HOT WORK PROCEDURE

Application

This procedure is intended to reduce the risk of personnel injury and loss of property caused by fires ignited by hot work. Hot work is defined as use of open flames, acetylene cutting, welding and allied process, brazing, thawing pipe, torch-applied roofing and similar operations producing a spark, flame or heat. This procedure applies to all hot work conducted on Stanford University, including hot work conducted by contractors, Stanford University personnel or students. This procedure does not apply to use of candles, cooking, pyrotechnics, furnaces or laboratory equipment.

University departments conducting hot work and General Contractors for new-building construction projects or construction on Stanford University property shall have a written permit program in place that satisfies the requirements of California Fire Code (CFC) Article 49 and Article 87, current edition. The program shall be approved by Stanford University Fire Marshal Office of the Environmental Health and Safety Department (SUFMO) and records shall be available for review by SUFMO and insurance carriers.

Justification

All property losses caused by hot work as an ignition source are preventable; yet, hot work is a leading cause of fires in all types of property. Proper planning, supervision, and participation in hot work fire prevention can achieve the goal of preventing fires ignited by hot work. There is a requirement established by California Fire Code Art. 49 and Art. 87 to manage hot work.

References

California Fire Code, Article 49 – Hot Work
California Fire Code, Article 87 – Firesafety During Construction, Alteration or Demolition of a Building
NFPA 51B – Fire Prevention in Use of Cutting and Welding Practices
Hot Work Program

A. Hot work is not to be conducted at Stanford University properties unless supervised by procedures approved by Stanford Fire Marshal for hot work. Hot work permits can be obtained by contacting Stanford Fire Marshall Office (SUFMO) during working hours. Stanford University Departments that have need to frequently conduct hot work may have personnel trained as Permit Authorizing Individuals that are authorized to issue hot work permits. A Permit Authorizing Individual shall be designated to issue Hot Work Permits and maintain records (see NFPA 51B for expected duties). The program shall be reviewed and approved by SUFMO.

B. Plumbers employed by Stanford University may use the “Hot Work Fire Safety Checklist” attached to this document for soldering copper pipe if they have received hot work training and have their supervisor’s approval.

C. General contractors that have full control of a Stanford University building shall be responsible for hot work under their direction. They shall have a written program in place that provides for inspection, hot work permits and personnel training, which meets the requirements of CFC Art. 49 and Art 87. They shall provide a copy of their program to SUFMO for review and approval. Permits shall be posted on site and be available for review by the fire official for at least 48 hours after completion of work or the duration of the project, whichever is longer.

D. General Hot Work Guidance

1. Avoid hot work when possible. Consider all alternative methods to hot work. Some alternative methods include:
   a) Manual hydraulic shears vs. saw/torch cutting
   b) Mechanical bolting vs. welding
   c) Screwed or flanged pipe vs. sweat soldering
   d) Reciprocating saw vs. radial saw
   e) Mechanically attached roof systems vs. torch applied roof system
   f) Mechanical pipe cutter vs. torch or radial saw cutting

2. When possible relocate the hot work to a suitably arranged and isolated fixed hot work station. Fixed hot work stations shall be maintained free of combustibles. Plans for fixed hot work stations shall be submitted to SUFMO for review and approval. (see section 3.05)

3. Manage any hot work conducted outside of a designated, or fixed hot work station using a formal hot work permit system. (CFC 4901.6) The hot work system shall be based on the NFPA 51B Hot Work Permit System or an alternative that has been reviewed and approved by SUFMO. Prior to commencing hot work the personnel providing authorization and the fire watch shall have appropriate training and the precautions in section 3.03 shall be followed.

4. Prohibit hot work in buildings when sprinklers are out of service, if so equipped.
5. Prohibit hot work in areas/equipment where hot work cannot be conducted safely. (CFC 4901.5.2) When these conditions exist on a construction site, designate the area and/or equipment involved as a “no Hot Work Area” and prominently post this restriction. Examples of a “No Hot Work Area” can include:

a) Areas/equipment that contain/handle flammable liquids, flammable gasses, combustible dusts or combustible metals (CFC 7901.10, 7902.1.2)

b) Partition, walls, ceilings or roofs with combustible plastic coverings or cores (e.g., expanded plastic insulation, sandwich panels)

c) Rubber lined equipment

d) Oxygen enriched atmosphere (CFC 8001.9)

e) Storage and handling of oxidizer materials (CFC 801.9)

6. When hot work must be conducted in areas or equipment containing hazardous processes as described above, authorization shall be received from SUFMO before proceeding.

7. There shall be an assigned Fire Watch with no other assigned duties. The Fire watch will remain in the area for a minimum of 30 minutes following the completion of work. Exception: A fire watch will not be required when the hot work area has no fire hazards or combustible exposures. (CFC 4901.4) For orbital welding and soldering plumbing only, the operator may act as his own fire watch when the Permit Authorizing Individual considers it safe to do so. The operator shall be trained in fire watch responsibilities and perform the tasks normally assigned to fire watch.

**Training**

Acceptable hot work policies must include training for management, Permit Authorizing Individuals and fire watch personnel. Records of training and/or certification shall be maintained for SUFMO review.

SUFMO shall offer training programs for hot work supervision and fire watch.

SUFMO will provide consultation, when requested, on design of hot work program.

**Fixed Hot Work Area, CFC 4902**

Hot-work areas may be authorized in a permanent or temporary place, typically in a workshop that has been set up and maintained for the purpose of conducting hot work. Fixed hot-work areas require one-time review by SUFMO and may require a building permit. Work performed in a fixed hot work area does not require a fire watch or hot
work permits. The area must be maintained in accordance with the requirements of the approval or building permit.

Locate hot work stations in noncombustible buildings or combustible buildings with secured noncombustible barriers over combustible floors, walls and ceilings in the designated area. Remove all combustibles within the station itself. Provide at least one 2A:40BC extinguisher in the immediate area.

Separate hot work operations from combustibles by 35 feet (11 m) of open space or use noncombustible enclosures to isolate from other combustibles.
Fire Safety Precautions
The fire-safety precautions listed below apply to the hot work area. This will generally be surface area within 35 ft (11 m) of the hot work. The major purpose is to isolate fuels from sparks. For orbital welding and soldering plumbing only, the precautions need to be applied to only within 3 ft. of the work. An alternative to the 35 ft (11 m) rule is to provide appropriate barriers.

Within the hot work area:

• Sweep floors clean, removing grease and oils as well. Do not simply soak them up with sawdust. Cover floors made of combustible material (e.g., plank on steel, wood block) with fire-resistant tarpaulins or other noncombustible material. (CFC 4901.5.5)

• Remove flammable liquids like paints, oils and lacquers from the work area. Do not just seal them. (CFC 4901.5.2)

• Protect combustibles that cannot be moved with fire resistive tarpaulins or metal shields. This includes all storage or machinery with grease or lint deposits. (CFC 4901.5.3)

• Either eliminate explosive atmospheres or prohibit the hot work. Halt processes that produce explosive atmospheres, and continuously monitor the area for accumulation of combustible gases before, during and after hot work.

• Cover all wall and floor openings. Plug floor openings with a listed fire stop material or wetted stuffing. Seal ductwork and duct openings with metal covers built for the vents or cover them with fire-resistive tarpaulins. (Ductwork is invariably dusty and can circulate fire through a facility as easily as it circulates air. Ductwork also can have combustible coverings and/or insulation.) (CFC 4901.5.4)

• Place noncombustible screens around hot work at the floor to trap sparks. Close all doors and fire doors to prevent sparks from escaping. (CFC 4901.5.4)

• Suspend fire-resistive tarpaulins under hot work conducted near the ceiling above locations where persons are likely to pass to shield them from hot sparks or slag. (CFC 4901.5.4).

• Prohibit hot work on partitions, walls, ceilings or roofs with combustible plastic coverings or cores (e.g., expanded plastic insulation, sandwich panels). Walls and roofs with plastic insulation are associated with a high percentage of hot work fires.

• Schedule hot work during shutdown periods if possible.

• The contractor/welder shall provide a minimum 2-A: 20-BC or one 2.5 gal. water extinguisher in the work area, fully charged and serviced. Extinguishers belonging to the University are not to be used for this purpose. (CFC 4901.9)

• If automatic fire detection devices are present in the immediate area that need to be disabled to prevent nuisance alarms and/or actuation of suppression systems, follow normal impairment procedures to ensure restitution.

• Hot work on pressurized vessels, piping, and equipment should only be conducted after the equipment has been secured, isolated, and vented. If flammable liquids, gases or solids, are present, they should also be purged and/or cleaned. Without proper isolation and depressurization, hot work used for disassembly or modification of pressurized equipment can result in rapid release of pressure that could damage adjacent structures or equipment causing additional property damage, particularly if flammable fluids and gases are released.