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Glenn Safety Manual – Chapter 28

Hot Work Authority

Approved by: QS/Chief, Safety and Health Division

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Change Record

Rev.	Effective Date	Expiration Date	GRC-25, Change Request #	Description
C	2/3/2012	2/3/2017	90	Changes are administrative and do not affect other organizations.
Change 1	4/15/2014	2/3/2017	N/A	Administrative change to add front cover and change history log to comply with NPR 1400.1 Deleted “The requirement for a GRC Hot Work Permit program is delineated in” and inserted “The GRC shall follow the requirements of” in Section 4.0 Policy.
D	12/15/2016	12/15/2021	16-010	General updates, updates to fire extinguisher training requirements, and added designated hot work area process and form.

***Include all information for each revision. Do not remove old revision data. Add new rows to table when space runs out by pressing the tab key in the last row, far right column.*

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Chapter 28—Hot Work Authority

Note: The current version of this chapter is maintained and approved by the Safety and Health Division (SHeD). The last revision date of this chapter was December 2016. The current version is maintained on the Glenn Research Center intranet within the BMS Library. Approved by Chief of Safety and Health Division.

1.0 PURPOSE

This chapter covers provisions to prevent loss of life, property, and research capability caused by ignition from hot work operations and specific requirements to prevent such ignition. The chapter also provides a review of precautions and measures to be taken to ensure that all occupational health requirements are met to protect the workers in the area. To facilitate these measures, prior to starting any hot work activity, a Hot Work Authorization Permit (NASA GRC–7A) shall be required.

2.0 APPLICABILITY

This chapter is applicable to the following:

- All NASA Glenn Research Center (GRC) civil servant employees at Lewis Field (LF) and Plum Brook Station (PBS).
- All GRC contractors, other NASA contractors, and non-NASA and non-contractor individuals present at GRC.
- In this chapter, all mandatory actions (i.e., requirements) are denoted by statements containing the term “shall.” The terms “may” or “can” denote discretionary privilege or permission, “should” denotes a good practice and is recommended, but not required, “will” denotes expected outcome, and “are” or “is” denotes descriptive material.

3.0 BACKGROUND

Hot work processes are a necessary part of our industrial world. Too often, however, the persons who use, contract, or supervise the use of these processes do not fully appreciate that their improper use can result in loss of life or property by fire and explosion.

As per the National Fire Protection Association (NFPA), approximately 6 percent of fires in industrial properties and many fires in other properties have been caused by cutting and welding, primarily with portable equipment in areas not specifically designed for such work.

4.0 POLICY AND MEASUREMENT/VERIFICATION

4.1 GRC Policy

The GRC shall follow the requirements of NASA Policy Requirement (NPR) 8715.3, NASA Safety and Health Program Policy and NASA Standard 8719.11.

4.2 Measurement and Verification

Compliance with the responsibilities and requirements of this chapter are measured and verified through the use of programmatic self-assessments, regulatory and agency audits, and internal field inspections and surveys.

5.0 RESPONSIBILITIES

5.1 Requester

The requester identifies the need for hot work operations and decides if the work can be done in a designated area or if a non-designated area permit is required. Once the determination is made, the requestor shall follow the appropriate process described below.

Non-Designated Hot Work Area Requestor:

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If the work is a non-designated area, the requester shall complete a Hot Work Authorization Permit (NASA GRC-7A) and schedule a site visit with the Safety and Health Division (SHeD). This permit process requires the requester to review the site and operation and to schedule and conduct a site inspection with SHeD prior to the start of hot work operations. Immediately prior to starting hot work, the requester shall complete the Hot Work Operation Permit (NASA GRC-7B), this will serve as the operation permit for that specific task and is valid for that day only. The requester shall verify that all conditions issued on the Hot Work Authorization Permit (NASA GRC-7A) are adhered to. The requester shall maintain and adhere to the Hot Work Authorization Permit and the associated Hot Work Operation Permit documentation in the field including the responsibilities that follow.

Designated Hot Work Area Requestor:

The Designated Hot Work Area Requestor maintains the designated hot work area and verifies its proper use. They will renew the Hot Work Authorization Permit (NASA GRC-7A) and schedule a site visit with SHED yearly. (See above for instructions). As each form is filled or at the end of the year, whichever comes first, the requestor will review the Designated Hot Work Area Operation Permit (NASA GRC-7C) and sign to verify that each person is approved and that they are following the proper procedures prior to starting a hot work task, this serves as the permit for that operation. The designated hot work area requester shall maintain and adhere to the Hot Work Authorization Permit and the associated Hot Work Requirements Checklist/Conditions documentation in the field.

Additional responsibilities of the requester and designated hot work requester are as follows:

- Shall verify that hot work is not being performed on a painted surface. All paint shall be removed prior to a hot work. Measures to abate any lead-based paint shall be undertaken as noted in Chapter 5 of the Occupational Health Programs Manual for lead-based-painted surfaces.
- Shall ensure that all conditions specified on the Hot Work Authorization Permit are adhered to.
- Shall post Hot Work Authorization Permit near work area.
- If not in a designated hot work area, Shall notify dispatch at LF (216) 433-2088 or PBS at (419) 621-3222 prior to and at the completion of hot work activities. A hot work activity is considered complete when the fire watch inspection concludes.
- Shall designate the fire watch as required.
- Shall complete, post, and adhere to all aspects of the Hot Work Operation Permit (NASA GRC-7B or NASA GRC-7C).
- Shall make appropriate safety and firefighting equipment available.
- Shall properly protect or remove flammable and combustible material within 35 feet of the hot work.
- Shall inspect equipment for worn or cracked hoses and oil or grease on regulators, torches, helmets, lenses, gloves, long-sleeved shirts, aprons, and long pants; inspect welding screen conditions and ventilation equipment; ensure cylinders are stored securely and upright and oxygen is stored away from fuel gas cylinders by 20 feet; inspect for dented or cracked cylinders; and inspect electrical plugs on electrical welders, fire extinguishers, and gage conditions. Remove any damaged items from service.
- Shall ensure that workers comply with the required NASA safety and occupational health regulations.
- Shall return original Hot Work Authorization Permit (NASA GRC-7A) and all Hot Work Operation Permits (NASA GRC-7B or NASA GRC-7C) to SHeD to close out hot work. If these documents are not returned then, at the discretion of the SHeD, new hot work permits will not be issued. An overview presentation of the hot work permit process can be given by SHeD upon request.
- Shall verify compliance with 29 Code of Federal Regulations (CFR) 1910, 29 CFR 1926, and NFPA 51B.
- Shall verify that a Negative Exposure Assessment has verified that the hot work operators may forgo use of a respirator in accordance with the Occupational Health Manual (GLM-QS-1800.1), Chapter 21: Hazard Assessment/Exposure Assessment Program.

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- If the fire suppression system is removed from service for a period in excess of 4 hours for the hot work process, shall fill out the Fire Protection Impairment Authorization (GRC-316) form and submit to the Authority Having Jurisdiction for approval.

5.2 Safety and Health Division

- Serves as technical consultant for resolution of fire and life safety issues and concerns.
- Ensures that hazard controls have been identified on the Hot Work Authorization Permit (NASA GRC-7A).
- Conducts a site visit and provides an approval signature on the Hot Work Authorization Permit (NASA GRC-7A) and issues conditions on the permit.
- Shall determine and provide guidance if fire protection system will be required to be disabled during the hot work activities.
- Maintains a record file of completed Hot Work Authorization Permits for a period of 3 years.
- Terminates hot work operation when it is being performed unsafely and contacts the appropriate management personnel.
- Conducts periodic site inspections to monitor implementation.
- On an annual basis assess the effectiveness of Hot Work Authorization Permit Program. This is accomplished by reviewing returned permits for accuracy and by trending findings associated with the periodic site inspections.

5.3 Authority Having Jurisdiction

- Reviews and approves the fire protection system impairment plan or procedure, which shall be implemented when a fire suppression system is removed from service for a period in excess of 4 hours.
- Provides technical guidance on applicable fire protection life safety codes.

5.4 Worker Performing Hot Work

- Shall be familiar with the site and the procedures for sounding a local fire alarm and notifying the NASA Emergency Dispatcher in the event of a fire. A method of direct communications to the NASA Emergency Dispatcher shall be available during the entire fire watch period at the site of the hot work.

At LF, call 911 from a NASA phone or (216) 433-8888 from a cell phone.

At PBS, call 911 from a NASA phone or (419) 621-3222 from a cell phone.

- Shall be trained in the use of the fire extinguisher utilized at the specific site of the hot work (29 CFR 1910.157). The workers shall provide their own fire extinguishers independent of the fire extinguishers installed, for the sole purpose of protecting the building and occupants.
- At a minimum, one 2A:20B:C multipurpose dry chemical fire extinguisher shall be provided at each hot work site. Any alternate fire extinguishing agents must be reviewed by SHED.
- Shall conduct hot work operations in a safe and controlled manner, including all identified conditions and controls listed on the Hot Work Authorization Permit (NASA GRC-7A) and the Hot Work Operation Permits (NASA GRC-7B and GRC-7C).
- Shall continue to perform hot work only as long as conditions are unchanged from those under which the permit was granted. If work conditions do change, hot work activities shall stop, all equipment shall be put in a safe shut down position as necessary, and a new permit applied for.
- Shall comply with 29 CFR 1910, 29 CFR 1926 and NFPA 51B.

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5.5 Fire Watch

A designated employee for fire watch is required any time or place when a hot work is performed outside a designated weld shop area.

The Fire Watch

- Shall have no other duties or responsibilities while performing the duties of the fire watch unless they meet the requirements of the Hot Work Operation Permit (NASA GRC-7B), Fire Watch Requirements.
- Shall be trained in the use of the appropriate fire extinguishing. The training shall include discharging an extinguisher. See Training in section 6.4 for specific training requirements.
- Shall have a fire extinguisher readily available to fight small incipient incidents. The extinguishing equipment refers to additional fire extinguishers present at the site of the hot work that are independent of the extinguishers present for protecting the building occupants and building equipment.
- Shall perform required continuous inspections in all areas of hot work operations, including the areas adjacent, above and below the hot work area, for smoldering fires. These inspections shall be performed continuously for at least 30 minutes after completion of the hot work.
- If work conditions do change, hot work activities shall stop, all equipment shall be put in a safe shut down position as necessary, and a new permit applied for.
- Shall be familiar with the site procedure for sounding a local fire alarm. In the event of a fire, notify the NASA Emergency Dispatcher:

At LF, call 911 from a NASA phone or (216) 433-8888 from a cell phone.

At PBS, call 911 from a NASA phone or (419) 621-3222 from a cell phone.

- If a fire extinguisher is discharged at the hot work site the fire watch shall:
 - At LF notify NASA Emergency Dispatch by dialing 911 from a NASA phone or (216) 433-8888 from a cell or pay phone. At PBS notify NASA Emergency Dispatch by dialing 911 from a NASA phone or (419) 621-3222 from a cell phone.
 - Notify a supervisor or appropriate NASA manager.
 - Contact SHeD for Mishap Report directions. (Refer to the Glenn Safety Manual, Chapter 21, Mishap and Close Call Reporting, Investigating and Recordkeeping for more information.)

5.6 Supervisor shall

- Provide required personal protective equipment to the worker performing hot work.
- Establish designated areas for cutting and welding and coordinate permitting with SHeD.
- Ensure that employees performing hot work operations have had the appropriate training and certifications.

5.7 Dispatch shall

- Log all notifications of hot work activities starting and completing within their log books.

6.0 REQUIREMENTS

6.1 Program Requirements (NASA STD 8719.11)

- Welding, cutting, and open flame operations conducted outside a designated welding/hot work shop shall require a permit issued by SHeD.
- Designated welding/hot work areas shall have their hot work permit reviewed annually by SHeD.
- The requester shall ensure a fire watch is provided on all welding, cutting, open flames, and other hot work requiring a permit. The fire watch shall have no other duties or responsibilities while performing the duties of

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the fire watch unless they meet the requirements of the Hot Work Operation Permit (NASA GRC-7B), Fire Watch Requirements.

- When fire systems are required to be deactivated for welding, cutting, open flames, or other hot work, it is imperative that the systems be turned back on as soon as possible.
- The permit location of welding, cutting, open flames or other hot work shall not be changed or altered.
- Whenever changes are made that either alter the permitted area, require new processes to be introduced into the area, or cause relocation to a different site, a new permit shall be issued.
- Use of tar pots shall require a Hot Work Authorization Permit issued by SHeD.
- Tar pots shall not be located within 20 feet of a facility or shall be protected from the facility by a barrier standing 4 feet above and to all sides of the pot that are exposed to the building.
- At a minimum, rope barriers shall be provided to keep unrelated personnel 20 feet from the tar pot.
- The tar pot operator shall verify that the lid will close tight, and the tar pot will be constantly attended from 30 minutes prior to operations until 30 minutes after operations.
- Asphalt kettles shall not be located within 20 feet of any combustible materials, combustible building surface or any building opening and within a controlled area identified by the use of traffic cones, barriers or other approved means.
- Asphalt kettles shall not block means of egress, gates, roadways, or entrances.
- Location of fuel containers for asphalt kettles shall be at least 10 feet from the burner.
- An operating asphalt kettle shall be attended by a minimum of one knowledgeable employee of operations and hazards. The employee shall be within 100 feet of the kettle and within sight of the kettle at all times.
- There shall be a portable fire extinguisher of a minimum 40 BC rating within 25 feet of each asphalt kettle and one portable extinguisher with a minimum 3A 40BC rating on the roof being covered.
- Whenever a fire suppression system is removed from service for a period in excess of 4 hours, the NASA Authority Having Jurisdiction shall be notified in writing, and an approved fire protection system impairment plan or procedure shall be implemented.

6.2 Program Requirements (29 CFR 1910 and 29 CFR 1926)

- All combustibles shall be relocated at least 35 feet from the worksite. Where relocation is impracticable, combustibles shall be protected with flameproof covers or otherwise shielded.
- Before hot work is performed, the requester shall inspect the work area and provide written authorization. This is documented on the Hot Work Operation Permit (NASA GRC-7B).
- Appropriate personal protective equipment shall be worn during hot work operations.
- Appropriate local exhaust ventilations will be applied to prevent exposure to welding fumes and respirators will be worn in accordance with GLM-QS-1800.1, Chapter 4: Respiratory Protection Program

6.3 Program Requirements (NFPA 51B)

- All hot work fabrics (welding blankets, welding curtains and/or welding pads) shall be listed, approved or the equivalent for such use. One such listing is ANSI/FM 4950, which requires any fabric used for welding protection shall have its rating printed on the fabric in addition to “Uses and Limitations” labels as per the certifying body’s requirement.

6.4 Training Requirements (NASA STD 8719.11, 29 CFR 1926 and 29 CFR 1910)

- Permitting officials, fire watches, welders, and their apprentices shall be familiar with and trained to the requirements of NFPA 51 B, 29 CFR 1910.252, and 29 CFR 1910.253.

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- General Industry, civil servants and support service contractors shall be trained annually in the use of the appropriate fire extinguishing (29 CFR 1910.157). SATERN course number GRC-4R1400.
- Construction contractors will follow CFR 1926. They will be responsible for training and showing proof of training upon request.
- A Glenn specific Hot Work Permit Process Overview presentation can be given by SHeD at any time upon request.

7.0 RECORDS

- Hot Work Authorization Permit (NASA GRC-7A).—Maintained by SHeD.
- Hot Work Operation Permit (NASA GRC-7B).—Maintained by SHeD.
- Designated Hot Work Area Operation Permit (NASA GRC-7C) – Maintained by SHeD
- SHeD Inspections are maintained in the SHeD Safety, Health, and Environmental Tracking System (SHETrak).

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8.0 REFERENCES

Document Number	Document Name
29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1926	Safety and Health Regulations for Construction
ANSI Z49.1	American National Safety Institute, Safety in Welding, Cutting and Allied Processes, 2012
NPR 8715.3	NASA Procedural Requirements, General Safety Program Requirements
STD 8719.11	NASA Technical Standards, Safety Standard for Fire Protection
NFPA 51B	National Fire Protection Association, Standard for Fire Prevention during Welding, Cutting and Other Hot Work, 2014
ANSI /FM 4950	Evaluating Welding Pads, Welding Blankets and Welding Curtains for Hot Work Operations
GLM-QS-1800.1	Occupational Health Programs Manual, Chapter 5, Lead
GLM-QS-1800.1	Occupational Health Programs Manual, Chapter 4, Respiratory Protection Program
GLM-QS-1700.1	Glenn Safety Manual, Chapter 21, Mishap and Close Call Reporting, Investigating, and Recordkeeping

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APPENDIX A.—DEFINITIONS AND ACRONYMS

American National Safety Institute (ANSI)

Code of Federal Regulations (CFR)

Construction of Facilities (C of F).—Designated projects managed by the Facilities Division for the repair, rehabilitation, and modification of existing facilities; the construction of new facilities; compliance and restoration activities; the design of facility projects; and advanced planning related to future facility needs.

Designated hot work/weld shop area.—Specific area equipped to provide safe and hazard controlled space for ongoing hot work/welding operations. Welding curtains, warning signs, and fixed local exhaust ventilation are typical of these designated areas.

Designated Hot Work Area Operation Permit (NASA GRC-7C)- this is a mechanism for verification of the required precautions to be taken before performing hot work in a designated area and for verification of the usage of the area by the designated area requestor.

Fire watch.—An individual assigned to be in an area for the express purpose of preventing a fire from occurring, extinguishing small fires, protecting other individuals from fire or life safety dangers, and notifying appropriate personnel in case of an emergency. This individual cannot be the worker performing the hot work unless they meet the requirements of the Hot Work Operation Permit (NASA GRC-7B), Fire Watch Requirements.

Glenn Research Center (GRC)

Hot work.—all heat, spark, or flame-producing operations including cutting, welding, Thermite welding, brazing, soldering, grinding, thermal spraying, thawing pipe, torch-applied roofing, or any other similar situation.

Hot Work Authorization Permit (NASA GRC-7A).—the document used to assure that hot work operations are carried out in a safe and controlled manner. The Hot Work Authorization Permit represents the first step in conducting a hot work operation.

Hot Work Operation Permit (NASA GRC-7B).—the list is a mechanism for verification of the required precautions to be taken and for the establishment of the needed fire watch for the required duration for all work done outside of a designated area (test cell, outside, construction, etc). Is valid for that day only and only for one specific task.

NASA Policy Directive (NPD)

NASA Procedural Requirement (NPR)

National Fire Protection Association (NFPA)

Requester.—the person or organization that needs the hot work completed; coordinates all hot work activities for a given task.

Safety and Health Division (SHeD)

Safety and Mission Assurance Directorate (SMAD)

Welding Blanket.—a heat-resistant fabric designed to be in the vicinity of a hot work operation. Intended for use in horizontal applications with light to moderate exposures.

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.

Welding Pad.—a heat-resistant fabric designed to be placed directly under hot work operations. Intended for use in horizontal applications with severe exposures.

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