

REQUIREMENT 2. HOT WORK OPERATIONS

1.0 PURPOSE

- 1.1 To establish a requirement with responsibilities for any hot work operations during all phases of construction, renovation and routine maintenance work performed in any owned University of Pennsylvania facility or related construction project.
- 1.2 To ensure the safety of all persons working in or occupying a building where a "hot work" operation is performed.
- 1.3 To ensure the preservation of University assets and mission continuity.
- 1.4 The premise of this requirement is to prevent an uncontrolled fire.

2.0 DEFINITIONS

- 2.1 **FIRE WATCH:** A temporary measure establishing continuous and systematic surveillance of a building, or portion thereof, by one or more qualified individuals, for the purposes of identifying and controlling fire hazards, detecting early signs of unwanted fire, alerting building occupants to the fire and notifying the fire department.

A Fire Watch may be required when fire protection systems in a building, or a portion thereof, have been impaired for testing, inspection or maintenance, construction in the building.

- 2.2 **HOT WORK:** An operation or activity such as welding, soldering, Thermit welding, thermal spraying, thawing pipe, installation of torch-applied roof systems, cutting, burning, heating, grinding, spark producing, slag, or intense heat producing activities capable of igniting combustible materials or flammable atmospheres. Includes cutting and welding operations for construction/demolition activities that involve the use of portable gas or arc welding equipment, open flame or spark-producing apparatus.
- 2.3 **THE FIRE SAFETY SUPERVISOR (FSS):** is a person trained and responsible for hot work safety requirements. As part of the hot work permit process, the FSS is responsible for reviewing the site prior to issuing the permit and following up as the job progresses. For outside contractors and operations/maintenance jobs performed by Facilities and Real Estate Division (FRES) at the University of Pennsylvania, this position shall be the responsibility of the on-site supervisor.
- 2.3 **ANNUAL HOT WORK PERMIT:** Is a permit that can be requested for areas that have been predetermined and regularly perform hot work. This includes, but is not limited to, shops or lab areas in University of Pennsylvania owned facilities.

3.0 RESPONSIBILITY

- 3.1 **ANY PERSON PERFORMING HOT WORK AT ALL UNIVERSITY OF PENNSYLVANIA OWNED FACILITIES AND RELATED CONSTRUCTION PROJECTS.**

3.1.1 The University requires a Hot Work Permit (see Appendix "A" of this document) before anyone can begin hot work. Persons performing hot work must comply with this requirement.

3.1.2 It is the responsibility of Facilities Project Managers to ensure that all contractors are adhering to the requirements set forth in this document.

3.1.2 University supervisors are responsible for meeting the requirements set forth in this document.

4.0 PROCEDURES

4.1 FIRE SAFETY SUPERVISOR

- 4.1.1** The Fire Safety Supervisor (FSS) is the Permit Authorizing Individual (PAI) responsible for inspecting the hot work area for fire safety and issuing and submitting a written University-approved Hot Work Permit to the hot work operations personnel prior to the initiation of hot work.
- 4.1.2** Every campus hot work operation is required to have one FSS to act as the responsible PAI.
- 4.1.3** The on-site FSS will ensure compliance with federal, state and local laws, statutes, ordinances and codes regarding the work to be completed.
- 4.1.4** If a job requires hot work, a Hot Work Permit must be prepared, submitted as per instructions on the permit and displayed at the entrance to the work area. The date, time and location of the work to be performed are required on the permit. A permit expiration date and time, as well as the supervisor's signature, are required on the permit.
- 4.1.5** Before hot work is permitted and at least once per day, while the Hot Work Permit is in effect, the area shall be inspected by the FSS or qualified designee to ensure that the area is fire safe.
- 4.1.6** The Hot Work Permit Required Area includes a 35-foot (11M) fire-safety zone around any area of a work-site exposed to sparks, hot slag, radiant heat or convective heat. The fire-safety zone is critical to ensure fire safe hot work operations.
- 4.1.7** A fire-safety zone is established by: (a) closing fire doors and sealing floor and wall openings with a Factory Mutual Research Corporation-Approved fire-stop material; (b) removing combustible storage or covering heavy, unmovable combustible storage with a fire-resistive tarpaulin; and (c) removing or shielding from sparks all potential fuels within 35 feet (11M) of the work area.
- 4.1.8** Multiple fire-safety zones may be listed on one (1) Hot Work Permit as long as the FSS has inspected and approved the fire safe requirements of each fire-safety zone.
- 4.1.9** All personnel assigned to perform hot work and assigned fire watch duty (see 4.2 below) shall be proficient in the use of portable extinguishers.
- 4.1.10** FSS must obtain Hot Work Permits by contacting Fire and Emergency Services (FES) at (215) 573-7857. *Emergency Hot Work Permits are available by calling the PennComm Center at (215) 573-3333 or by printing the applicable Appendix A or B of this permit.*
- 4.1.11** Upon completion of the hot work the FSS is required to remove the permit from the site and keep it on file for 48 hours after the completion of the hot work.
- 4.1.12** Upon completion of the hot work the FSS must ensure that any impairments made to buildings' life safety systems to complete the hot work are restored to operating conditions.

4.1.13 Hot Work precautions checklist: (See Appendix A)

- Can this job be avoided?
- Is there a safer way to perform this work?
- Are the available sprinklers, hose streams and extinguishers ready for service and operable?
- When hot work is performed close to automatic sprinklers, noncombustible barriers or damp cloth guards shall be used to shield the individual sprinklers, but shall be removed when the work is completed.
- Smoke and heat detectors shall be covered or zoned-out prior to initiating hot work to prevent accidental fire alarms.
- Is all hot work equipment in good repair?
- Requirements within 35 feet (11M) of work:
 - Flammable liquids, lint and oily deposits removed?
 - Explosive atmosphere in area eliminated?
 - Is the floor swept clean?
 - Are combustible floors wet down, covered with damp sand or fire-resistive sheets?
 - Have combustibles been removed or protected with fire resistive tarpaulins or metal shields?
 - Are all walls and floor openings covered?
 - Are fire-resistive tarpaulins suspended beneath the work?
 - Have ducts and conveyors been protected or shut down to prevent an ignition source being carried to remote combustibles?
- Requirements for work on walls, ceilings or roofs:
 - Is the construction noncombustible, as well as without combustible coverings or insulation?
 - Have combustibles on the other side of the wall, ceiling or roof been moved or covered to prevent ignition?
- Requirements for work on enclosed equipment:
 - Are University of Pennsylvania Confined Space Entry Procedures being followed?
 - <http://www.ehrs.upenn.edu/programs/occupat/confspace.html> Has the enclosed equipment been cleaned of all combustibles?
 - Has the container been purged of flammable liquids and vapors?
 - In pressurized vessels, has piping and equipment been removed from service, isolated and vented?

4.2 FIRE WATCH

- 4.2.1** The Fire Watch shall be dedicated to inspecting the work and surrounding area for signs of smoke or fire. The Fire Watch personnel may perform no other work while completing the assigned Fire Watch duties.
- 4.2.2** The Fire Watch shall include the entire hot work area. Hot work conducted in areas with vertical or horizontal fire exposures, unobservable by a single individual, shall have additional Fire Watch personnel assigned to ensure that those exposed areas are monitored. The supervisor initiating the Hot Work Permit is responsible for assigning adequate Fire Watch personnel to observe the adjoining areas where a fire might spread.
- 4.2.3** Fire Watch personnel shall have fire-extinguishing equipment readily available and shall be proficient in the use of such equipment. Fire Watch personnel shall be responsible for sounding alarm and extinguishing incipient-stage fires.
- 4.2.4** At least one portable fire extinguisher with a minimum 2 – A:20 – B:C rating shall be readily accessible within 30 feet (9144mm) of the hot work location and maintained in accordance with NFPA 10. (Consult the 2013 Philadelphia Fire Code, section 906 for additional portable fire extinguisher requirements).

4.2.5 Requirements for Hot Work Fire Watch:

- Fire Watch shall be provided for thirty (30) minutes following the cessation of the hot work.
- Fire Watch shall be performed with an appropriate extinguisher, and where required, a charged hose line.
- Fire Watch personnel shall be proficient in the use of fire extinguishers and in sounding a fire alarm.
- Adjoining areas, above and below, may require additional Fire Watches. *The responsible Hot Work Supervisor shall inspect all adjoining areas and determine whether to initiate a Fire Watch in any of these areas.*
- After the Fire Watch is complete, the area shall be monitored for up to an additional one hundred eighty (180) minutes to ensure a fire-free operation.

NOTE: Hot Work preparation shall include considering what time of day to perform the hot work – morning or early afternoon – so there is sufficient time after the Fire Watch is complete to monitor the area for up to one hundred eighty (180) minutes.

4.2.6 In Case of Fire:

- First, notify everyone to clear the area immediately and sound the building alarm.
- If possible, confine the fire area by closing any doors while leaving the area.
- From a safe area, call PennComm at 215-573-3333 or 511 from any campus phone.
NOTE: If 911 is called, direct contact with the Philadelphia Fire Communications Center will be made which might delay the Penn Public Safety Division's response to the emergency.
- In case of fire at New Bolton Center and Morris Arboretum 9-1-1 will be called with an immediate follow up call to PennComm 215-573-3333. According to office campus hot work permit (See Appendix "B").
- If the fire is small (e.g. the flame of the fire is no larger than a single office waste basket) or contained and you have been properly trained, you may try to extinguish the fire using the appropriate extinguishing equipment. Make sure you always have a safe path of egress.

4.3 FIRE MONITOR

4.3.1 A Fire Monitor will remain in the immediate hot work area for up to one hundred twenty (120) minutes after the Fire Watch is complete. The Fire Monitor may perform other tasks as long as he/she is available in the immediate hot work area to spot check the area for smoke or fire.

4.3.2 The Fire Monitor will follow section 4.2.5 and section 4.2.6 in case of evidence of fire.

4.4 ANNUAL HOT WORK PERMIT

4.4.1 Shops and labs may request an annual hot work permit by contacting FES (215)573-7857.

4.4.2 FES Safety Specialist must inspect the area to ensure all safety requirements listed on permit are met. Upon Safety Specialist's approval an annual permit will be issued.

4.4.3 The annual permit and safety requirement must be posted at all times in the hot work space.

4.4.4 An annual hot work permit will be valid for one year after it is issued.

4.4.5 Re-inspection of the space will be conducted before the current permit's expiration date. Upon successful re-inspection a new permit will be issued.

5.0 SUPERSEDES

5.1 This requirement supersedes the Welding/Cutting portion (pages 112-113) of the Safety Guidelines for Contractor's chapter which appeared in Section 1 (Safety Procedures/Guidelines) of the Safety Manual of the University of Pennsylvania.

6.0 GENERAL REFERENCES

- 6.1 The University of Pennsylvania "HOT WORK PERMIT"
- 6.2 Philadelphia Fire Code, Section 2604.2
- 6.3 NFPA 51B – Fire Prevention in Use of Cutting and Welding Processes.
- 6.4 29 CFR 1910.252.
- 6.5 <http://www.ehrs.upenn.edu/programs/occupat/confspace.html>
- 6.6 NFPA 10 –Standard for Portable Fire Extinguishers

7.0 CONTACT INFORMATION

- 7.1 **For question regarding this requirement contact Fire and Emergency Services at (215) 573-7857.**