

## **Occupational Health and Safety Programs**



### **HOT WORK OPERATIONS**

**Table of Contents**

1.0	PURPOSE .....	3
2.0	SCOPE .....	3
3.0	RESPONSIBILITY .....	3
3.1	Managers .....	3
3.2	Supervisors of Hot Work Operations .....	3
3.3	OHS Office .....	4
3.4	Workers .....	4
4.0	REFERENCES .....	4
5.0	DEFINITIONS .....	4
6.0	PROCEDURE .....	7
7.0	ATTACHMENTS .....	11

### 1.0 PURPOSE

The purpose of this program is to specify requirements for safe hot work operations involving welding, cutting, soldering, roof work and grinding as well as other tasks that could generate sparks or slag. In addition, any work that generates enough dust to harm or negatively impact the fire protection system may also be subject to Hot Work protocols.

### 2.0 SCOPE

This program applies to all St. Francis Xavier University (StFX) work sites, including contractor operations. All legislative jurisdictional, StFX and contractor requirements will be reviewed, and the more stringent requirements will be applied.

### 3.0 RESPONSIBILITY

#### 3.1 Managers

- a) Verify implementation and enforcement of this program;
- b) Verify that equipment specified in this program is available and utilized.

#### 3.2 Supervisors of Hot Work Operations

- a) Supervisors of Hot Work Operations include FM Supervisors and Project Managers. See Section 5.14 - Definitions.
- b) For larger or long-term projects, the FM Supervisor or Project Manager may designate a Contractor Supervisor to act as Supervisor of Hot Work Operations, who will be assigned these responsibilities for the project. The Contractor Supervisor will then be responsible for contractor and sub-contractors' hot work operations and adherence to this program for work on their jobsites. The FM Supervisor or Project Manager shall ensure that the Contractor Supervisor is trained in this program, understands the fire safety systems in place, and how the work may affect other persons in the vicinity of the work.
- c) Ensure the requirements in this Program regarding cutting and welding to include hot work permitting are met;
- d) If hot work is to be done, designate a competent Permit Owner;
- e) If appropriate, identify a Designated Hot Work Area where hot work can consistently be conducted without permitting or a fire watch;
- f) Determine which fire/life safety systems require disabling, contact the appropriate parties and ensure follow-up when hot work is complete;
- g) Advise all Permit Owners who may be performing hot work about flammable materials, hazardous processes or conditions and the potential for fire hazards;
- h) Before signing Hot Work Permit, verify that contractors have been trained in and comply with the hot work permitting requirements in this Program;
- i) Ensure workers under their supervision are competent to participate in Hot Work Operations by confirming they have the required training and are following:

- i. This program; and
  - ii. StFX and project specific requirements.
- j) Verify that hot work Fire Watchers are properly trained in their duties and assigned as needed;
- k) Ensure only competent workers are assigned duties that require little or no supervision;
- l) Advise affected persons about hot work (and possible interferences); and
- m) Ensure permit is posted in a prominent location.

### **3.3 OHS Office**

- a) Monitor worker activities and conduct periodic reviews to verify ongoing compliance with:
  - i. This program;
  - ii. StFX and project specific requirements; and
  - iii. Applicable legislation and regulatory requirements.

### **3.4 Workers**

- a) Workers, including Permit Owners and Fire Watchers must be trained and understand and follow:
  - i. The requirements in this program;
  - ii. StFX and project specific requirements; and
  - iii. Applicable legislation and regulatory requirements.

## **4.0 REFERENCES**

- Legislative Jurisdictional Requirements
- NFPA 51B, Standard for Fire Prevention during Welding, Cutting, and other Hot Work.
- Nova Scotia OSGRs Part 10, Welding, Cutting, Burning and Soldering
- CSA Standard CSA W117.2, "Safety in Welding, Cutting, and Allied Processes"

## **5.0 DEFINITIONS**

### **5.1 Approved**

Acceptable to the authority having jurisdiction.

### **5.2 Combustion**

Any chemical process that involves oxidation sufficient to produce light or heat.

### **5.3 Designated Hot Work Area**

A safe location identified for the conduct of hot work that is free from risk of fire or explosion and may be permanent as designated by the Supervisor of Hot Work. A hot work permit and fire watch are not required. Designated Hot Work Areas shall:

- a) Be approved jointly by Supervisor of Hot Work and Manager, OHS annually;
- b) Include signage to indicate "Designated Hot Work Area" and map including boundary limits;

- c) Have no combustibles within 35 feet or an enclosed room constructed of non-combustible material and adequate ventilation; and
- d) Have a fire extinguisher dedicated for the area.

#### **5.4 Fire Resistance**

So resistant to fire that, for specified time and under conditions of a standard heat intensity, it will not fail structurally and will not permit the side away from the fire to become hotter than a specified temperature. For purposes of this part, fire resistance shall be determined by the Standard Methods of Fire Tests of Building Construction and Materials, NFPA 251-1969.

#### **5.5 Fire Monitor**

A service that can be arranged by the Supervisor of Hot Work with StFX Safety & Security to monitor a work area following the Fire Watch within specified intervals, as noted in Section 21 of the Hot Work Permit

#### **5.6 Fire Patrol**

A service that can be arranged with StFX Safety & Security to patrol an area, as required, when fire safety systems are disabled. This service is not part of the Hot Work Permit.

#### **5.7 Fire Watch**

A Fire Watch makes sure that the work area and surroundings are monitored by a Fire Watcher to ensure that sparks, slag or any other ignition sources during hot work are controlled and kept in check from becoming a fire.

#### **5.8 Fire Watcher**

A worker trained to perform the Fire Watch function to observe hot work operations and react properly to aid in extinguishing a fire and communicating the emergency to affect an evacuation and fire department response if necessary.

#### **5.9 Flammable**

Capable of being easily ignited, burning intensely, or having a rapid rate of flame spread.

#### **5.10 Flash Point**

The temperature at which a liquid gives off vapor sufficient to form an ignitable mixture with the air near the surface of the liquid or within the vessel used as determined by appropriate test procedure and apparatus as specified below.

- a) The flash point of liquids having a viscosity less than 45 Saybolt Universal Second(s) at 100° F (37.8° C) shall be determined in accordance with the Standard Method of Test for Flash Point by the Tag Closed Tester, ASTM D-56-69.
- b) The flash point of liquids having a viscosity of 45 Saybolt Universal Second(s) or more at 175° F (79.4° C) or higher shall be determined in accordance with the Standard Method of Test for Flash Point by the Pensky Martens Closed Tester, ASTM D-93-69.

### **5.11 Hot Work**

Work involving burning, welding, or a similar operation that is capable of initiating fires or explosions. Operations that could generate sparks, slag or heat sufficient to ignite combustible materials include, but are not limited to:

- a) Welding;
- b) Brazing;
- c) Soldering
- d) Torch-applied roofing;
- e) Cutting metal;
- f) Drilling on metal or concrete;
- g) Grinding on metal or concrete;
- h) Sawing on metal or concrete;
- i) Use of a torch to heat pipes;
- j) Heat treating;
- k) Chemical welding; and
- l) Powder driven fasteners.

In addition, any work that generates enough dust to harm or negatively impact the fire protection system may also be subject to Hot Work protocols.

### **5.12 Lower Explosive Limit**

Lowest concentration (percentage) of a gas or vapor in air capable of producing a flash of fire in presence of an ignition source (arc, flame, heat). Concentrations lower than LEL are 'too lean' to burn. Also called lower flammable limit (LFL).

### **5.13 Permit Owner**

The individual authorized by the Supervisor of Hot Work Operations to perform hot work. This person may be a StFX or a contractor employee.

### **5.14 Supervisor of Hot Work Operations**

For the purposes of this program, Supervisor of Hot Work include FM Supervisors and Project Managers. For larger or long-term projects, the FM Supervisor or Project Manager may designate a Contractor Supervisor to act as Supervisor of Hot Work operations. See Section 3.2 - Responsibilities.

### **5.15 Welding and Allied Processes**

Processes such as arc welding, oxy-fuel gas welding, open-flame soldering, brazing, thermal spraying, oxygen cutting and arc cutting.

### **5.16 Welding Blanket**

A heat-resistant fabric designed to be placed in the vicinity of a hot work operation. Intended for use in horizontal applications with light to moderate exposures that can result from chipping, grinding, heat treating, sand blasting and light horizontal welding. Designed to protect machinery and prevent ignition of combustibles such as wood that are located adjacent to the underside of the blanket.

### **5.17 Welding Curtain**

A heat-resistant fabric designed to be placed in the vicinity of a hot work operation. Intended for use in vertical applications with light to moderate exposures that result from chipping, grinding, heat treating, sand blasting and light horizontal welding. Designed to prevent sparks from escaping a confined area.

### **5.18 Welding Pads**

A heat-resistant fabric designed to be placed directly under a hot work operation such as welding or cutting. Intended for use in horizontal applications with severe exposures that result from molten substances or heavy horizontal welding. Designed to prevent the ignition of combustibles that are located adjacent to the underside of the pad.

## **6.0 PROCEDURE**

### **6.1 Hazards**

- a) Fire or explosion that could result in injury and/or property damage;
- b) Burns from welding arc, sparks and slag;
- c) Electric shock;
- d) Toxic fumes and gases;
- e) Noise;
- f) Ultraviolet radiation excessive bright light (welding arc flash); and
- g) Risk of strains and sprains from lifting and carrying welding cables and moving compressed gas bottles and maintaining unusual postures while welding and cutting.

### **6.2 Hazard Controls**

#### **6.2.1 General Requirements**

- a) Hot work permits are not required in designated areas nor in locations where there is no risk of igniting combustible materials.
- b) Workers involved in hot work operations will have an awareness of the risks involved and understand the emergency procedures in event of a fire.
- c) Oil and grease must be kept away from oxygen systems. Gauge connections, valves, etc., must not be lubricated nor allowed to be in contact with oil or grease.
- d) Prior to performing hot work, all equipment items will be inspected to verify that they are in safe operating condition

- e) Tag out and report to supervision all equipment deficiencies and leaks.
- f) For any hot work involving Confined Space Entry, refer to Program OHS-01.

### **6.2.2 Compressed Gas Cylinders, Bottles/Tanks**

- a) All compressed gas storage and handling operations will be in accordance with current jurisdictional legislation unless the guidance in this program is determined to be more stringent.
- b) During use, keep compressed gas cylinders, tanks or bottles sufficiently away from the operation to avoid sparks, hot slag and flame from contacting the surface of the container.
- c) For all other requirements, refer to SOP for Compressed Gases.

### **6.2.3 Hot Work Permits**

- a) A Hot Work Permit will be completed, and the requirements of the permit followed. Blank permits can be obtained from Facilities Management Stores.
- b) The Supervisor of Hot Work Operations and the Permit Owner will determine if a hot work permit and fire watch are necessary.
- c) The permit will be signed by the following individuals in the following order, once each person checks the permit, inspects the area and equipment and determines the work can be done safely.
  - 1. The Permit Owner
  - 2. The Fire Watcher
  - 3. The Supervisor of Hot Work Operations
- d) The Supervisor of Hot Work Operations shall advise affected persons about hot work (and possible interferences), and ensure permit is posted in a prominent location.
- e) The Permit Owner or Supervisor of Hot Work will contact Safety and Security at 902 867 4444 or email [security@stfx.ca](mailto:security@stfx.ca) to let them know about the hot work.
- f) A copy of the permit will be retained at the site of the hot work for the duration of the hot work. A copy of the hot permit will be retained by the Supervisor of Hot Work for 90 days.
- g) Permit Owner to contact Safety and Security 902 867 4444 once work is complete and fire watch is starting.



**6.2.4 Preparation for Welding, Cutting or Other Spark or Slag Producing Tasks**

- a) Based on the risk of fire and explosion, a hot work permit will be prepared.
- b) When practical, items to be worked on will be moved to a designated safe location where there are no fire hazards or opportunity for the exposure of other workers.
- c) If inside a building or whenever there is risk of a potential flammable atmosphere, sampling for LEL is required. If the LEL is greater than 10%, hot work will not be initiated.
- d) Areas where cutting, welding or grinding will be performed will be clean and all accumulations of trash, paper, wood shavings, plastic materials, and rags, or other combustible materials will be removed from the area where sparks or slag could travel or 35 feet (11 meters) whichever is greater, before hot work is initiated.
- e) Conveyors that could carry sparks and slag from the operating area will be shut down and locked out.
- f) Combustible floors shall be kept wet or protected by a listed or approved welding blanket, welding pad or equivalent.
- g) Where floors have been wet down, workers operating arc welding equipment shall be protected from shock.
- h) If relocation of combustible materials is not feasible, they will be covered and protected by a listed or approved welding curtain, welding blanket, welding pad or equivalent. Covers shall overlap and be tight against the floor to prevent entry of sparks and slag.
- i) Openings or cracks in walls, floors and ducts within 35 feet (11 meters) of the site shall be covered or sealed with listed or approved fire-rated or noncombustible material to prevent the passage of sparks or slag to adjacent areas.
- j) If hot work is to be done near walls, partitions, ceilings or roofs of combustible construction, they shall be protected by a listed or approved welding curtain, welding blanket, welding pad or equivalent.
- k) If hot work is done on one side of a wall, partition, ceiling or roof either a fire watch shall be established on the opposite side from the hot work or all combustibles will be relocated 35 feet (11 meters) away from the wall.
- l) When the generation of sparks or slag is possible, persons not involved in the operation will be protected by the installation of "Do Not Enter" barricade tape.

Special attention must be made to areas beneath the hot work operation as hot sparks and slag can fall several stories beneath an operation.

- m) At least one 20 lb. fire extinguisher **MARKED AS HOT WORK** with a valid inspection tag will be available in the work area and maintained ready for instant use in the event of fire, where hot work is performed around/within wood structures a water extinguisher or hose line is to be available. The Fire Watch will determine if more than one fire extinguisher is required, depending on the type of hot work being performed.
- n) If hose lines are located in the hot work area, they will be connected and ready for use but need not be unrolled or charged.

### **6.2.5 Fire Watch**

- a) A fire watch will be required by the Permit Owner according to the Fire Watch Decision Tree.
- b) Workers designated as Fire Watchers will be trained in their duties.
- c) The Fire Watcher will remain vigilant during and for 30 minutes after the completion of the hot work operation unless directed by the Permit Owner to remain longer. This will be noted on the permit.
- d) More than one Fire Watcher may be required if sparks or slag could enter other areas of the structure or fall to lower floors.
- e) The Supervisor of Hot Work will arrange for monitoring after the fire watch, depending on the hazard assessment of the type of hot work being performed.

### **6.3 Training**

All workers who participate in hot work operations will receive proper instruction, education and training to sufficiently perform their job-related activities in a safe and efficient manner.

Training will include but is not limited to:

- a) The contents of this Program;
- b) Regulatory requirements;
- c) Review of Safety Data Sheets (SDSs);
- d) Permitting procedures;
- e) Sources of flammable and combustible material;
- f) LEL measurement;
- g) Danger/hazards to be aware of;
- h) Barricading;

- i) Personal protective equipment; and
- j) Proper labeling requirements.

### 6.3.1 Fire Watchers Training

In addition to the above training, Fire Watchers training will include the following:

- a) The basics of fire behavior, the different classes of fire and of extinguishing agents, the stages of fire, and methods for extinguishing fires;
- b) The recognition of the adverse health effects that may be caused by exposure to fire;
- c) The physical characteristics of the hot work area;
- d) The hazards associated with fire watch duties;
- e) The personal protective equipment (PPE) needed to perform fire watch duties safely;
- f) The use of PPE;
- g) The selection and use of any fire extinguishers likely to be used by a Fire Watcher in the work area;
- h) The location and use of barriers, e.g., fire blankets, etc.;
- i) The means of communication designated for Fire Watchers;
- j) When and how to start fire alarm procedures; and
- k) The evacuation plan for the hot work area.
- l) To alert others to exit the space whenever:
  - i. The fire watch perceives an unsafe condition;
  - ii. The fire watch perceives that a worker performing hot work is in danger;
  - iii. An evacuation signal, such as an alarm, is activated.

## 7.0 ATTACHMENTS

- Hot Work Permit

REVISION SUMMARY		
DATE	REVISION	SUMMARY
17 Nov 2023	0	