

PART 1 – GENERAL

- 1.1 Scope. Welding, cutting, open torches and other hot work operations and equipment shall comply with this section.
- 1.2 Permits. Permits shall be required as set forth in Section 3.3.
- 1.3 Restricted areas. Hot work shall only be conducted in areas designed or authorized for that purpose by the personnel responsible for a Hot Work Program. Hot work shall not be conducted in the following areas unless approval has been obtained from the fire code official:
 1. Areas where the sprinkler system is impaired.
 2. Areas where there exists the potential of an explosive atmosphere, such as locations where flammable gases, liquids or vapors are present.
 3. Areas with readily ignitable materials, such as storage of large quantities of bulk sulfur, baled paper, cotton, lint, dust, or loose combustible materials.
 4. At other locations as specified by the fire code official.
- 1.4 Cylinders and containers. Compressed gas cylinders and fuel containers shall comply with this chapter and Chapter 30 of the 2009 International Fire Code (2009 IFC).
- 1.5 Design and installation of oxygen-fuel gas systems. An oxygen-fuel gas system with two or more manifold cylinders of oxygen shall be in accordance with NFPA 51.

PART 2 – DEFINITIONS

2.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown below.

HOT WORK. Operations including cutting, welding, Thermite welding, brazing, soldering, grinding, thermal spraying, thawing pipe, installation of torch-applied roof systems or any other similar activity.

HOT WORK AREA. The area exposed to sparks, hot slag, radiant heat, or convective heat as a result of the hot work.

HOT WORK EQUIPMENT. Electric or gas welding or cutting equipment used for hot work.

HOT WORK PERMITS. Permits issued by the City of Memphis Fire Prevention Bureau for the facility where hot work operations will be conducted.

HOT WORK PROGRAM. A permitted program, carried out by the City of Memphis Fire Prevention Bureau. The intent is to have trained; on-site, responsible personnel ensure that required hot work safety measures are taken to prevent fires and fire spread.

RESPONSIBLE PERSON. A person trained in the safety and fire safety considerations concerned with hot work. Responsible for reviewing the sites prior to the commencement of hot work operations and following up as the job progresses.

TORCH-APPLIED ROOF SYSTEM. Bituminous roofing systems using membranes that are adhered by heating with a torch and melting asphalt back coating instead of mopping hot asphalt for adhesion.

PART 3- GENERAL REQUIREMENTS

- 3.1 General. Hot Work conditions and operations shall comply with this chapter.
- 3.2 Temporary and fixed hot work areas. Temporary and fixed hot work areas shall comply with this section.
- 3.3 Hot work program permit. Hot work permits shall be requested from:

**City of Memphis Fire Prevention Bureau
2668 Avery Avenue
Memphis, TN 38112
Ph (901) 636-5401
Fire.Prevention@memphistn.gov**

An approved Hot Work Permit must be on site prior to the commencement of any hot work operations.

- 3.4 Signage. Visible hazard identification signs shall be provided where where the hot work area is accessible to persons other than the operator of the hot work equipment, conspicuous signs shall be posted to warn others before they enter the hot work area. Such signs shall display the following warning:

CAUTION
HOT WORK IN PROGRESS
STAY CLEAR.

PART 4 – FIRE SAFETY REQUIREMENTS

- 4.1 Protection of combustibles. Protection of combustibles shall be in accordance with Section 4.1.1 through 4.1.9.
- 4.1.1 Combustibles. Hot Work areas shall not contain combustibles or shall be provided with appropriate shielding to prevent sparks, slag or heat from igniting exposed combustibles.
- 4.1.2 Openings. Openings and cracks in walls, floors, ducts or shafts within the hot work area shall be tightly covered to prevent the passage of sparks to adjacent combustible areas, or shielded by metal fire-resistant guards, or curtains shall be provided to prevent passage of sparks or slag.
- 4.1.3 Housekeeping. Floors shall be kept clean within the hot work area.
- 4.1.4 Conveyor systems. Conveyor systems that are capable of carrying sparks to distant combustibles shall be shielded or shut down.
- 4.1.5 Partitions. Partitions segregating hot work areas from other areas of the building shall be noncombustible. In fixed hot work areas, the partitions shall be securely connected to the floor such that no gap exists between the floor and the partition. Partitions shall prevent the passage of sparks, slag, and heat from the hot work area.
- 4.1.6 Floors. Fixed hot work areas shall have floors with noncombustible surfaces.

4.1.7 Precautions in hot work. Hot work shall not be performed on containers or equipment that contains or has contained flammable liquids, gases or solids until the containers and equipment have been thoroughly cleaned, inert or purged; except that “hot tapping” shall be allowed on tanks and pipe lines when such work is to be conducted by approved personnel.

4.1.8 Sprinkler protection. Automatic sprinkler protection shall not be shut off while hot work is performed. Where hot work is performed close to automatic sprinklers, noncombustible barriers or damp cloth guards shall shield the individual sprinkler heads and shall be removed when the work is completed. If the work extends over several days, the shields shall be removed at the end of each workday.

4.1.9 Fire detection systems. Approved special precautions shall be taken to avoid accidental operation of automatic fire detection systems.

4.2 Fire watch. Fire watches shall be established and conducted in accordance with Sections 4.2.1 through 4.2.6

4.2.1 When required. A fire watch shall be provided during hot work activities and shall for a minimum of 30 minutes after the conclusion of the work. The fire code official, or the responsible manager under a hot work program, is authorized to extend the fire watch based on the hazards or work being performed.

Exception: Where the hot work area has no fire hazards or combustible exposures.

4.2.2 Location. The fire watch shall include the entire hot work area. Hot work conducted in areas with vertical or horizontal fire exposures that are not observable by a single individual shall have additional personnel assigned to fire watches to ensure that exposed areas are monitored.

4.2.3 Duties. Individuals designated to fire watch duty shall have fire-extinguishing equipment readily available and shall be trained in the use of such equipment. Individuals assigned to fire watch duty shall be responsible for extinguishing spot fires and communicating an alarm.

4.2.4 Fire training. The individuals responsible for performing the hot work and individuals responsible for providing the fire watch shall be trained in the use of portable fire extinguishers.

4.2.5 Fire hoses. Where hose lines are required, they shall be connected, charged and ready for operation.

4.2.6 Fire extinguisher. A minimum of one portable fire extinguisher with a minimum 2-A:20-B:C rating shall be readily accessible within 30 feet of the location where hot work is performed.

4.3 Area reviews. Before hot work is permitted and at least once per day while the permit is in effect, the area shall be inspected by the individual responsible for authorizing hot work operations to ensure that it is a fire safe area.

4.3.1 Pre-hot work check. A pre-hot work check shall be conducted prior hot work operations to ensure that all equipment is safe and hazards are recognized and protected. A report of the check shall be kept at the work site during the work and available upon request. The pre-hot work check shall determine all of the following:

1. Hot work equipment to be used shall be in satisfactory operating condition and in good repair.

2. Hot work site is clear of combustibles or combustibles are protected.
3. Exposed construction is of noncombustible materials or, if combustible, then protected.
4. Openings are protected.
5. Floors are kept clean.
6. No exposed combustibles are located on the opposite side of partitions, walls, ceilings or floors.
7. Fire watches, where required, are assigned.
8. Approved actions have been taken to prevent accidental activation of suppression and detection equipment in accordance with Sections 4.1.8 and 4.1.9.
9. Fire extinguishers and fire hoses (where provided) are operable and available.

PART 5 – GAS WELDING AND CUTTING

5.1 General. Devices or attachments mixing air or oxygen with combustible gases prior to consumption, except at the burner or in a standard torch or blow pipe, shall not be allowed unless approved.

5.2 Cylinder and container storage, handling and use. Storage, handling and use of compressed gas cylinders, containers and tanks shall be in accordance with this section.

5.2.1 Cylinders connected for use. The storage or use of a single cylinder of oxygen and a single cylinder of fuel gas located on a cart shall be allowed without requiring the cylinders to be separated when the cylinders are connected to regulators, ready for service, equipped with apparatus designed for cutting or welding and all of the following:

1. Carts shall be kept away from the cutting or welding operation or fire-resistant shields shall be provided.
2. Cylinders shall be secured to the cart to resist movement.
3. Carts shall be in accordance with Section 2703.10.3 of the 2009 IFC.
4. Cylinder valves not having fixed hand wheels shall have keys, handles or nonadjustable wrenches on valve stems while the cylinders are in service.
5. Cylinder valve outlet connections shall conform to the requirements of CGA V-1.
6. Cylinder valves shall be closed when work is finished.
7. Cylinder valves shall be closed before moving the cart.

5.2.1.1 Individual cart separation. Individual carts shall be separated from each other in accordance with Section 2703.9.8 of the 2009 IFC.

5.3 Precautions. Cylinders, valves, regulators, hose and other apparatus and fittings for oxygen shall be kept free from oil or grease. Oxygen cylinders, apparatus and fittings shall not be handled with oily hands, oily gloves, or greasy tools or equipment.

5.4 Acetylene gas. Acetylene gas shall not be piped except in approved cylinder manifolds and cylinder manifold connections, or utilized at a pressure exceeding 15 pounds per square inch gauge (psig) (103 kPa) unless dissolved in a suitable solvent in cylinders manufactured in accordance with DOT 49 CFR Part 178. Acetylene gas shall not be brought in contact with unalloyed copper, except in a blowpipe or torch.

5.5 Remote locations. Oxygen and fuel-gas cylinders and acetylene generators shall be located away from the hot work area to prevent such cylinders or generators from being heated by radiation from heated materials, sparks or slag, or misdirection of the torch.

5.6 Cylinders shutoff. The torch valve shall be closed and the gas supply to the torch completely shut off when gas welding or cutting operations are discontinued for a period of 1 hour or more.

5.7 Prohibited operation. Welding or cutting work shall not be held or supported on compressed gas cylinders or containers.

5.8 Tests. Tests for leaks in piping systems and equipment shall be made with soapy water. The use of flames shall be prohibited for leak testing.

PART 6 – ELECTRIC ARC HOT WORK

6.1 General. The frame or case of electric hot work machines, except internal-combustion-engine-driven machines, shall be grounded. Ground connections shall be mechanically strong and electrically adequate for the required current.

6.2 Return circuits. Welding current return circuits from the work to the machine shall have proper electrical contact at joints. The electrical contact shall be periodically inspected.

6.3 Disconnecting. Electrodes shall be removed from the holders when electric arc welding or cutting is disconnected for any period of 1 hour or more. The holders shall be located to prevent accidental contact and the machines shall be disconnected from all power source.

6.4 Emergency disconnect. A switch or circuit breaker shall be provided so that fixed electric welders and control equipment can be disconnected from the supply circuit. The disconnect shall be installed in accordance with NFPA 70.

6.5 Damaged cable. Damaged cable shall be removed from service until properly repaired or replaced.

PART 7 – CALCIUM CARBIDE SYSTEMS

7.1 Calcium carbide storage. Storage and handling of calcium carbide shall comply with Chapter 27 of of the 2009 IFC and Chapter 9 of NFPA 51.

PART 8 – ACETYLENE GENERATORS

8.1 Use of acetylene generators. The use of acetylene generators shall comply with this section and Chapter 6 of NFPA 51 A.

8.2 Portable generators. The minimum volume of rooms containing portable generators shall be 35 times the total gas- generating capacity per charge of all generators in the room. The gas-generating capacity in cubic feet per charge shall be assumed to be 4.5 times the weight of carbide per charge in

pounds. The minimum ceiling height of rooms containing generators shall be 10 feet (3048 mm). An acetylene generator shall not be moved by derrick, crane or hoist while charged.

8.3 Protection against freezing. Generators shall be located where water will not freeze. Common salt such as sodium chloride or other corrosive chemicals shall not be utilized for protection against freezing.

PART 9 – PIPING MANIFOLDS AND HOSE SYSTEMS FOR FUEL GASES AND OXYGEN

9.1 General. The use of piping manifolds and hose systems shall be in accordance with Section 9.2 through 9.7, Chapter 30 of the 2009 IFC and Chapter 5 of NFPA 51.

9.2 Protection. Piping shall be protected against physical damage.

9.3 Signage. Signage shall be provide for piping and hose systems as follows:

1. Above-ground piping systems shall be marked in accordance with ASME A13.1.
2. Station outlets shall be marked to indicate their intended usage.
3. Signs shall be posted, indicating clearly the location and identify of section shutoff valves.

9.4 Mani-folding of cylinders. Oxygen manifolds shall not be located in an acetylene generator room. Oxygen manifolds shall be located at least 20 feet away from combustible material such as oil or grease, and gas cylinders containing flammable gases, unless the gas cylinders are separated by a fire partition.

9.5 Identification of manifolds. Signs shall be posted for oxygen manifolds with service pressures not exceeding 200 psig (1379 kPa). Such signs shall include the words:

LOW-PRESSURE MANIFOLD
DO NOT CONNECT HIGH-PRESSURE CYLINDERS
MAXIMUM PRESSURE 250 PSIG

9.6 Clamps. Hose connections shall be clamped or otherwise securely fastened.

9.7 Inspection. Hoses shall be inspected frequently for leaks, burns, wear, loose connections or other defects rendering the hose unfit for service.

END OF SECTION 01141