CALTECH FACILITIES HOT WORK PERMIT PROGRAM

April 2011

Caltech’s Hot Work Permit Program was developed in accordance with OSHA regulations and NFPA with the goal of preventing accidental fires or explosions incident to the performance of hot work.

Purpose: This document is designed to describe the safety procedures and relevant guidelines to follow prior to, during, and at the completion of Hot Work at Caltech to prevent the possibility of fire or explosion in conjunction with the conduct of the hot work. Hot work involves any operation that might create a spark, flame, heat, or that have the capability of initiating fires or explosions. See hot work operation definition below. These operations require a Hot Work Permit.

This program describes the procedures and guidelines for both employees and contractors to perform hot work at Caltech. Section 1 includes definitions and general guidelines. Section 2 addresses Caltech employees and Section 3 addresses contractors. Caltech managers and supervisors oversee the hot work program for operations under their supervision and the Caltech Campus Inspector oversees the hot work program related to contractor performed work.

Section 1 – Definitions, General Guidelines, and Training Requirements

Definitions

• Permit Authorizing Individual (PAI) can be any individual that has completed the hot work safety training.

• Fire Watch can be any employee who has successfully completed hot work safety training.

• Hot Work Operators (HWOs) are employees who perform hot work operations. A HWO must always obtain a Hot Work Permit before beginning hot work.

• Hot Work Operation - Hot work involves welding, brazing, soldering, heat treating, sanding, cutting, grinding, hot riveting and other similar applications that produce a spark, flame or heat, or that have the capability of initiating fires or explosions.

General Guidelines

• Work should be performed using alternative methods other than hot work whenever possible.

• Hot work should be performed in designated hot work rooms whenever it is practical. A permit is not required for hot work rooms, such as a maintenance, machine or tech shops, where hot work operations (grinding, etc.) are routinely conducted and proper fire safeguards are already in place.
A Hot Work Permit normally is job specific for one job and active through the expiration date on the permit which is usually for one day.  
The permit should be posted in the area of hot work for the duration of the activity.  
The permit is automatically void and hot work is stopped immediately if work area conditions change such that the area is no longer fire safe. Work can resume only after the permit is re-signed or another permit is issued.  
A copy of every permit shall be filed by the PAI or Campus Inspector in a location designated by their supervisor and kept for a period of one year.

Safety measures required by the Hot Work Permit  
- All flammable and combustible materials within a 35-foot radius of hot work must be removed.  
  - When flammable and combustible materials within a 35-foot radius of hot work cannot be removed they must be covered with flame retardant tarps and a fire watch must be posted.  
- Floors and surfaces within a 35-foot radius of the hot work area must be swept free of combustible dust or debris. If combustible, floors must be wet down.  
- The equipment or material to be worked on is thoroughly cleaned of all deposits of oil, carbon, dust, or other combustible/flammable residues.  
- All openings or cracks in the walls, floors, or ducts that are potential travel passages for sparks, heat and flames must be covered.  
- Hot work equipment must be inspected and in good working condition.  
- Exhaust and return air fans (HVAC) within 35 feet have been turned off.  
- Hot work areas must be isolated with tape, barricades, or traffic horses to warn personnel from walking into and under this area when work is in progress and divert them from hazards, such as falling sparks and flash burns.  
- Compressed oxygen is not to be used under any circumstances for the purpose of ventilation, comfort, cooling, blowing dust from clothes, or for cleaning the work area.

Fire Suppression, Detection, Alarm, and Sprinklers  
- Fire extinguishers must be readily available and accessible. It cannot be the building fire extinguisher nearby, they must be additional.  
- Entire building smoke detection and alarms systems cannot be shut down. Instead, smoke detectors in the area of hot work may be covered for the duration of hot work to prevent false alarms.  
- Automatic sprinkler systems cannot be shut down to perform hot work. Instead, individual sprinkler heads in the area of hot work may be covered with a wet rag to prevent accidental activation.  
- Hot work permits must not be issued in areas affected by sprinkler system impairments. In the event of a sprinkler system impairment during work, the area supervisor or contractor must cease hot work operations until the impairment can be corrected.
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Fire Watch Requirements
A Fire Watch must be posted by a PAI or Contractor if the following conditions exist:
• Combustible materials cannot be removed from within a 35-foot radius of the hot work.
• Wall or floor openings within a 35-foot radius of hot work expose combustible materials in adjacent areas, including concealed spaces in walls or floors.
• Combustible materials are adjacent to the opposite side of partitions, walls, ceilings or roofs.

Hot Work Safety Training
Caltech employees involved in hot work are required to complete hot work training including Supervisors, Permit Authorizing Individuals, Hot Work Operators and Fire Watch personnel. The following courses must be completed:
• Hot Work Permit Training – Required upon initial assignment and refresher training required every 5 years (for staff who do routine hot work, because of personnel turnover, training will be accomplished annually).
• Fire Extinguisher Training – Required once a year. The hands-on classroom training must be completed for the initial class.

Departmental Training
Managers and Supervisors shall train Caltech employees on departmental Hot Work Permit procedures and specific safety procedures for the type of hot work equipment used. This training shall be completed upon initial assignment and cover the following subjects:
• Safety procedures specific to the equipment used
• Required personal protective equipment for job tasks
• Identification of Permit Authorizing Individuals and how they can be contacted
• Where to file copies of completed Hot Work Permits
• Locations of designated hot work rooms where a Hot Work Permit is not required

Section 2 - Caltech employee process for obtaining a Hot Work Permit

Caltech Department Managers and Supervisors oversee the Hot Work Permit program for hot work operations under their supervision. Managers and Supervisors are responsible for designating employees as Permit Authorizing Individuals (PAI), who will issue Hot Work Permits. Any employee who has successfully completed hot work safety training may be a PAI. Hot Work Operators are allowed to be PAI, but they are not allowed to issue their own Hot Work Permits.

Hot Work Operators who perform frequent or daily brazing and soldering operations, at multiple sites, will comply with the following process: A single, PAI signed, laminated hot work permit may be carried and used at multiple sites as long as it is posted at each site during hot work and all hot work rules are followed. The permit shall have an expiration date one year from the date of issue at which time it will be turned in and hot work training will be repeated.
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and a new permit issued. Copies of each issued permit will be kept in the individual employee’s personnel file or place designated by their supervisor.

Hot Work Permit process – Caltech Employee:

Prior to start of any hot work operation:

- A Hot Work Operator determines a need for hot work.
- The Hot Work Operator ensures the area around hot work activities is in compliance with the general guidelines, safety measures required by the Hot Work Permit, and the fire suppression system requirements listed above. (see Section 1)
- The Hot Work Operator contacts a Permit Authorizing Individual.
- The Permit Authorizing Individual inspects the hot work site and completes the Hot Work Permit Form.
- The Permit Authorizing Individual posts a Fire Watch if the situation requires one. (See Fire Watch Requirements above)
- Once all permit safety guidelines are satisfied, the Permit Authorizing Individual signs and posts the permit.

During and after hot work:

- Fire watch will be provided during and for 60 minutes after work, including any coffee or lunch breaks.
- Fire watch person is supplied with a suitable fire extinguisher and properly trained in use of fire extinguisher and activation of the nearest local fire alarm.
- The hot work area and all adjacent area (including floors above and below) must be monitored periodically for 4 hours after the work has been completed.
- If barricades are removed, mark hot materials to warn other workers, employees, and visitors of the potential burn hazard.
- Upon completion of the work, the PAI will conduct a final inspection of area.

Section 3 - Contractor process for obtaining a Hot Work Permit

Contractors and Vendors
All contractors must obtain a hot work permit from the Campus Inspector when required as defined above. Caltech’s Project Managers should notify the contractor during the Pre-Construction meeting of this requirement. Contractors should fill out the Hot Permit form, seek approval from the Campus Inspector and retain their copy of proof of compliance. (See attached)

Permits are valid as long the same person or crew is continuously working on the job, for a period not exceeding 48 hours.
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Hot Work Permit Process - Contractor

Prior to start of any hot work operation:

- Campus Inspector examines the work area for compliance with general guidelines, safety measures required by the Hot Work Permit, and the fire suppression system requirements listed above. (see Section 1) The work will be confined to the area or equipment specified on the permit.
- The Campus Inspector will review all appropriate emergency procedures with the person doing the hot work.
- The contractor will provide the Campus Inspector a copy of the company safety procedures.
- The Campus Inspector signs the permit. One copy is provided to the contractor (Part 2) for posting in the hot work area. Posting is required to be visible throughout the hot work operation. The original copy (Part 1) will be kept by the Campus Inspector until the job is complete.

During and after hot work:

- Fire watch will be provided during and for 60 minutes after work, including any breaks.
- Fire watch person is supplied with a suitable fire extinguisher and properly trained in use of fire extinguisher and activation of the nearest local fire alarm.
- The hot work area and all adjacent area (including floors above and below) must be monitored periodically for 4 hours after the work has been completed. Caltech requires contractor to notify Security after work hours (call 626-395-4701).
- If barricades are removed, mark hot materials to warn other workers, employees, and visitors of the potential burn hazard.
- Upon completion of the work, the Caltech Inspector will conduct a final inspection of area and sign off on Part 2 of permit if the area is fire-safe.

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<th>Campus Inspector</th>
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HOT WORK PERMIT

BEFORE INITIATING HOT WORK, CAN THIS JOB BE AVOIDED?
IS THERE A SAFER WAY?

This Hot Work Permit is required for any temporary operation involving open flames or producing heat and/or sparks. This includes, but is not limited to: Brazing, Cutting, Grinding, Soldering, Torch Applied Roofing and Welding.

INSTRUCTIONS

1. Fire Safety Supervisor:
   A. Verify precautions listed at right (or do not proceed with the work).
   B. Complete and retain Part 1.
   C. Issue Part 2 to person doing job.

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<thead>
<tr>
<th>PART 1 REQUIREDS AURS PRECAUTIONS CHECKLIST</th>
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<tr>
<td>□ Available sprinklers, hose streams and extinguishers are in service/operable.</td>
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<td>□ Hot Work equipment in good repair.</td>
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<tr>
<td>Requirements within 35 ft (11 m) of work</td>
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<td>□ Flammable liquids, dust, lint and oily deposits removed.</td>
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<tr>
<td>□ Explosive atmosphere in area eliminated.</td>
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<td>□ Floors swept clean.</td>
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<tr>
<td>□ Combustible floors wet down, covered with damp sand or fire-resistive sheets.</td>
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<tr>
<td>□ Remove other combustibles where possible. Otherwise protect with fire-resistive tarps or metal shields.</td>
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<tr>
<td>□ All wall and floor openings covered.</td>
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<tr>
<td>□ Fire-resistant tarps or metal suspended beneath work.</td>
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<tr>
<td>□ Protect or shut down ducts and conveyors that might carry sparks to distant combustibles.</td>
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WORK ON WALLS, CEILINGS OR ROOFS

- □ Construction is noncombustible and without combustible covering or insulation.
- □ Combustibles on other side of walls, ceilings or roofs are moved away.

WORK ON ENCLOSURE EQUIPMENT

- □ Enclosed equipment cleaned of all combustibles.
- □ Containers purged of flammable liquids/vapors.
- □ Pressurized vessels, piping and equipment removed from service, isolated and vented.

FIRE WATCH/HOT WORK AREA MONITORING

- □ Fire watch will be provided during and for 60 minutes after work, including any coffee or lunch breaks.
- □ Fire watch is supplied with suitable extinguishers, and where practical, a charged hose.
- □ Fire watch is trained in use of equipment & in sounding alarm.
- □ Fire watch may be required in adjoining areas, above & below.
- □ Monitor Hot Work area for 4 hours after job is completed.

Other Precautions Taken:

- ..........................................................