LAFAYETTE COLLEGE

Hot Work Permit Program

Department of Public Safety - Environmental, Health and Safety
Standard Operating Procedure (SOP) #25

Purpose

To protect Lafayette College employees, contractors, and the campus community against fire from welding and other hot work in hazardous areas.

Scope

A Hot Work Permit shall be used whenever work involves an actual or possible source of ignition; or may cause the activation of a fire alarm system; or may cause occupants of a building or area to contact emergency personnel to report the smell of smoke, heat, etc.

Responsibilities

Department Heads

- Ensure that appropriate supervisors and employees (new hires and transfers) are trained and knowledgeable in this standard operating procedure (SOP).
- Be familiar with and follow the requirements of this program.
- Hold the appropriate supervisors accountable for following these procedures.
- Select contractors to perform cutting or welding who have suitably trained personnel and who have an awareness of the magnitude of the risks involved.
- Advise all contractors about flammable materials or hazardous conditions of which they may not be aware.
- Ensure that only approved equipment, such as torches, manifolds, regulators or pressure reducing valves, and acetylene generators, be used.
- Establish approved areas for cutting and welding or establish procedures for approving cutting and welding.

Public Safety EHS

- Review and update the College's Hot Work Permit Program annually.
- Assist in training employees to ensure that the purpose and function of the Hot Work Program are understood and utilized.

Supervisors

- Ensure that employees (new hires and transfers) are trained and knowledgeable in the safe application of this SOP.
- Document the training, retain a copy for your records, and forward the original to EHS.
- Maintain and calibrate atmospheric testing equipment.
- Test and approve the atmosphere prior to any hot work.
- Ensure that fire protection and extinguishing equipment are properly located at the site.
- Follow the requirements of this SOP when issuing Hot Work Permits.
- Determine the combustible materials and hazardous areas present or likely to be present in the work location.
- Protect combustibles from ignition by the following:

  - Have the work moved to a location free from dangerous combustibles.
  - If the work cannot be moved, have the combustibles moved to a safe distance from the work or have the combustibles properly shielded against ignition.
  - See that cutting and welding are scheduled so that operations that might expose combustibles to ignition are not started during cutting or welding.
  - Provide employees with proper personal protective equipment. See Appendix C for more details.

- Assign a firewatcher where other than a minor fire might develop, or any of the following conditions exist:

  - Appreciable combustible material in building construction or contents is closer than 35 feet to the point of operation.
  - Appreciable combustibles are more than 35 feet away but are easily ignited by sparks.
  - Wall or floor openings within a 35-foot radius expose combustible material in adjacent areas including concealed spaces in walls or floors.
  - Combustible materials are adjacent to the opposite side of metal partitions, walls, ceilings or roofs and are likely to be ignited by conduction or radiation.

- Authorize hot work through the use of a Hot Work Permit.

<u>Cutter or Welder</u>

- Attend training as required.
- Handle equipment safely and use it so as not to endanger lives and property.
- Obtain approval from supervisor before starting to cut or weld.
- Cut or weld only where conditions are safe.
- Continue to cut or weld only so long as conditions are unchanged from those under which approval was granted.
- Wear and maintain appropriate personal protective equipment (PPE). See Appendix C.
- Permanent or portable curtains and screens must be used if persons are or could be exposed to the direct or reflected radiation.

<u>Fire Watcher</u>

- Obtain the proper type of extinguisher and maintain it at the worksite. Never use a mounted extinguisher as your primary means of protection - they are for emergency back up only.
  - Consideration must be given to the capacity, extinguishing agent and its effect on Class A, B, C, or D fires. Make sure it is charged and ready for use.
- Be knowledgeable in the proper uses of the extinguisher.
- Utilize fire blankets or similar means of protection to contain hot slag or sparks, or relocate combustible material if possible.
- Remain on duty for at least 30 minutes after the hot work cease if the work involves welding or cutting over steel floors or deck plates inside of a building. This is to prevent undetected sparks from smoldering and then later catching fire.

General Requirements

Hot work permits shall be issued by a supervisor for:

- Torch cutting, gas welding, arc welding, open flame soldering, grinding, or use of fired heaters in all building areas (or areas outside buildings) where ignition or alarm may occur.
- Spark or ignition producing work in all hazardous areas of building and/or areas of storage or use of flammable, explosives, hazardous materials, etc., and in confined spaces.

Note: Hot Work Permits shall not be issued for more than five consecutive working days.

Permissible Areas

Areas that are or have been designated as fire safe (i.e. the mechanical trades shop). Questions regarding specific criteria for the issuance of a Hot Work Permit within a specific area shall be referred to the Executive Director of Facilities Operations or Associate Director of Facilities Operations.

Prohibited Areas

Cutting and welding shall not be permitted in the following situations:

- In areas not designated as fire safe.
- In buildings with sprinklers while such protection is impaired.
- In the presence of explosive atmospheres (mixtures of flammable gases, vapors, liquids, or dusts with air) or explosive atmospheres that may develop inside un-cleaned or improperly prepared drums, tanks or other containers and equipment which have previously contained such materials or that may develop in areas with an accumulation of combustible dusts.

Permit Cancellation

Any individual may stop the work covered by this permit at any time if they consider the prevailing conditions or work methods to be unsafe. Anyone stopping work in this manner will inform persons doing the work, remove the site copy of the permit and return it to Environmental, Health and Safety, giving the reasons for this action.

Environmental, Health and Safety and the supervisor will visit the work site and decide whether or not the permit should be revalidated.

Note: This permit is automatically canceled in the event of a spill of combustible/flammable or hazardous materials in the vicinity or the sounding of the fire or gas alarm.

Issuing a Hot Work Permit

Contact your supervisor if you will be cutting or welding outside of a fire safe area. The supervisor will complete the Pre-Hot Work Permit Checklist (Appendix A).

If all questions on the Pre-Hot Work Permit Checklist were answered "yes" a Hot Work Permit will be completed (Appendix B). The tag or permit will be maintained at the worksite until the job is complete. When complete, the employee will then check the area for fire. The supervisor will subsequently check the area 30 minutes after the job is complete. File the permits for 30 days.

Fire detection and suppression equipment must remain operational at all times, unless otherwise protected or approved by Lafayette College Facilities Operations and Public Safety.

APPENDIX A

Pre-Hot Work Permit Checklist		
Task	**Yes**	**No**
Has the Department Head for the area been notified that welding or cutting is about to begin in the area?		
Has worksite been inspected to see how close combustible materials are to the work area?		
Has the need for a "fire watcher" been determined?		
Is the release of flammable vapors inside the building or upwind of the worksite unlikely?		
Has the equipment on which Hot Work is to be performed been opened, blinded, vented, washed or otherwise cleaned and ventilated?		
If applicable, have you followed the requirements for Hot Work within a Permit-Required Confined Space (refer to Confined Space SOP #19)?		
NOTE: If you answer "no" to any of the above questions, contact EHS at extension 5330. If all answers are "yes" complete a Hot Work Permit for the job site.		
Supervisor Signature:	**Date:**	

APPENDIX B

Hot Work Permit		
Date:	**Location:**	
Description of work:		
Checklist		
Standard Precautions		
	Sprinklers are in-service	
	Cutting and welding equipment is in good repair	
Precautions Within 35 Feet of Work Area		
	Floors are swept clean of combustibles	
	Combustible floors are wet down, covered with damp sand, metal, or other shields	
	No combustible material or flammable liquids	
	Combustibles and flammable liquids protected with covers, guards or metal shields	
	All wall and floor openings covered	
	Covers suspended beneath work to collect sparks	
Work on Walls or Ceilings		
	Construction noncombustible and without combustible covering	
	Combustibles moved away from opposite side of wall	
Work on Enclosed Equipment (tanks, containers, ducts, dust collectors, etc.)		
	Equipment cleaned of all combustibles	
	Containers purged of flammable vapors	
	Permit-required confined space entry procedure has been followed (SOP #19)	
Fire Watch		
	To be provided during and 30 minutes after operation	
	Supplied with extinguisher and small hose	
	Trained in use of equipment and in sounding fire alarm	
The location where this work is to be done has been examined, necessary precautions taken, and permission is granted for this work. **Supervisor Signature:**		
Start Time:	End Time:	Expires:
Final Checkup		
Work area and all adjacent areas to which sparks and heat might have spread (including floors above and below and on opposite sides of walls) were inspected 30 minutes after the work was completed and were found fire safe. **Supervisor or Fire Watch Signature:**		

APPENDIX C

Goggles or other suitable eye protection shall be used during all gas welding or oxygen cutting operations. Spectacles without side shields, with suitable filter lenses are permitted for use during gas welding operations on light work, for torch brazing or for inspection.

All operators and attendants of resistance welding or resistance brazing equipment shall use transparent face shields or goggles, depending on the particular job, to protect their faces or eyes, as required.

Permanent or portable curtains and screens must be used if persons are or could be exposed to the direct or reflected radiation

The following table describes general hot work tasks, their potential hazards, and recommended PPE.

Activity	Potential Hazard(s)	Recommended PPE
Torch Cutting and Brazing	Burns, flying particles, falling objects, cuts	Eye protection in the form of suitable goggles shall be provided where needed for brazing operations Welding clothing (FR), where needed Thermal/work gloves Safety shoes
Welding	Burns, eye damage, electrical shock, cuts, and falling objects, respiratory	Welding hood with proper shading Welding clothing (FR) Thermal/work gloves Safety shoes
Soldering, Filing, Grinding, Sanding	Flying particles, cuts	Safety glasses or goggles Work gloves Work shoes

The following is a guide for the selection of the proper shade numbers. These recommendations may be varied to suit the individual's needs.

Welding Operation	Shade Number
Shielded metal-arc welding – (1/16, 3/32, 1/8, 5/32-inch electrodes)	10
Gas-Shielded arc welding (nonferrous) – (1/16, 3/32, 1/8, 5/32 – inch electrodes)	11
Gas-shielded arc welding (ferrous) – (1/16-, 3/32-, 1/8-, 5/32-inch electrodes)	12
Shielded metal-arc welding: 3/16, 7/32, ¼ inch electrodes	12
Shielded metal-arc welding: 5/16, 3/8 inch electrodes	14
Atomic Hydrogen Welding	10-14
Carbon Arc Welding	14
Soldering	2
Torch brazing	3 or 4
Light cutting, up to 1 inch	3 or 4
Medium cutting, 1 inch to 6 inches	4 or 5
Heavy cutting, 6 inches and over	5 or 6
Gas welding (light) up to 1/8 inch	4 or 5
Gas welding (medium) 1/8 inch to ½ inch	5 or 6
Gas welding (heavy) ½ inch and over	6 or 8

* As a rule of thumb, start with a shade that is too dark to see the weld zone. Then go to a lighter shade which gives sufficient view of the weld zone without going below the minimum. In oxy-fuel gas welding or cutting where the torch produces a high yellow light, it is desirable to use a filter lens that absorbs the yellow or sodium line in the visible light of the (spectrum) operation.