

Liberty University

Hot Works Procedures & Operations

Purpose

This procedure has been prepared as a guide for, building maintenance, contractors and equipment repair personnel (including persons who perform cutting and welding), fire watchers, their supervisors (including outside contractors), and Facility Operations personnel on whose property, cutting and welding is to be performed.

Scope

This standard covers provisions to prevent loss of life and property from fire in the use of oxy-fuel gas and electric arc cutting and welding equipment.

Procedures

Before any welding or cutting is begun personnel shall

- Establish approved areas for cutting and welding or establish procedures for approval of cutting and welding operations;
- Designate an individual responsible to authorize cutting and welding operations in areas not specifically designed or approved for such processes. The individual shall be aware of the fire hazards involved and shall be familiar with the provisions of this guide;
- Ensure that only approved apparatus, such as torches, manifolds, regulators or pressure reducing valves, and acetylene generators, be used;
- Ensure that cutters or welders and their supervisors are suitably trained in the safe operation of their equipment, and emergency procedures in the event of a fire;
- Select contractors to perform cutting or welding who employ suitably trained personnel and who have an awareness of the magnitude of the risks involved;
- Advise all contractors of their duties and responsibilities during "hot works" operations.

Before cutting and/or welding, a "hot works" permit must be obtained from a Liberty University Health & Environmental Safety representative.

It is requested that *at least* 24 hours notice, of works needing a hot works permit be made to ensure the all the required safety procedures are in place. The area shall be inspected by the supervisor responsible for the work and if necessary by LU Health & Environmental Safety personnel to ensure that:

- a) Cutting and welding equipment is in satisfactory operating condition;
- b) All combustible materials in the area have been moved to a safe distance from the work or the combustibles have been properly shielded from ignition sources;
- c) The supervisor shall ensure that appropriate fire protection and extinguishing equipment are properly located on site;
- d) The supervisor shall make arrangements for a firewatch to remain on site at least one-half hour after the completion of cutting or welding operations to detect and extinguish possible smoldering fires;
- e) The supervisor shall ensure that a copy of the "hot works" permit is located on the job site and LU Health & Environmental Safety has been notified and received a copy of the permit.

Hot Works Permit

Prior to issuing a hot works permit the area will be inspected by the LU Health & Environmental Safety designated representative.

Before cutting or welding is permitted and at least once per day while the permit is in effect, the area shall be inspected by the LU Health & Environmental Safety designated representative to ensure that it is a fire safe area. This individual shall designate precautions to be followed on the "hot works" permit. This individual shall sign the permit and notify LU Health & Environmental Safety that the work is authorized, and shall verify the following:

- Cutting and welding equipment to be used shall be in satisfactory operating condition.
- Where combustible materials such as paper, wood shavings, or textile fibers are on the floor, the floor shall be swept clean for a radius of 35 ft (11 m).
- Combustible floors (except wood on concrete) shall be kept wet, covered with damp sand, or protected by fire-resistant shields. Where floors have been wet down, personnel operating arc welding or cutting equipment shall be protected from possible electrical shock.
- All combustibles shall be relocated at least 35 ft (11 m) horizontally from the work site. Where relocation is impractical, combustibles shall be protected with flameproof covers or otherwise shielded with metal or fire-resistant guards or curtains. Edges of covers at the floor shall be tight to prevent sparks from going under them. This precaution is also important at overlaps where several covers are used to protect a large pile.
- Openings or cracks in walls, floors, or ducts within 35 ft (11 m) of the site shall be tightly covered to prevent the passage of sparks to adjacent areas.
- Conveyor systems that might carry sparks to distant combustibles shall be protected.
- Where cutting or welding is done near walls, partitions, ceilings, or roofs of combustible construction, fire-resistant shields or guards shall be provided to prevent ignition. If welding is to be done on a metal wall, partition, ceiling, or roof, precautions shall be taken to prevent ignition of combustibles on the other side, due to conduction or radiation, preferably by relocating combustibles. Where combustibles are not relocated, a fire watch on the opposite side from the work shall be provided. Welding shall not be attempted on a metal partition, wall, ceiling, or roof having a combustible covering, nor on walls or partitions of combustible sandwich-type panel construction.
- Cutting or welding on pipes or other metal in contact with combustible walls, partitions, ceilings, or roofs shall not be undertaken if the work is close enough to cause ignition by conduction.
- Fully charged and operable fire extinguishers, appropriate for the type of possible fire, shall be available at the work area. Contractors are responsible to furnish appropriate fire extinguishers during the project. LU Health & Environmental Safety can supply these if requested.
- Where welding or cutting is done in close 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. Special precautions shall be taken to avoid accidental operation of automatic fire detection or suppression systems (e.g., special extinguishing systems).
- Nearby personnel shall be suitably protected against heat, sparks, slag, and shielding should be provided to prevent direct vision onto the work area for passers by.
- The LU Health & Environmental Safety representative is responsible to isolate fire detection devices (smoke/heat detectors). Detectors cannot be covered with gloves, tape, plastic, etc. without prior approval of LU Facility Operations Fire Alarm Technicians.
- All personnel involved in the cutting/welding operations must be familiar with Liberty University emergency procedures.

Ventilation

Adequate ventilation (natural, mechanical, or respirator) must be provided for all welding, cutting, brazing, and related operations. Adequate ventilation depends upon the following factors.

- Volume and configuration of space in which operations occur.
- Number and type of operations generating contaminants.
- Allowable levels of specific toxic or flammable contaminants being generated.
- Natural airflow (rate and direction) and general atmospheric conditions where work is being done.
- Location of the welder and other person's breathing zones in relation to the contaminants or sources.
- Natural ventilation is acceptable for welding, cutting, and related processes where the necessary precautions have been taken to keep the welder's breathing zone away from the welding or brazing plume.

Special Ventilation Concerns

Certain materials, sometimes contained in the consumables, base metals, coatings, or atmospheres of welding or cutting operations, have low or very low permissible exposure limits (American Conference of Governmental Industrial Hygienists, Threshold Limit Value 1.0 mg/m³ or less). Among these materials are:

- Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Beryllium, Manganese, Mercury, Nickel, Selenium, Silver, & Vanadium

The **Safety Data Sheets** must be on site available to identify any of the materials listed above that may be present.

Whenever these materials are encountered as designated constituents in welding, brazing, or cutting operations, special ventilation precautions shall be taken to assure the level of contaminants in the atmosphere is below permissible exposure limits or recommendations.

For further information concerning this guide, please contact:-

Health & Environmental Safety on 434 582-3389 or Email LU_safety@liberty.edu