



Canadian Space Agency
Agence spatiale
canadienne



JOHN H. CHAPMAN SPACE CENTRE

PROPERTY MANAGEMENT

HOT WORK PROGRAM

APRIL 2013



HOT WORK PROGRAM

Table of Contents

1)	PURPOSE.....	4
2)	AREA OF APPLICATION.....	4
3)	SCOPE.....	4
a)	Application	4
b)	Limitations.....	4
c)	Prohibitions.....	4
d)	Definitions	5
i)	Controlled area:	5
ii)	Fire Watcher:	5
4)	DUTIES AND RESPONSIBILITIES	6
5)	HOT WORK PROCEDURE.....	7
a)	General Instructions.....	7
b)	Issuing of the hot work permit.....	7
6)	SPECIAL PROVISIONS	8
a)	Hot work in confined spaces.....	8
b)	Hot work on containers.....	9
c)	Fire protection.....	9
i)	Tanks and work equipment	9
ii)	Safety zone with 11-metre (35-foot) radius	9
iii)	Firefighting equipment.....	9
iv)	Hot work on walls and ceilings	9
v)	Superimposed work.....	10
7)	DOCUMENTS	10
a)	Hot work permit.....	10
i)	Description.....	10
ii)	Hot work permit location.....	10
b)	Permit log.....	10
i)	Description.....	10
ii)	Permit log location.....	10
8)	REQUIRED TRAINING.....	10
9)	MONITORING	11
a)	Hot work monitoring	11
10)	REVIEW.....	11



HOT WORK PROGRAM

APPENDIX I HOT WORK PERMIT

APPENDIX II APPLICABLE REGULATIONS

APPENDIX III APPROVAL DOCUMENT

APPENDIX IV UPDATE

APPENDIX V DELEGATION OF AUTHORITY TO ISSUE PERMITS



HOT WORK PROGRAM

1) PURPOSE

The purpose of this Program is to identify work situations that pose an additional risk of fire because flames, sparks, smoke or heat are generated and to control these hazards by implementing appropriate preventive measures.

2) AREA OF APPLICATION

This Program applies to the Property Management Division at the John H. Chapman Space Centre (JHCSC), including the employees of external contractors.

The JHCSC Property Management Division believes that every effort should be made to avoid having to carry out hot work and undertakes to ensure that there is no other method that can be used to carry out the work prior to issuing a hot work permit.

3) SCOPE

a) Application

The Program applies to all maintenance, servicing, repair, construction, setting up/dismantling, installation and adjustment work that produces flames, sparks, smoke or heat. These activities include, but are not limited to, cutting, welding and grinding.

b) Limitations

This Program does not apply to work carried out in areas specifically identified as “designated areas” or to work carried out outdoors more than 11 metres (35 feet) from buildings and combustible materials. In these cases, the prevention aspects described in these procedures apply, but the issuing of a permit is not necessary.

Work in confined spaces or in a potentially hazardous or explosive atmosphere may not be carried out unless an analysis of the atmosphere is done and it is certified that there is no danger. In this work situation, continuous ventilation must be maintained (refer to Part 11, p. 15).

c) Prohibitions

It is prohibited to work on partitions, walls, ceilings and roofs with a combustible covering or insulation. This type of work is particularly hazardous and is designated as such (controlled area). In addition, a risk analysis must be carried out and effective control measures must be implemented during and following the period of work in accordance with the responsibilities of the fire watcher, who will be on duty as soon as the work begins.

Work where a pipe or a metal object may, by conduction, ignite a fire on combustible material with which it comes in contact is prohibited.



HOT WORK PROGRAM

d) Definitions

Hot work: Any work in which a flame is used or an ignition source may be produced (refer to Part 11, p. 15).

Designated area: A work area deemed to be safe for hot work carried out on a regular basis, as determined based on the type and frequency of the work carried out, and which is permanently fitted up in such a way as to prevent risks of fire. The designated area is the maintenance garage located in Room 2C-103.

i) **Controlled area:** A work area where hot work is permitted, provided the area is specifically fitted up in such a way as to prevent risks of fire. A hot work permit must be obtained prior to carrying out work in a controlled area.

ii) **Fire watcher:** A person designated to monitor the hot work to ensure that no fires are ignited. A fire watcher is designated if one of the following conditions applies:

- The hot work is carried out in an area where there is considerable risk of fire (refer to Part 11, p. 15);
- There is combustible material within a radius of 11 metres (35 feet);
- There is combustible material within a radius of more than 11 metres (35 feet), but the combustible material may easily ignite if a spark comes in contact with it;
- Openings in the floor and walls within a radius of 11 metres (35 feet), including hidden spaces, expose combustible material in adjacent areas;
- There is adjacent combustible material on the other side of a wall, floor, ceiling or roof—opposite from where the hot work is to be carried out—that may ignite directly or indirectly (in which case, more than one fire watcher may be required).

Work authority: A qualified person who issues the hot work permit. The names of work authorities are entered on the permit.

Qualified person: In respect of a specified task, a person who, because of his/her knowledge, training and experience, is qualified to perform that task safely and properly.

Unsafe situations: Any deviation from regulations in effect, an unsafe practice, poorly maintained premises, an improper or hazardous set-up, etc. (excluding deviations having to do with conduct and work methods associated with another activity).

Inspections audit: An audit of the quality of inspections and the ability to compile an inventory of risks and/or non-conformances.



HOT WORK PROGRAM

4) DUTIES AND RESPONSIBILITIES

Property Manager

The Property Manager is responsible for implementing the JHCSC Hot Work Program and has the following duties and responsibilities:

- Implement a Hot Work Program related to the activities of the JHCSC Property Management Division;
- Ensure compliance with this Program.

Work Authorities (Operations Managers, Project Officers and qualified persons designated by the JHCSC)

Work Authorities are responsible for the Hot Work Program as it pertains to activities under the responsibility of the JHCSC Property Management Division and have the following duties and responsibilities:

- Ensure that the Program is implemented appropriately and that employees have received the necessary training to implement the Program;
- Plan and monitor hot work activities;
- Issue hot work permits after ensuring there is compliance with the information indicated on the permits;
- Ensure that there are optimum safe working conditions before authorizing hot work;
- Ensure that persons involved in the hot work know how to use their equipment safely and are familiar with procedures in case of emergency;
- Ensure that the fire watcher, when required, is familiar with his/her duties and responsibilities;
- Notify the section foreman if the hot work will encroach upon the work area required for regular operations;
- Inspect the work areas, identify unsafe situations and determine preventive or corrective action to be taken for each non-conformance noted.

Implementers (includes all Property Management employees, contract workers and contractors' employees)

Implementers are qualified persons performing a task in the work area. They have the following duties and responsibilities:

- Obtain a hot work permit from the work authority for any work that requires a hot work permit;



HOT WORK PROGRAM

- Ensure that there is no combustible material in the area around the work. If there is combustible material, it must be covered with spark-arresting tarpaulins;
- Inspect and handle own equipment safely;
- Comply fully with precautions indicated on the hot work permit;
- Stop work immediately upon noticing a hazard or unsafe conditions;
- Depending on the degree of risk associated with the work, remain on the hot work site for 30 minutes after completion of the work to ensure that no fire has ignited.

Fire watcher (where required)

A fire watcher is a qualified person designated to monitor the hot work in order to ensure that no fires are ignited (see Section 3, d, ii above) and has the following duties and responsibilities:

- Be familiar with hazards inherent to the workplace and hazards associated with the hot work;
- Ensure that safe conditions are maintained throughout the period of hot work as well as during meal and break periods, if necessary;
- Halt work immediately upon noticing unsafe conditions;
- Have a fire extinguisher nearby and know how to use it;
- Assess any fire that may ignite, try to extinguish it, if possible, and sound the evacuation alarm if the fire is beyond the control of the fire extinguishing equipment and the workers are unsure what to do to put it out;
- Be familiar with the evacuation procedure (emergency measures plan);
- Inspect the areas where hot work was carried out one hour, two hours, three hours and four hours after completion of the work to make sure that no fire has ignited.

5) HOT WORK PROCEDURE

a) General Instructions

The work to which this safe work program applies must be carried out in compliance with the instructions for the work and the steps to be followed. In addition, this work must be carried out in accordance with all other applicable procedures.

b) Issuing of the hot work permit

The following procedure must be followed prior to carrying out any work that Section 3 concerns:

1. The Work Authority will check whether or not it is possible to avoid carrying out hot work by using another work method, using other tools or changing the work area;



HOT WORK PROGRAM

2. Where hot work cannot be avoided, the Work Authority will issue a hot work permit after filling out the appropriate sections. The Work Authority must check that the safety requirements on the permit have been met before authorizing the start of work;
3. The Work Authority will appoint a fire watcher, if necessary;
4. The Work Authority will provide the worker(s) and the fire watcher with hot work instructions (if applicable);
5. The Work Authority will go to the Control Centre with the hot work permit and provide the control officer on duty with information on where the work will be carried out, the scope of the work and how long it will take;
6. The worker(s) and the fire watcher (where applicable) will sign the hot work permit and post it in the work areas;
7. While the work is carried out, special attention must be given to hot material and sparks flying into the air;
8. The Work Authority and the John H. Chapman Space Centre Security Services control officer are to be notified when the work is completed.
9. The Work Authority will ensure that the work is monitored, as follows:
 - a. The fire watcher, where required, must remain in the work areas during the first, second, third and fourth hours following completion of the work to ensure that no fires have ignited. The permit must be initialled in the designated spot for each hour of monitoring by the fire watcher.
 - b. If the fire watcher is not required, the Work Authority will ensure that the hot work site is monitored for 30 minutes following completion of the work.
10. The work area is to be cleaned, protective tarpaulins and the safety perimeter removed and the work permit submitted to the Work Authority;
11. The Work Authority will enter comments and fill out the final sections of the permit, notify the control officer, have the control officer sign the permit, and then close the permit. The permit must be kept in a log under Property Management responsibility.

6) SPECIAL PROVISIONS

a) Hot work in confined spaces

No hot work should be carried out in an enclosed space without the implementation of a work-in-confined-spaces program.



HOT WORK PROGRAM

b) Hot work on containers

In cases where hot work must be performed on a container that holds or previously held liquids, dust or flammable gases, the following precautions must be taken:

- Tanks, pipes, containers and other receptacles must be cleaned and drained (by filling them with water or inert gas);
- Connecting pipes must be closed (plugged) or disconnected and locked out;
- Containers holding flammable or combustible materials that cannot be removed from the area must be kept closed and covered with fireproof tarpaulins.

c) Fire protection

In all cases, the following precautions must be taken in work areas.

i) Tanks and work equipment

- Tanks and cylinders (oxygen and acetylene) should be fastened in place in their brackets at a safe distance from the work and out of the way of flying incandescent material; and
- Must comply with legal requirements and be in proper working order.

ii) Safety zone with 11-metre (35-foot) radius

- Remove all flammable or combustible materials; if not possible, cover them with protective fireproof tarpaulins;
- Plug all openings in the floor, walls and ductwork through which sparks might travel;
- Turn off conveyors and equipment, if necessary;
- Clean all surfaces on which there is or has been flammable or combustible liquid or dust;
- Use tarpaulins or protective screens to contain heat, sparks, flames and hot material.

iii) Firefighting equipment

- Firefighting equipment meeting sector requirements must be present and operational;
- There must be an operational portable extinguisher for each welding cart;
- Do not, under any circumstances, shut off any automatic sprinkler system or heat or smoke detection system in order to perform hot work in an area served by these systems. However, under certain conditions, horns may be deactivated temporarily by the control officer on duty.

iv) Hot work on walls and ceilings

- Subject to the following conditions, hot work may be performed on walls, ceilings, partitions and roofs with combustible coverings or insulation;
- This type of work is particularly at risk and is designated as such (controlled area);
- The combustible material on the other side of a wall or ceiling must be moved a distance away from the wall or ceiling;



HOT WORK PROGRAM

- The work may be performed only after fireproof tarpaulins or equivalent protective material are placed on the exposed surface;
 - A risk analysis must be carried out and effective monitoring measures implemented during and following the period of work in accordance with the responsibilities of the fire watcher, who will be on duty as soon as the work begins.
- v) **Superimposed work**
- Over superimposed work, install suspended tarpaulins to prevent incandescent material from reaching the lower floors;
 - If necessary, have a fire watcher on every floor where a fire could be ignited.

7) DOCUMENTS

a) Hot work permit

i) Description

A hot work permit is required when work is performed using equipment or tools that require the use of an open flame or that may produce heat or sparks.

ii) Hot work permit safekeeping

The hot work permit must be kept on the work site while the work is performed, then kept in a hot work permit binder for a minimum period of one year.

b) Permit log

i) Description

A permit distribution list

ii) Permit log safekeeping

The permit log must be kept in a permit log binder for a minimum period of five years.

8) REQUIRED TRAINING

The employer's representatives, for whom known and foreseeable risks to health and safety are associated with the task or activity of an employee or any person working under their responsibility, must take training that specifically applies to the health and safety risk(s).

In accordance with regulatory requirements, the employer must provide all employees with the necessary information, training, coaching and supervision to ensure their health and safety. To fulfil their responsibilities, workers must familiarize themselves with the said Program and sign a register confirming that they have read and understood their responsibilities. In addition, workers must comply with the employer's workplace health and safety instructions.



HOT WORK PROGRAM

9) MONITORING

a) Hot work monitoring

To ensure that hot work is properly carried out, the work will be assessed according to the following criteria:

- Hot work permits are duly filled out by the Work Authority;
- The Work Authority will periodically inspect the implementation of the described measures in the work areas.

10) REVIEW

Hot work, the Hot Work Program and hot work supporting documentation must be reviewed and updated after the first year of implementation and subsequently, every five years.

APPENDIX I: HOT WORK PERMIT

FIRST AND FOREMOST, IS THERE A METHOD THAT CAN BE USED IN ORDER TO AVOID HAVING TO PERFORM HOT WORK?
IS THERE A SAFER METHOD?

The permit must be issued prior to the start of any temporary work that involves open flames or generates heat and sparks.

Persons authorized to issue permits (Work Authorities): Alain Dion, Benoit Haché, Mathieu Gamache, Josée Brassard, Michel Campbell, Luc Reid and persons who will have been trained and delegated authority in writing by the aforementioned persons.

PART 1

i) <u>INSTRUCTIONS</u>	<u>PRECAUTIONS TO BE TAKEN</u>
<p>1. The Work Authority must</p> <ul style="list-style-type: none">A. Check the precautions listed in the right-hand column (or not undertake the work);B. Fill out and keep PART 1 (Use Part 1A in support of the hot work notice);C. Issue the permit to the person performing the hot work. <p>HOT WORK PERFORMED BY</p> <p><input type="checkbox"/> John H. Chapman Space Centre employee</p> <p><input type="checkbox"/> Contractor – Name of company: _____</p> <p>Name in block letters of person performing the hot work: _____</p> <p>Date: _____</p> <p>Work location: Type of work: _____</p> <p>Name of person performing the hot work: _____</p>	<ul style="list-style-type: none"><input type="checkbox"/> Automatic sprinklers and a portable extinguisher are in working order and on the worksite.<input type="checkbox"/> The hot work equipment is in proper working order. <p>(a) Precautions to be taken within a 11-metre (35-foot) radius</p> <ul style="list-style-type: none"><input type="checkbox"/> Flammable liquids, dust, fibre and oily deposits have been removed.<input type="checkbox"/> The explosive atmosphere in the area has been eliminated. <input type="checkbox"/> Floors are swept clean.<input type="checkbox"/> Combustible floors are protected with fire-resistant tarpaulins or protective metal screens. <input type="checkbox"/> All other combustible material has been removed where possible. If not, fire-resistant tarpaulins or protective metal screens have been installed. <input type="checkbox"/> All openings in the floor and walls have been plugged.<input type="checkbox"/> Fire-resistant tarpaulins have been installed below the work area.<input type="checkbox"/> Ductwork and airways through which sparks may be carried towards combustible items that have been moved a distance away are covered or closed off.

I hereby certify that the work area has been inspected, that the precautions checked off on the control list have been implemented to prevent fire and that authorization for this work has been granted.

SIGNATURE

Work Authority: _____

Person performing the work:

**ESTIMATED
PERMIT EXPIRY
TIME:**



Time:

The Work Authority's or the supervisor's signature is required for the following at the times specified:

Work completion time and notice given to the control officer to reactivate audible alarms: _____

Monitoring for 30 minutes: _____

Monitoring for 1st hour: _____

Monitoring for 2nd hour: _____

Monitoring for 3rd hour: _____

Monitoring for 4th hour: _____

Permit expiry time: _____

Control Officer's signature: _____

**In case of emergency or fire,
call the Control Officer at**

(b) Hot work on walls, ceilings or roofs

- The walls, ceilings or roofs concerned are not combustible and have no combustible coverings or insulation.

- The combustible materials on the other side of the walls, ceilings or roofs are a distance away from the said walls, ceilings or roofs.

(c) Work equipment that is shut off

- All combustible materials have been removed from the equipment that is shut off.
- Containers are drained of flammable liquids or gases.
- Vessels, pipes and equipment under pressure are turned off, isolated and ventilated.

(d) Fire monitoring and hot work area control

- A fire watcher will be on duty during the work period, including during coffee and lunch breaks, and for 30 minutes following the work period, and only if the conditions stated in sections (a), (b) or (c) above apply or have been met.
- A supervisor is required**
- The supervisor has appropriate portable extinguishers and, if possible, a small fire hose set up.
- The supervisor knows how to use this equipment and knows how to sound the alarm.
- A fire watcher or fire watchers may be required in adjacent higher-level or lower-level areas.
- The hot work area will be monitored for four hours after the work is completed.

(a) Other precautions

450-926-4993. The Control Officer will then call 911.

- Inform the control officer of the scope of the work and leave the permit on job site for the duration of the operation.



HOT WORK PROGRAM

APPENDIX II: APPLICABLE REGULATIONS

For Companies under Federal Jurisdiction

Excerpt from the

CANADA OCCUPATIONAL HEALTH AND SAFETY REGULATIONS

PART XVII, SAFE OCCUPANCY OF THE WORK PLACE

Fire Hazard Areas

17.11 (1) Subject to subsection (2), no person shall, in a fire hazard area,

- (a) use any equipment, machinery or tool of a type that may provide a source of ignition; or
- (b) smoke or use an open flame or other source of ignition.

(2) Where it is not reasonably practicable to avoid performing work involving the use of any equipment, machinery or tool that may provide a source of ignition in an area that has an atmosphere that contains or is likely to contain explosive concentrations of combustible dust or in an area where combustible dust has accumulated in a sufficient quantity to be a fire hazard, the following shall apply:

(a) the atmosphere and surfaces in the area where the work is to be performed and within that portion of the surrounding area that is accessible to sparks or pieces of hot metal produced by the work shall be substantially free of combustible dust;

(b) where any equipment, machinery or tool produces combustible dust that may reach the areas referred to in paragraph (a), the equipment, machinery or tool shall be made inoperative prior to and during the time the work is being performed;

(c) in so far as is practicable, the area where the work is to be performed shall be enclosed to prevent the escape of sparks or pieces of hot metal produced by the work;

(d) all openings in floors and walls through which sparks or pieces of hot metal produced by the work may pass shall be sealed or covered to prevent such passage;

(e) any combustible materials within the areas referred to in paragraph (a) shall be removed or, if this is not reasonably practicable, shall be covered with a non-combustible protective covering;

(f) floors and walls of combustible material within the areas referred to in paragraph (a) shall be protected from the fire hazard by

- (i) drenching the surfaces of the floors and walls with water, or
- (ii) covering the floors and walls with a non-combustible protective covering;

(g) the work shall be performed under the supervision of a qualified person, who shall remain in the work area while the work is performed and for 30 minutes thereafter; and



HOT WORK PROGRAM

(h) there shall be readily available in the work area at least one hand-held portable fire extinguisher and

- (i) a water hose at least 25 mm in diameter that is connected to a water supply line, or
- (ii) a supply of not less than 200 L of water and a bucket.

SOR/88-632, s. 78(F); SOR/94-263, s. 64.

17.12 Signs shall be posted in conspicuous places at all entrances to a fire hazard area

- (a) identifying the area as a fire hazard area; and
- (b) prohibiting the use of an open flame or other source of ignition in the area.

PART XI CONFINED SPACES Hot Work

11.9 (1) Unless a qualified person has determined that the work can be performed safely, hot work shall not be performed in a confined space that contains

- (a) an explosive or flammable hazardous substance in a concentration in excess of 10 per cent of its lower explosive limit; or
- (b) oxygen in a concentration in excess of 23 per cent.

(2) Where hot work is to be performed in a confined space that contains concentrations of flammable or explosive materials in excess of the concentration set out in paragraph (1)(a) or (b),

- (a) a qualified person shall patrol the area surrounding the confined space and maintain a fire-protection watch in that area until all fire hazard has passed; and
- (b) fire extinguishers specified as emergency equipment pursuant to paragraph 11.3(d) shall be provided in the area referred to in paragraph (a).

(3) Where an airborne hazardous substance may be produced by hot work in a confined space, no person shall enter or occupy the confined space unless

- (a) section 11.10 is complied with; or
- (b) the person uses a respiratory protective device that meets the requirements of sections 12.2, 12.3 and 12.7.

SOR/92-544, [s. 1](#); SOR/95-286, [s. 9](#); SOR/2002-208, s. 43(F).



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Effective Date
April 2013

HOT WORK PROGRAM

APPENDIX III

APPROVAL DOCUMENT

Area of application: John H. Chapman Space Centre

Property Manager: _____

Yves Bélanger

April 1, 2013



HOT WORK PROGRAM

APPENDIX IV UPDATE

#	Date	Update Author	Comments
1	February 7, 2014	Benoit Haché	Correction made in the permit; details with respect to identification information; waiting period for low-risk work changed to 30 minutes following completion of the work
2			
3			



HOT WORK PROGRAM

APPENDIX V: DELEGATION OF AUTHORITY TO ISSUE PERMITS

This document certifies that the responsible representative of the company and the delegated representative for issuing the hot work permit have both read the Hot Work Program in effect at the John H. Chapman Space Centre and undertake to take necessary measures to comply with the instructions stated in the Hot Work Program.

The company and its delegated representative will be fully liable for any failure to implement the Program.

Name of John H. Chapman Space Centre project officer:

Signature: _____

Company name: _____

Company representative: _____

Signature: _____

Contractor's representative with delegated authority to issue the permit:

Signature: _____

Date: _____