Stanford | Environmental Health & Safety

Hot work permits

Hot work operations are the ones which require use of an open flame, or which produces heat or sparks sufficient to ignite nearby flammable or combustible materials.

Few examples of hot work operations include but are not limited to flame/torch-based soldering, glass blowing, welding, grinding, cutting, brazing, thermal spraying,thermite welding, induction welding, thawing pipes, or any other activity that uses an open flame source or generates temperatures sufficient to ignite nearby materials. If your research work meets this definition of hot work, then your lab will need a hot work permit.

There are two types of hot work permit issued by the Stanford University Fire Marshal Office (SUFMO):

A **Fixed Hot Work Permit** - a permanent permit issued for a fixed area. The permit is tailored to the specific activities, environment, and personnel using the equipment needing the permit and posted at the approved fixed hot work area. Each year during SUFMO's fire inspection the inspector reviews and renews this hot work permit.

A **Temporary Hot Work Permit** is issued for one-time use and is only for a certain period of time and will be posted at the approved hot work area. This is generally provided for hot work performed outside of designated/fixed hot work areas.

It must be noted that the following items in research settings are generally considered exempt from the hot work permit requirements:

1. Use of electric soldering irons for electronics and small electrical work.
2. Use of heat guns for drying, shrinking, or curing.
3. Use of Bunsen burners, in research laboratories when attended on lab benches and fume hoods. (Does not apply to standalone alcohol lamps, camp stoves etc.) . Reference can be made to open flame safety practices document
4. Heat treatment or annealing ovens designed and built by manufacturers with a Nationally Recognized Testing Laboratory (NRTL) certification (e.g., Underwriters Lab (UL))
5. Laser cutting with appropriate posted signage and all other laser use approved by SU Laser Safety Officer (LSO).

Control measures

The following control measures should be implemented prior to conducting hot work, to ensure safety of the researchers:

Engineering controls

- At minimum have one certified portable fire extinguisher (at minimum 2-A:20-B:C rating) readily accessible within 30 feet of the location where hot work is performed. (*Note: SUFMO will provide any required extinguisher either by calling 650-725-2129 to request a temporary use extinguisher: a form will be filled out upon pickup at 480 Oak Rd, for permanent use by the lab, this can be purchased using a PTA and by completing the online form at: goto.stanford.edu/fire-requests)*

- The working surface for the use of the soldering and brazing activities should be of a non combustible material (e.g., laboratory bench top, Duraboard, tile, etc).
- Have a mechanical ventilation system to control smoke and fumes.
- Hot work equipment should be in operational condition and good repair.
- Hot permit areas should have floors made-up of non-combustible surfaces.
- Do not shut off the automatic sprinkler protection system while performing hot work.

Administrative controls

- Hot work shall not be performed on equipment, containers, compressed gas cylinders containing any flammable solids, liquids, or gases unless they are thoroughly cleaned, inerted, or purged.
- Remove any combustible or flammable materials (e.g., papers, notebooks and chemicals) from the surrounding of the designated hot work area.
- Keep floors clean in the hot work permit area.
- Establish a fire watch when conducting any hot work activity and continue to fire watch for at least 30 minutes after completion of hot work. If the hot work area has no fire hazard or combustible or flammable exposures then there is no requirement for a fire watch personnel.
- When performing hot work tie off long hair, loose clothing or dangling jewelries.
- Complete hot work and fire extinguisher training prior to doing hot work.
- At minimum wear appropriate PPE such as ANSI Z87.1 approved safety glasses with side shield, flame resistant gloves, fire resistant outerwear (e.g.,leather apron), close toed shoes etc.
- If flame/torch based soldering or brazing is done ensure to wear safety glasses with filter lenses with a shade number for protection from radiant energy.
- As PPE requirements may differ depending on the type of hot work performed,contact EH&S at 650-723-0448 for an assessment .

Restricted hot work areas

Hot work shall not be performed in the following areas unless approved by SUFMO:

1. Areas where the sprinkler system is impaired.
2. An entire building's fire detection system is shut down.
3. Areas with readily ignitable materials, (e.g., storage of large quantities of bulk sulfur, baled paper, cotton, lint, dust, oil deposits, or loose combustible materials such as rubber, wood shavings) .
4. Areas where there exists the potential of an explosive atmosphere, such as locations where flammable gases, liquids, vapors or dusts are present.
5. Combustible or flammable materials are within 35 feet and cannot be moved or protected.
6. Any other location specified by SUFMO.

Reach out to your EHS Research Safety Specialist, who will connect you to the Stanford University Fire Marshal's Office (SUFMO) for assessment and issuance of a hot work permit issued as per the provisions of Cal/OSHA and Chapter 35 of California Fire Code.

References

Hot work program. California State University, Northridge. (2023, April 26). https://www.csun.edu/ehs/hot-work-program

Hot work. Harvard University EH&S. (n.d.). https://www.ehs.harvard.edu/programs/hot-work

Hot work - University of Washington. (n.d.). https://ehs.washington.edu/fire-life/hot-work

UC Berkeley Welding & Hot work program. University of California, Berkeley. (n.d.). https://ehs.berkeley.edu/workplace-safety/welding-and-hot-work-program

HOT WORK PERMIT

STOP!
Avoid hot work when possible! Consider using an alternative cold work method.

This Hot Work Permit is required for any temporary operation involving open flames or producing heat and/or sparks conducted outside a Hot Work Designated Area. This includes, but is not limited to brazing, cutting, grinding, soldering, torch-applied roofing and welding.

Instructions for Permit Authorizer

1. Specify the precautions to take.
2. Fill out and keep **Part 1** during the hot work process.
3. Issue **Part 2** to the person doing the job.
4. Keep **Part 2** on file for future reference, including signed confirmation that the post-work fire watch and monitoring have been completed.
5. Sign off the final check on **Part 2**.

HOT WORK BY
- ☐ Employee
- ☐ Contractor _____

DATE	JOB NUMBER

LOCATION OF WORK (BUILDING/FLOOR/OBJECT)

WORK TO BE PERFORMED

NAME OF PERSON PERFORMING HOT WORK

NAME OF PERSON PERFORMING FIRE WATCH

I verify the above location has been examined, the Required Precautions have been taken, and permission is authorized for this work.

PERMIT AUTHORIZER (PRINT AND SIGN)

THIS PERMIT EXPIRES ON (LIMIT AUTHORIZATION TO ONE SHIFT):

DATE: _____ TIME: _____ ☐ AM ☐ PM

Note: Emergency notification on back of form.

Additional FM Global Resources:
Property Loss Prevention Data Sheet 10-3, *Hot Work Management*
Hot Work Permit form (F2630) via fmglobalcatalog.com
Online training at training.fmglobal.com
FM Approved equipment via fmapprovals.com

Part 1

Required Precautions

Y	NA	
☐	☐	The fire pump is in operation and switched to automatic.
☐	☐	Control valves to water supply for sprinkler system are open.
☐		Extinguishers are in service/operable.
☐		Hot work equipment is in good working condition.

Requirements within 35 ft. (10 m) of hot work

☐	☐	Shield combustible construction using listed (e.g., FM Approved) welding pads, blankets and curtains.
☐	☐	Remove or shield nonremovable combustibles using listed (e.g., FM Approved) welding pads, blankets and curtains.
☐	☐	Isolate potential sources of flammable gas, ignitable liquid or combustible dust/lint (e.g., shut down equipment).
☐	☐	Remove ignitable liquid, combustible dust/lint and combustible residues.
☐	☐	Shut down ventilation and conveying systems.
☐	☐	Remove combustibles and consider a second fire watch on opposite side of floor, wall, ceiling or roof when openings exist or thermally conductive materials pass through.
☐	☐	Is work on a combustible building assembly (e.g., torch-applied roofing)? If yes, provide **ADDITIONAL REQUIRED PRECAUTIONS** below.

Hot work on/in closed equipment, ductwork or piping

☐	☐	Isolate equipment from service.
☐	☐	Remove ignitable liquid and purge flammable gas/vapor.
☐	☐	Prior to work, and/or during work, monitor for flammable gas/vapor. LEL reading(s): _____
☐	☐	Remove combustible dust/lint or other combustible materials.
☐	☐	Is work on/in equipment with nonremovable combustible linings or parts? If yes, provide **ADDITIONAL REQUIRED PRECAUTIONS** below.

Fire watch/fire monitoring the hot work area

Times listed are sufficient for majority. Use Table at back of permit for guidance for combustible concealed cavities, roof work or favorable factors.

☐		Perform a continuous fire watch during hot work.
☐		Perform a continuous fire watch post-work for ☐ 1 hour or Other _____ hours.
☐	☐	Perform fire monitoring for ☐ 3 hours or Other _____ hours.

ADDITIONAL REQUIRED PRECAUTIONS:

WARNING

HOT WORK IN PROGRESS! Watch for fire!

Instructions

Person performing hot work: Record time started and display permit at hot work area. After hot work is completed, record time and leave permit displayed for fire watch.

Fire watch: Watch area during hot work and after work completion. Prior to leaving area, perform final inspection, sign, leave permit displayed and notify Fire Monitor or Permit Authorizer.

Fire monitor: Monitor area after post-work fire watch completion. Perform final inspection, sign and return to Permit Authorizer.

HOT WORK BY
☐ Employee
☐ Contractor _____

DATE | JOB NUMBER

LOCATION OF WORK (BUILDING/FLOOR/OBJECT)

WORK TO BE PERFORMED

NAME OF PERSON PERFORMING HOT WORK

NAME OF PERSON PERFORMING FIRE WATCH

I verify the above location has been examined, the Required Precautions have been taken, and permission is authorized for this work.

PERMIT AUTHORIZER (PRINT AND SIGN)

THIS PERMIT EXPIRES ON (LIMIT AUTHORIZATION TO ONE SHIFT):

DATE: TIME: ☐ AM ☐ PM

Hot Work Date: Start Time: ☐ AM ☐ PM
Finish Time: ☐ AM ☐ PM

Post-Work Fire Watch Finish Time: ☐ AM ☐ PM
Name

Fire Monitor ☐ Person ☐ Other Finish Time: ☐ AM ☐ PM
Name/Other

Final Check Time: ☐ AM ☐ PM
Name

Part 2

Required Precautions

Y	NA	
☐	☐	The fire pump is in operation and switched to automatic.
☐	☐	Control valves to water supply for sprinkler system are open.
☐		Extinguishers are in service/operable.
☐		Hot work equipment is in good working condition.

Requirements within 35 ft. (10 m) of hot work

☐	☐	Shield combustible construction using listed (e.g., FM Approved) welding pads, blankets and curtains.
☐	☐	Remove or shield nonremovable combustibles using listed (e.g., FM Approved) welding pads, blankets and curtains.
☐	☐	Isolate potential sources of flammable gas, ignitable liquid or combustible dust/lint (e.g., shut down equipment).
☐	☐	Remove ignitable liquid, combustible dust/lint and combustible residues.
☐	☐	Shut down ventilation and conveying systems.
☐	☐	Remove combustibles and consider a second fire watch on opposite side of floor, wall, ceiling or roof when openings exist or thermally conductive materials pass through.
☐	☐	Is work on a combustible building assembly (e.g., torch-applied roofing)? If yes, provide **ADDITIONAL REQUIRED PRECAUTIONS** below.

Hot work on/in closed equipment, ductwork or piping

☐	☐	Isolate equipment from service.
☐	☐	Remove ignitable liquid and purge flammable gas/vapor.
☐	☐	Prior to work, and/or during work, monitor for flammable gas/vapor. LEL reading(s):
☐	☐	Remove combustible dust/lint or other combustible materials.
☐	☐	Is work on/in equipment with nonremovable combustible linings or parts? If yes, provide **ADDITIONAL REQUIRED PRECAUTIONS** below.

Fire watch/fire monitoring the hot work area

Times listed are sufficient for majority. Use Table at back of permit for guidance for combustible concealed cavities, roof work or favorable factors.

☐ Perform a continuous fire watch during hot work.
☐ Perform a continuous fire watch post-work for
☐ 1 hour or Other ____ hours.
☐ ☐ Perform fire monitoring for
☐ 3 hours or Other ____ hours.

ADDITIONAL REQUIRED PRECAUTIONS:

WARNING

HOT WORK IN PROGRESS!
Watch for fire!

In case of emergency, call the contacts listed below before attempting to extinguish the fire.

Contact	Number

Construction and Occupancy Factors for Post-Work Fire Watch and Monitoring Periods

		Construction Factors					
		Noncombustible construction, or FM Approved Class 1 or Class A building materials		Combustible construction without concealed cavities		Combustible construction with unprotected concealed cavities	
		Watch	**Monitor**	**Watch**	**Monitor**	**Watch**	**Monitor**
Occupancy Factors	Noncombustible with any combustibles contained within closed equipment (e.g., ignitable liquid within piping)	30 minutes	0 hours	1 hour	3 hours	1 hour	5 hours
	Office, retail or manufacturing with limited combustible loading	1 hour	1 hour	1 hour	3 hours	1 hour	5 hours
	Manufacturing with moderate to significant combustible loading except as noted below	1 hour	2 hours	1 hour	3 hours	1 hour	5 hours
	Warehousing	1 hour	2 hours	1 hour	3 hours	1 hour	5 hours
	Exceptions: Occupancies with processing or having bulk storage of combustible materials capable of supporting slow-growing fires (e.g., paper, pulp, textile fibers, wood, bark, grain, coal or charcoal)	1 hour	3 hours	1 hour	3 hours	1 hour	5 hours

When performing torch-applied roofing, apply additional precautions and conduct a minimum 2-hour fire watch and 2 hours fire monitoring. If an infrared camera is utilized, reduce to a 1-hour fire watch and 1 hour fire monitoring.

When performing hot work on/in equipment containing nonremovable combustible linings or parts, apply additional precautions and conduct a minimum 1-hour fire watch and 3 hours fire monitoring within the equipment, and in the surrounding areas per Table above.

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