long sleeve, flame-resistant shirt, a face shield with safety glasses, and leather gloves are required along with all standard PPE; this is required for anyone involved in cadwelding activities and all other personnel must remain at least ten (10) feet away from the work

5.4 Designated Hot Work Areas

A Designated Hot Work Area may be established in lieu of obtaining a Hot Work Permit if it meets all the following requirements:

- If within a structure, the structure must be constructed of non-combustible or fire-resistive materials
- All opening or cracks in walls or floors covered to prevent passage of sparks
- Be free of combustible and flammable materials
- Suitably separated from other work activities by means of space (100' minimum)
- Have barricading, signage, or a spotter in place when hot work activities are actively taking place (when sparks, flames, or similar are being produced)
- Equipped with adequate fire extinguisher readily available for use

- Have adequate ventilation to remove smoke, fumes, and odors (general or mechanical)

A Designated Hot Work Area cannot be established within an energized, or previously energized substation.

5.5 Atmospheric Testing

When a Hot Work Permit is required in a confined or enclosed space, or if there is reasonable concern (i.e. nearby refineries, equipment, etc), atmospheric testing must be conducted to verify a valid oxygen atmosphere, and that a flammable/combustible atmosphere does not exist in the work area utilizing a Direct Reading Air Monitoring Instrument capable of reading Oxygen (O₂) percentage and Lower Explosive Limit (LEL) percentage. This must be done at least once per day before the work begins, or if any change in conditions warrants retesting the atmosphere. An attempt must be made to reduce the LEL to zero (0) percent for any flammable gas, vapor, dust, or mist. Where zero (0) percent cannot be obtained, Hot Work can only be conducted if continuous readings of less than 10 percent of the listed LEL for the material in question are achieved. Oxygen levels should be between 20.8-21.0% oxygen. Oxygen levels outside of this range must be investigated, and work of any kind must never be performed outside of 19.5%-23.5% oxygen.

5.6 Ventilation

Adequate ventilation must be enough so that personnel exposures to hazardous concentrations of contaminants (fumes, gases, dust, etc) are maintained below the allowable limits. If adequate ventilation is not practical, respiratory protective equipment must be utilized.

- In order to determine if ventilation is adequate for a space or work area the following must be considered:
 - Volume and configuration of the space in which the Hot Work activity will occur including confined spaces
 - Number and type of operations generating contaminants
 - Concentrations of specific toxic or flammable contaminants generated
 - Natural air flow in the space or work area, including the rate and general atmospheric conditions
 - Location of the welder's and other personnel's breathing zones in relation to the contaminants or sources
- A Ventilation Plan approved by the Safety Department is required for all Hot Work activities that take place inside of a confined space.

5.7 Personal Protective Equipment (PPE)

Depending on the materials and Hot Work activity taking place, different safety and health hazards may be present from which workers must be protected. PPE must be selected according to the assessment of the hazards that are or may be present.

- Minimum PPE Requirements for performing Hot Work activities or within the immediate vicinity (at least ten (10) feet):
 - Long sleeve flame resistant shirts or a welding jacket
 - Flame resistant shirts/jackets must be fastened at the wrist and neck

- Long pants made of treated cotton, wool, leather, or FR
- Pants must be worn over boots to prevent slag or sparks from entering the boots
- Appropriate welding gloves
- Leather boots
- Hoods/Helmets providing UV/IR radiation and eye protection as needed
- Respirators as needed and approved by Ampirical management

5.8 Special considerations:

- In circumstances, specifically working in enclosed spaces, where it is impossible to provide adequate ventilation to prevent the accumulation of toxic materials or oxygen deficiency, airline respirators or hose masks approved for this purpose by the National Institute for Occupational Safety and Health (NIOSH) under 42 CFR Part 84, Approval of Respiratory Protective Devices shall be used.
- Operations involving metals containing lead, other than as an impurity, or metals coated with lead-bearing materials, including paint, shall be done using local exhaust ventilation or airline respirators. Such operations, when done outdoors, shall be done using respirators approved for this purpose by NIOSH under 42 CFR Part 84, Approval of Respiratory Protective Devices. In all cases, other workers in the immediate vicinity exposed to the same atmosphere must be protected in the same manner.

6 Training

Hot work training will be delivered to all employees performing, supervising, or authorizing hot work activities, as well as those performing Fire Watch duties. Employees performing Hot Work and their supervisors must be suitably trained in the safe operation of Hot Work equipment and safe use of the process. Training will be delivered prior to assignment involving Hot Work activities and retraining will be provided if it is believed the employee does not have the understanding or skills necessary to perform the task.

6.1 Training for those performing Hot Work or Hot Work-related activities will include:

- The Hot Work Procedure
- Process for obtaining a Hot Work Permit
- Conditions for which a Hot Work Permit is required
- The hazards associated with Hot Work
- Precautions for controlling hazards, including PPE and appropriate barriers
- The use and requirements of gas detection equipment

6.2 Additionally, Fire Watch training will include:

- Proper use of fire-extinguishing equipment
- Activation of the emergency alarm system
- Use of the air monitoring equipment to be utilized

7 References

7.1 OSHA 29 CFR 1910.251-255

7.2 OSHA 29 CFR 1926.350-354