

SECTION 43**WELDING AND CUTTING****1. GENERAL**

- 1.1. When welding or burning, approved eye protection with suitable filtered lenses will be worn.
- 1.2. Keep welding leads and burning hoses up off floors, walkways and stairways.
- 1.3. A suitable fire extinguisher shall be present at each welding or burning operation.
- 1.4. Hot work permits may be required on some projects.

2. GAS WELDING AND CUTTING- CYLINDER REGULATIONS

- 2.1. Valve protection caps shall be in place and secure.
- 2.2. Movement of tanks by hand will be to tilt and roll on bottom of cylinder by one person, or carried by two persons.
- 2.3. Cylinders will be secured against movement while being used
- 2.4. Cylinders shall be kept in an upright position during storage and secured from falling.
- 2.5. Cylinders are not to be hoisted by means of choke slings.
- 2.6. Storage of cylinders will be by gas type and not stored together. Separate by a minimum of 20'.
- 2.7. Cylinders containing oxygen, acetylene or other fuel gas will not be taken into confined spaces.
- 2.8. Welders shall have proficient knowledge of use of cylinders.

3. ARC WELDING AND CUTTING

- 3.1. Only manual electrode holders shall be used.
- 3.2. Equipment shall be properly grounded.
- 3.3. All cables shall be:
 - 3.3.1. Completely insulated
 - 3.3.2. Flexible type
 - 3.3.3. Capable of handling maximum current
 - 3.3.4. Checked for damage before use – damaged cables will not be used until repaired.
- 3.4. Proper ventilation shall be insured.
- 3.5. Torches will be lit only by the use of a striker.

4. VENTILATION AND PROTECTORS

- 4.1. Welding, burning, and heating performed in confined spaces may require exhaust ventilation to reduce concentrations of smoke and fumes to safe levels
- 4.2. If adequate ventilation cannot be provided, employees will be provided with and required to use air-supplied breathing apparatus as specified by the supervisor.

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- 4.3. In the open air, when welding, cutting, or heating metals have toxic significance (zinc, lead, cadmium, or chromium-bearing metals), filter-type respirators will be worn.

5. Hot Work Permit

- 5.1. HWP covers welding, brazing, soldering, heat treating, grinding, powder-actuated tools, hot riveting and all other similar applications producing a spark, flame, or heat.
- 5.2. This program does not cover use of: candles, laboratory activities, pyrotechnics or special effects, cooking equipment, electric soldering irons or torch-applied roofing (See NFPA 241).
- 5.3. All subcontractors shall have in place at minimum a policy that meets or exceeds this MAPP HSE policy. Contractors are expected to maintain a written hot work program that outlines their procedures and safety precautions. Proof of employee training in hot work procedures must be available for review.
- 5.4. Hot work operations in confined spaces require additional safeguards and are addressed in the current MAPP Confined Spaces Policy.
- 5.5. Hot work on and near building systems and piping may require additional safeguards and are addressed in current Control of Hazardous Energy – Lockout/Tagout Policy.
- 5.6. Definitions
- 5.6.1.** Competent Hot Work Supervisor (CHWS) Employees that have shall have successfully completed competent person training and examination to be considered competent for hot work. For outside contractors the hot work supervisor shall be identified and the name provided to the MAPP Project team as part of the SSSP. The CHWS cannot be the hot work operator.
- 5.6.2.** Designated Area. Permanent location designed for or approved by the MAPP Superintendent for hot work operations to be performed regularly.
- 5.6.3.** Hot Work. Any work involving welding, brazing, soldering, heat treating, grinding, powder-actuated tools, hot riveting and all other similar applications producing a spark, flame, or heat, or similar operations that are capable of initiating fires or explosions.
- 5.6.4.** Hot Work Permit. A document issued by the MAPP Project Team to the CHWS for the purpose of authorizing a specified activity.
- 5.6.5.** Hot Work Operator: An individual designated by the subcontractor to perform hot work under the authorization of a CHWS.
- 5.6.6.** Welding and Allied Processes. Those processes such as arc welding, oxy-fuel gas welding, open-flame soldering, brazing, thermal spraying, oxygen cutting, and arc cutting.
- 5.7. Responsibilities
- 5.7.1.** Competent Hot Work Supervisor (CHWS)
- 5.7.2.** The CHWS is responsible for the safe operations of hot work activity under their supervision. These duties include:

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- 5.7.2.1.** Conducting a hazard assessment in the proposed hot work area to determine any potential fire risks.
- 5.7.2.2.** Prepare and have approved hot work permits to hot work operators.
- 5.7.2.3.** Ensure that only approved apparatus, such as torches, manifolds, regulators and pressure reducing valves, are used.
- 5.7.2.4.** Ensure that all individuals involved in the hot work operations are trained in and are familiar with MAPP Hot Work requirements.
- 5.7.2.5.** Ensure that all individuals involved in the hot work operations are trained in the safe operation of their equipment and the safe use of the process. These individuals must have an awareness of the risks involved and understand the emergency procedures in the event of a fire.
- 5.7.2.6.** Determine site-specific flammable materials, hazardous processes, or other potential fire hazards present or likely to be present in the work location.
- 5.7.2.7.** Ensure combustibles are protected from ignition by the following means:
 - 5.7.2.7.1.** Move the work to a location free from combustibles.
 - 5.7.2.7.2.** If the work cannot be moved, ensure the combustibles are moved to a safe distance or have the combustibles properly shielded against ignition.
 - 5.7.2.7.3.** Ensure hot work is scheduled such that operations that could expose flammables or combustibles to ignition do not occur during hot work operations.
 - 5.7.2.7.4.** If any of these conditions cannot be met, then hot work must not be performed.
- 5.7.2.8.** Determine that fire protection and extinguishing equipment are properly located and readily available.
- 5.7.2.9.** Ensure sufficient local exhaust ventilation is provided to prevent accumulation of any smoke and fume.
- 5.7.2.10.** Ensure that a fire watch is posted at the site when:
 - 5.7.2.10.1.** Hot work is performed in a location where other than a minor fire might develop, or where the following conditions exist.
 - 5.7.2.10.1.1.** Combustible materials in building construction or contents are closer than 30 ft to the point of hot work.
 - 5.7.2.10.1.2.** Combustible materials are more than 30 ft away but are easily ignited by sparks.
 - 5.7.2.10.1.3.** Wall or floor openings are within 30 feet and expose combustible materials in adjacent areas. This includes combustible materials concealed in walls or floors.
 - 5.7.2.10.1.4.** Combustible materials are adjacent to the opposite side of partitions, walls, ceilings, or roofs and are likely to be ignited.

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- 5.7.2.10.2.** Where a fire watch is not required, the CHWS shall make a final inspection 1/2 hour after the completion of hot work operations to detect and extinguish possible smoldering fires.
- 5.7.3. Hot Work Operator (HWO)**
- 5.7.3.1.** The hot work operator shall handle the equipment safely and perform work so as not to endanger lives and property. Specific duties include:
- 5.7.3.2.** Complete required hot work training prior to conducting any hot work activities.
- 5.7.3.3.** Properly use any required personal protective equipment
- 5.7.3.4.** No hot work shall be conducted without specific written authorization from the MAPP Superintendent and the CHWS via completion of the Hot Work Permit.
- 5.7.3.5.** The operator must cease hot work operations if unsafe conditions develop.
- 5.7.3.6.** The operator must notify the CHWS for reassessment of the situation in the event of suspected unsafe conditions or concerns expressed by affected persons.
- 5.7.4. Fire Watch:**
- 5.7.4.1.** The fire watch is an individual posted in specific circumstances, as described above. The function of the fire watch is to observe the hot work and monitor conditions to ensure that a fire or explosion does not occur as a result of the work performed. The fire watch is authorized to stop any unsafe operation or activity. Specific duties and responsibilities include:
- 5.7.4.1.1.** Watch for fires, smoldering material or other signs of combustion.
- 5.7.4.1.2.** Be aware of the inherent hazards of the work site and of the hot work.
- 5.7.4.1.3.** Ensure that safe conditions are maintained during hot work operations and stop the hot work operations if unsafe conditions develop.
- 5.7.4.1.4.** Have fire-extinguishing equipment readily available and be trained in its use.
- 5.7.4.1.5.** Extinguish fires when the fires are obviously within the capacity of the equipment available. If the fire is beyond the capacity of the equipment, sound the alarm immediately.
- 5.7.4.1.6.** Be familiar with the facilities and procedures for sounding an alarm in the event of a fire.
- 5.7.4.1.7.** A fire watch shall be maintained for at least 1/2 hour after completion of hot work operations in order to detect and extinguish smoldering fires.

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- 5.7.4.1.8.** More than one fire watch shall be required if combustible materials that could be ignited by the hot work operation cannot be directly observed by a single fire watch (e.g. in adjacent rooms where hot work is done on a common wall).

5.8. Hot Work Operational Requirements

- 5.8.1.** Hot work is allowed only in areas that are or have been made fire-safe. Hot work may only be performed in either designated areas or permit-required areas.
- 5.8.2.** A designated area is a specific area designed or approved for such work, such as a maintenance shop or a detached outside location that is of noncombustible or fire-resistive construction, essentially free of combustible and flammable contents, and suitably segregated from adjacent areas.
- 5.8.3.** A permit-required area is an area made fire-safe by removing or protecting combustibles from ignition sources.
- 5.8.4.** Hot work is not allowed:
- 5.8.4.1.** In sprinklered buildings if the fire protection system is impaired
 - 5.8.4.2.** In the presence of explosive atmospheres or potentially explosive atmospheres (e.g. on drums previously containing solvents)
 - 5.8.4.3.** In explosive atmospheres that can develop in areas with an accumulation of combustible dusts (e.g. grain silos).
- 5.8.5. Hot Work Permit**
- 5.8.5.1.** Before hot work operations begin in a non-designated location, a completed hot work permit prepared by the CHWS and approved by the MAPP Superintendent is required. (MAPP Hot Work Permit). Based on local conditions, the CHWS must determine the length of the period, not to exceed 24 hours, for which the hot work permit is valid.
 - 5.8.5.2.** The following conditions must be confirmed by the CHWS before permitting the hot work to commence:
 - 5.8.5.3.** Equipment to be used (e.g. welding equipment, shields, personal protective equipment, fire extinguishers) must be in satisfactory operating condition and in good repair.
 - 5.8.5.4.** The floor must be swept clean for a radius of 30 ft if combustible materials, such as paper or wood shavings are on the floor,
 - 5.8.5.5.** Combustible floors (except wood on concrete) must be
 - 5.8.5.6.** kept wet or be covered with damp sand (note: where floors have been wet down, personnel operating arc welding or cutting equipment shall be protected from possible shock)., or
 - 5.8.5.7.** be protected by noncombustible or fire-retardant shields.
 - 5.8.5.8.** All combustible materials must be moved at least 30 ft away from the hot work operation. If relocation is impractical, combustibles must be protected

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with fire-retardant covers, shields or curtains. Edges of covers at the floor must be tight to prevent sparks from going under them, including where several covers overlap when protecting a large pile.

5.8.5.9. Openings or cracks in walls, floors, or ducts within 30 ft of the site must be tightly covered with fire-retardant or noncombustible material to prevent the passage of sparks to adjacent areas.

5.8.5.10. If hot work is done near walls, partitions, ceilings, or roofs of combustible construction, fire-retardant shields or guards must be provided to prevent ignition.

5.8.5.11. If hot work is to be done on a wall, partition, ceiling, or roof, precautions shall be taken to prevent ignition of combustibles on the other side by relocating combustibles. If it is impractical to relocate combustibles, a fire watch on the opposite side from the work must be posted.

5.8.5.12. Hot work must not be attempted on a partition, wall, ceiling, or roof that has a combustible covering or insulation, or on walls or partitions of combustible sandwich-type panel construction.

5.8.5.13. Hot work that is performed on pipes or other metal that is in contact with combustible walls, partitions, ceilings, roofs, or other combustibles must not be undertaken if the work is close enough to cause ignition by conduction.

5.8.5.14. Fully charged and operable fire extinguishers that are appropriate for the type of possible fire shall be available immediately at the work area. These extinguishers should be supplied by the group performing the hot work. The fire extinguishers normally located in a building are not considered to fulfill this requirement.

5.8.5.15. If hot work is done in proximity to a sprinkler head, a wet rag shall be laid over the head and then removed at the conclusion of the welding or cutting operation. During hot work, special precautions shall be taken to avoid accidental operation of automatic fire detection or suppression systems (for example, special extinguishing systems or sprinklers).

5.8.5.16. Nearby personnel must be suitably protected against heat, sparks, and slag.

5.8.6. Work Closeout:

5.8.6.1. A fire watch shall be maintained for at least 30 minutes after completion of hot work operations in order to detect and extinguish smoldering fires.

5.8.6.2. The CHWS shall inspect the job site 30 minutes following completion of hot work and close out the permit with the time and date of the final check.

5.8.6.3. The completed Hot Work Permit shall be stored in the MAPP Project files for the duration of the project.