

**MWI 8715.11**

**REVISION N**

**EFFECTIVE DATE: March 1, 2021**

**EXPIRATION DATE: March 1, 2026**

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# **MARSHALL WORK INSTRUCTION**

**QD01**

## **FIRE SAFETY PROGRAM**

**COMPLIANCE IS MANDATORY**

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<b>Fire Safety Program</b>	<b>MWI 8715.11</b>	<b>Revision: N</b>
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### DOCUMENT HISTORY LOG

Status (Baseline/ Revision/ Change/ Revalidation/ Canceled)	Document Revision/ Change	Effective Date	Description
Baseline		2/2/00	
Revision	A	3/28/01	<p>Document renumbered in accordance with MPG 1410.2; changed “3.2” to “NSS-1740.12, ‘NASA Safety Standard for Explosives, Propellants, and Pyrotechnics’”; changed title of “3.7” to “Marshall Safety, Health, and Environmental (SHE) Program”; deleted “b” in section 4; added definition for “Impairment Plan”; changed 5.2 to read “...precautions for operation involving open flames or producing heat and/or sparks. This includes, but not limited to: Brazing, Cutting, Grinding, Soldering with a torch, Thawing Pipe, Torch-Applied Roofing and Cad Welding”; revised 6.1.4 to read “...building manager, Industrial Safety Department, building occupants...return to normal. The building manager is responsible for notifying the building occupants of the fire protection system outage”; revised 6.1.5 to read “...are taken. The Facilities Engineering Department is responsible for maintaining an outage log documenting impairment plan requirement...”; deleted “and fire hose stations” from 6.1.6; revised 6.1.6 to read “spreadsheet will be maintained by the building manager and/or building manager assistant to document the type and location of each fire extinguisher in their area or responsibility”; revised 6.2.2 to read “...markings shall be placed...with requirements of NSS-1740.12”; revised 6.5.1 to read “Housekeeping, cleanliness, and means of egress are maintained...of NFPA 101, Chapter 7, 29 CFR 1910.22, and MPG 8715.1”; revised 6.5.4 to read “...self-closing lids meeting NFPA 30A requirements are provided...”; revised 6.6.1 to read “...makers, portable heaters, urns, hot plates, ovens, microwave ovens, grills, and similar heat-producing devices”; revised 6.6.2 to read “...or Assistant will issue a permit, MSFC Form 3798. The user is responsible for posting the permit at each...Permit approval is based...”; revised 6.f.(3) to read “The user shall operate the portable...”; revised 6.6.4 to read “The user is responsible for shutting off portable...unattended and at the end of the workday”; added 6.6.5 and NOTE 1”; revised 6.6.6 to read “...hours or when no one is working in the area...”; added 6.6.7 through 6.6.9; deleted 6.f.(8); added “and combustible”...“reference h(1)” to 6.7.4; added “and combustible”; revised 6.8.3 to read “...heaters (Kerosene) are not used unless ALL the following requirements are met and with S&amp;MA approval”; added 6.8.3.1 through 6.8.3.8; revised 6.13.2 to read “...from any occupied building...”; revised paragraph 9.1 to read “...Log (Impairment Plan)...”; revised 9.4 to read “...will be maintained by the building manager or assistant building manager for the length of time he or she is responsible for checking the fire extinguishers, then destroy or maintain for historical purposes”; added 9.6 and added “Employees who are expected/ required to use portable fire extinguishers will be trained annually in the general principles of fire extinguisher use and the hazards involved with incipient stage fire fighting per 29 CFR 1910.157 (g). The hands-on portable fire extinguisher training offer by the Redstone Fire Department will meet this requirement at MSFC.</p>
Revision	B	8/27/02	<p>Purpose –changed to fire safety, 3.3 changed to NASA-STD-8719.12, 3.6 added CGP P-1, 6.1.6 added appendix C..., 6.6.6.1 reworded, 6.1.7 added mechanical/equipment rooms..., 6.1.7.2 added mechanical/equipment room..., 6.1.7.3 added hot work permit..., 6.3.1 deleted exit, 6.3.2 added emergency/evacuation..., 6.4.1 added Natural Christmas tree..., 6.5.2 added required egress..., 6.6.1 added electrical grills..., 6.6.2 added portable</p>

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			appliances..., 6.6.4.2 added portable appliance..., 6.6.5 added portable appliance..., 6.6.6.1 added no more than, 6.6.7 added Portable..., 6.6.8 added portable, 6.6.9 added portable, 6.7 added portable charcoal or propane grills, 6.8 added MSFC Form 1155, 6.8.3.1 added MSFC Form 1155, 6.8.4 added or, 6.9.3 added areas that have cloth..., 6.9.3.1 added steel waste..., 6.9.4 added kerosene and oil-fired heaters, 6.9.4.1 added all heaters..., 6.9.4.2, 6.9.4.3 added and built-in..., 6.9.4.7 added will be required..., 6.9.4.8 added required in the..., 6.9.4.9 added heater will only..., 6.9.4.10 added In no case..., 6.10.3 added in accordance with..., 6.10.3 added bottles (approx 14..., 6.13 added specifically designed..., 9.4 added or the Facilities..., 10.1 added The hands-on..., 10.2 added Additional safety awareness..., added Appendix C
Revision	C	5/6/2004	Minor word changes throughout document, added Definition, 6.4 expanded Fire Emergency Procedure section, reworded 6.5.2 required for artificial holiday trees, added 6.6 candles, added 6.8.2.1, reworded 6.8.4, expanded 6.8.5 & 6.8.6.3, Added 6.9 Portable Heaters, Reworded 6.9.4, Added 6.11 Deep Fryers, Added New Appendix A , reworded section 6.17 Hot Work Permits, Added New Appendix E
Revision	D	6/22/2004	Added 3.9 US National Archives and Records Administration, "General Records Schedules" (GRS). Per the Directives Control Board decision June 3, 2004, changed the disposition of records (section 9) to match GRS schedule 18 section 9—"Destroy when 3 years old or upon discontinuance of facility, whichever is sooner."
Revision	E	9/30/2004	Revised per HQ rules and review, added 5.5, changed records 9.1 – 9.7 to include NRRS requirements, other minor wording changes in document.
Revision	F	8/4/2005	Reworded and reformatted several sections for easier reading, easier requirements to locate, and to have one requirement per statement number. Added section 6.1.2.1, 6.1.4.4, 6.10, and 6.11.5.1. Revised Appliance and Hot Work Permits
Revision	G	12/08/2006	Changed S&MA to ISD in several places. Rearranged Applicable Documents. Added fire extinguisher class description. Added Logistics Services Office to maintain list of portable fire extinguishers scheduled for maintenance. Added requirements for flammable storage cabinets. Added cargo container requirements. Renumbered entire section 6 to better identify topics. Removed requirement for form 542 to be maintained by building manager. Deleted requirement to maintain list of portable fire extinguishers. Deleted original Appendices C and E. Moved requirements for charcoal and deep fryer use to Appendix E. Moved portable appliance requirements to Appendix G. Added Appendices H, I, J, K and L. Moved holiday decorations and food warming requirements to Appendix K. Reflects minor editorial changes throughout the document.
Revision	H	9/4/2007	Expanded to include offsite operations. Minor grammar changes. Renumbered 6.18 to end. Minor rewording to make requirements clear and reduce confusion in some requirements. Reflects minor editorial changes.
Revision	I	10/1/2008	Revised 2. Applicability statement to address the applicability of this directive to the Michoud Assembly Facility. Added revised Hot Work Permit and Portable Appliance Permit. Changed Appendices to Chapters. Added MPD 1800.1. New 6.1.2-6.1.7, 6.18.3-6.18.5, 6.1.10-6.1.12, 6.4.4-6.4.5, 6.9.5-6.9.7, 6.10.2, 6.11.3-6.11.4, 6.15.4-6.15.8, 6.15.10-6.15.11, 6.16.1-6.16.9, 6.17.3-6.17.4, 6.17.12-6.17.14, 6.22.1-6.22.4, and 6.25.1-6.25.4. Changed Department to Branch and ISD to ISB. Moved portable fire extinguisher requirements to Chapter 7. Moved flammable and combustible liquid requirements to Chapter 11. Added 6.28 for MSFC's MAF.
Revision	J	01/07/2010	Added CH 15, added responsibility for fire watch and training, clarified fire prevention inspections, and added egress width requirements.

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Revision	K	8/10/2012	Total rewrite. Revised per 2011 management review. Rearranged some sections so that the flow is easier to follow and the requirement is clearer. Moved Training to Appendix E. Deleted Chapters 1, 2, 11, 12 & 13. Changed Chapters 3, 4, & 7 to Appendices. Moved topics of Chapter 11, 12 & 13 to section 5.22. Deleted section for MAF. Deleted examples of forms shown in Appendices. Removed toaster oven as being a permitted appliance per NASA STD 8719.11, Chapter 11. Reformatted per MWI 1410.1 revision.
Revision	L	5/09/2014	The update is to cancel OI QD-MAF-005 and the update makes the MWI more generic where it is worded so that it is more applicable to both MSFC and MAF. Where applicable replaced “MSFC and MAF” with “Center” so the instruction is more generic and be easily applicable to both locations. Where applicable replaced Center specific organization names (ISB, EEOH, FMO and PSO) with the generic terms “Center Safety Office, Center Occupational Health Office, Center Environmental Engineering Office, Center Facilities Management Office, Center Protective Services Office, etc.” so the instruction is more generic and be easily applicable to both locations. Used MSFC or MAF if the instruction is applicable to only one location. Added definitions in Appendix A for “Center Safety Office, Center Occupational Health Office, Center Environmental Engineering Office, Center Facilities Management Office, Center Protective Services Office, etc.” and identified what org at each location (MSFC or MAF) performs the instruction. Minor rewording throughout MWI. Updated section 5.5, 5.6 and Chapter 9 for employees that may require assistance in evacuating the building in the event of an emergency.
Revision	M	12/15/2015	Updated SHE Webpage to SHE Explornet Homepage, S&MA to SMA, updated title of MWI 1600.1 and MCP 1040.3, MCP 1040.4 and NRRS 1441.1. Updated process for fire protection system outage. Added in 5.11.1 “Certificate of Occupancy.”
Change	1	6/15/2016	On 6/15/16, at the request of the OPRD, the following changes were made – changed Fire Rescue Spots to Areas of Refuge to match NFPA terms. Added definition for building manager and collateral duty.
Change	2	7/13/2016	On 7/13/16, at the request of the OPRD, the following changes were made – changed Fire Designated Areas to Marshalling Areas. Deleted section 5.23 for smoking. This topic now addressed in MPR 8715.1 and MWI 8715.5.
Change	3	9/21/2016	On 9/21/16, at the request of the OPRD, the following changes were made – changed Marshalling Areas to Assembly Areas as requested by Emergency Management.
Change	4	3/17/2017	On 3/17/17, at the request of the OPRD, administrative changes were made to update Appendix D Records, Table of Contents and references to MSFC’s Explornet page.
Change	5	12/15/2020	On 12/15/20 an expiration date extension request was received from the OPRD to allow time for revisions to complete the directives review process. MSFC Center Directives Manager approved the request and expiration date is being revised from December 15, 2020 to April 1, 2021.
Revision	N	3/1/2021	Minor grammatical changes throughout. Added Chapter 10, Fire Protection Engineering, to address NASA-STD-8719.11B requirements delegated to Center AHJ. Added 5.23, Asphyxiants, Inert Gases and Cryogenics. Updated Chapter 2 with guidance for selection of clean agent systems and pre-action systems. Updated Chapter 1, Hot Work Operations. Updated NASA-STD-8719.11 references.

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## **1. PURPOSE**

This Marshall Work Instruction (MWI) provides instructions for protecting human life, property, and the environment from the risk of fire-related hazards by implementing the basic fire protection requirements as required by the National Fire Protection Association (NFPA) codes and standards, Occupational Safety and Health Administration (OSHA) standards, and NPR 8715.3.

## **2. APPLICABILITY**

2.1 This MWI applies to Center personnel, programs, projects, and activities including contractors and resident agencies to the extent specified in their respective contracts or agreements. (“Contractors,” for purposes of this paragraph, include contractors, grantees, Cooperative Agreement recipients, Space Act Agreement partners, or other agreement parties.)

2.2 This MWI also applies to the Michoud Assembly Facility (MAF).

2.3 This MWI applies as follows: 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/is” denotes descriptive material.

2.4 This MWI applies the following: all document citations are assumed to be the latest version unless otherwise noted.

## **3. AUTHORITY**

NPR 8715.3, NASA General Safety Program Requirements

## **4. APPLICABLE DOCUMENTS AND FORMS**

4.1 Occupational Safety and Health Standards, 29 CFR pt 1910

4.2 Safety and Health Regulations for Construction, 29 CFR pt 1926

4.3 Basic Program Elements for Federal Employee Occupational Safety and Health Programs and Related Matters, 29 CFR pt 1960

4.4 National Fire Protection Association (NFPA) codes and standards (current editions)

4.5 NPD 8500.1, NASA Environmental Management

4.6 NPR 1600.1, NASA Security Program Procedural Requirements

4.7 NPR 1800.1, NASA Occupational Health Program Procedures

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- 4.8 NPR 8715.1, NASA Occupational Safety and Health Programs
- 4.9 NPR 8800.15, Real Estate Management Program
- 4.10 NPR 8831.2, Facilities Maintenance and Operations Management
- 4.11 MPR 1600.1, MSFC Physical Security
- 4.12 MPR 3410.1, Training
- 4.13 MPR 8715.1, Marshall Safety, Health, and Environmental (SHE) Program
- 4.14 MWI 8715.5, Area/Building Manager and Organization's Safety, Health and Environmental (SHE) Point of Contact (POC) Program
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- 4.25 ASME A17.1, Safety Code for Elevators and Escalators
- 4.26 MSFC Form 549, Portable Fire Extinguisher Readiness Verification Tag
- 4.27 MSFC Form 1155, MSFC Hot Work Permit
- 4.28 MSFC Form 3798, Permit for Portable Appliances
- 4.29 MSFC Form 4651, MSFC Fire Safety System Impairment Plan

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4.30 MSFC Form 4665, Certificate of Occupancy

4.31 MSFC Label 45, Room Access Request

4.32 FM Global F2630 Form, Hot Work Permit

4.33 DWF 3090-170, Extinguisher Inspection Tag

4.34 AS50-HBK-001, MSFC Emergency Procedures Handbook

## **5. INSTRUCTIONS**

### **5.1 Center Fire Safety Program**

5.1.1 The Center shall implement a fire safety program in accordance with NPR 8715.3 and NASA STD 8719.11.

5.1.2 Current editions of NFPA codes and standards adopted and referenced by NASA STD 8719.11 shall be used at MSFC and MAF.

### **5.2 Center's Authority Having Jurisdiction (AHJ) for Fire Protection Requirements**

5.2.1 The Center's AHJ shall:

5.2.1.1 Be consulted when decisions are made regarding fire protection safety requirements for occupants, facilities, and operations in accordance with NFPA 1, NPR 8715.3 Chapter 5 and NASA STD 8719.11.

5.2.1.2 Coordinate with other Center organizations to ensure compliance with NFPA standards and requirements as necessary.

5.2.1.3 Be consulted when decisions are made regarding fire safety requirements for occupants, facilities, and operations.

5.2.1.4 Ensure a safety assessment is performed when to identify if newer Federal or NASA requirements need to be incorporated into existing facilities or equipment. (See NPR 8715.3 Chapter 9 for more information.)

5.2.1.5 Ensure this MWI does not conflict or supersede more stringent requirements that may be posed by NFPA, NPR 8715.3 or NASA STD 8719.11.

### **5.3 A Fire Is Discovered**

5.3.1 When a fire is discovered, perform the following:

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5.3.1.1 Activate the building’s fire alarm system. (See AS50-HBK-001 and posted building Emergency/Evacuation Plan for more information.)

*NOTE 1: At Marshall Space Flight Center (MSFC), call 911.*

*NOTE 2: At MAF, call 911 on a MAF network phone or on a non-MAF network phone, dial 504-257-2333 or 911.*

*NOTE 3: Provide the 911 operator as much information about your location as possible (i.e., building number, phone number, and name) and if safe, stay at the location until the arrival of emergency response personnel.*

*NOTE 4: At MSFC, emergency response roles for fire-related situations are defined in MCP 1040.2.*

*NOTE 5: At MAF, emergency response roles for fire-related situations are defined in MCP 1040.4 (only applicable to MAF).*

5.3.1.2 Do not attempt to use a portable fire extinguisher to extinguish a fire.

*NOTE: Employees are permitted to use a portable fire extinguisher to extinguish an incipient stage fire when they are familiar with the general principles and use of portable fire extinguishers. (See Appendix E of this MWI.)*

5.3.1.3 Do not place yourself in danger or leave yourself in a situation where there is no escape/evacuation route if you elect to extinguish an incipient stage fire.

5.3.2 Any person who deliberately, or through negligence, ignites or causes the burning of any combustible material in such a manner as to endanger the safety of any person or property may be deemed to be in violation of this MWI and be subject to disciplinary action in accordance with the “NASA Desk Guide for Table of Disciplinary Offenses and Penalties.”

*NOTE 1: This document is located on the MSFC’s “Inside Marshall,” select “Organizational Websites,” locate “Safety and Mission Assurance Directorate,” select “Safety, Health and Environmental,” select “Safety Policies and Procedures,” select “NASA Disciplinary Program.”*

*NOTE 2: If a fire is the result of a willful or negligent act the person(s) identified as initiating the fire is subject to discipline based on the severity of the event as determined by the investigation which could mean prosecution in a federal court with fines and imprisonment.*

5.3.2.1 At MSFC, contractor employees shall be subject to disciplinary action as determined by the Contracting Officer and/or Contracting Officer’s Representative, or requesting organization, and as agreed upon with the contractor.

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5.3.2.2 At MAF, contractor employees shall be subject to disciplinary action as determined by the Contracting Officer and/or Contracting Officer’s Representative and as agreed upon with the contractor.

#### 5.4 Building Fire Alarm Sounds

5.4.1 When a building fire alarm sounds, perform the following:

5.4.1.1 Immediately exit the building and proceed to the organization’s preselected assembly area shown on the building’s Emergency/Evacuation Plan. (See section 5.9 of this MWI and AS50-HBK-001 for more information.)

*NOTE: Accounting for employees can be of a great value when providing information to emergency response personnel during an emergency event.*

5.4.1.2 Do not delay a timely exit in order to power down computers or remove personal items.

5.4.1.3 Use stairwells to exit the building and avoid the elevators.

5.4.1.4 Avoid congregating near building exits/entrances, in the streets adjacent to the building, fire hydrants, fire trucks, or interference in any manner with fire department personnel or operations.

*NOTE: A general rule is not to locate any closer than 100 feet from the building, so as to not interfere with emergency response personnel. The distance may be greater depending on the nature of the emergency event.*

5.4.1.5 Close doors as they exit the room or area if possible.

*NOTE: Closing of doors can help prevent the spread of smoke and heat within the building.*

5.4.1.6 Call 911 upon evacuating the building if no response is noticed from the Fire Department.

*NOTE 1: If the call is made using a cell phone, be sure the 911 operator is made aware of your location (MSFC or MAF). Provide as much information about your location as possible (i.e., building number, column number, phone number, and name) and if safe, stay at the location until the arrival of emergency response personnel.*

*NOTE 2: At MAF, also call 504-257-2333.*

5.4.2 If a hazardous operation is being performed when the building fire alarm sounds, only essential personnel (those directly responsible for controlling the hazardous systems) are permitted to remain long enough to execute emergency shut-down procedures to return the building/facility to a safe condition. Once the safe condition is achieved, they are also to evacuate to assembly areas.

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5.4.2.1 Pre-fire plans or emergency plans that identify special evacuation procedures shall be developed by Center organizations responsible for performing operations considered as hazardous or contain a high or moderate level of risk. (See NFPA 101 Chapter 4 for more information.)

## 5.5 Persons That Require Assistance to Evacuate

5.5.1 Employees are encouraged to notify their supervisor, their Center sponsor/site contact, or escort if a building occupant or visitor requires assistance to evacuate the building in the event of an emergency. (See Chapter 9 of this MWI and contact the Center’s Safety Office for more information.)

*NOTE: This notification also includes persons with permanent or temporary physical disabilities. Employees that are unable to follow standard evacuation protocols are encouraged to notify their supervisors if they will need some level of assistance to evacuate a building during an emergency event. This notification will ensure an alternate evacuation plan is developed with the supervisor and employee. See NFPA, “Emergency Evacuation Planning Guide for People with Disabilities” for more information.*

## 5.6 Areas of Refuge

5.6.1 Areas of Refuge shall only be used by employees and visitors when they are unable to evacuate the building in the event of an emergency building evacuation. (See NFPA 101, Chapter 7, “Areas of Refuge” for more information.)

*NOTE 1: Areas of Refuge are provided in all MSFC multi-story buildings and are identified on the building’s Emergency/Evacuation Plan.*

*NOTE 2: Areas of Refuge are located where they can be accessed easily by emergency response personnel, such as adjacent to stairwells or elevators.*

*NOTE 3: Areas of Refuge are provided a phone and instructions for employees to notify emergency response personnel of their location and identify any additional actions that may be necessary by the employee.*

*NOTE 4: Areas of Refuge are currently not available at MAF. Contact the Center’s Safety Office for more information.*

## 5.7 Building Fire/Evacuation Drills

5.7.1 Fire/Evacuation drills shall:

5.7.1.1 Be performed at least annually in every building with a normal occupancy load of 10 or more people in accordance with NASA STD 8719.11, Appendix A, and NFPA 101 Chapter 4.

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5.7.1.2 Be scheduled and coordinated by Center’s Safety Office with the building manager or area supervisors to ensure conflicts with critical testing or critical mission operations are avoided.

5.7.1.3 Be unannounced to the building occupants.

*NOTE 1: A building fire drill is a method to observe employee behavior when they are alerted to evacuate the building, the orderliness of their evacuation, how employees assemble at their assembly area, and the effectiveness of the building’s fire notification system for an extended duration.*

*NOTE 2: At MAF, key personnel may be designated to be involved in the drill to prevent interruption of mission-essential activities when requested by the Center’s AHJ or Fire Chief.*

## 5.8 Building Emergency/Evacuation Plans

5.8.1 Emergency/Evacuation Plans shall:

5.8.1.1 Be conspicuously posted in each building.

*NOTE: These plans are normally posted in the common areas of buildings such as at the entrances, building lobbies, and in the elevator lobby on each floor of multi-story buildings.*

5.8.1.2 Identify the building emergency egress paths by “red dashed lines.”

5.8.1.3 Be maintained up-to-date with the identification and location of firefighting equipment, egress paths, areas of refuge, and assembly areas.

5.8.2 Building managers, area supervisors, Center’s Facilities Management Office (FMO), Center’s Emergency Operations Center (EOC), and the Center’s Safety Office work closely together to ensure the Building Emergency/Evacuation plans are maintained up-to-date.

*NOTE: Employees are encouraged to become familiar with the plan for their primary work area/building and any work area/building they may visit so they are aware of the quickest path to exit the area/building.*

## 5.9 Emergency/Evacuation Assembly Area

5.9.1 Emergency/evacuation assembly areas shall be selected from the building’s emergency/evacuation plan and communicated to all organization employees by supervisors.

*NOTE 1: Supervisors may select and communicate a specific location within the building’s emergency/evacuation assembly areas for the organization to gather after evacuating the building.*

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*NOTE 2: Employees are encouraged to notify their supervisor and/or team members upon their arrival at the assembly area. Accounting for employees can be of a great value when providing information to emergency response personnel. Notifying supervisors or team members that everyone is accounted for can reduce the possibility of placing emergency response personnel in a dangerous situation when there is no one left in the building to rescue.*

*NOTE 3: Employees are encouraged to stay in their pre-determined assembly area until they are notified to take other actions.*

## 5.10 Emergency Egress Path

5.10.1 Hallways, stairways, corridors, and doorways identified on the building's Emergency/Evacuation Plan as an emergency egress path from the building shall be kept clear at all times and not used for storage (e.g., file cabinets, furniture, other material, or equipment) in accordance with NASA STD 8719.11, Chapter 10 and NFPA 101, Chapters 4 and 7.

5.10.2 Building emergency egress path components (hallways, stairways, corridors, and doorways) width shall not be less than 28 inches for an existing exit access and 36 inches for new exit access in accordance with NFPA 101, Chapter 7.

*NOTE: Existing is determined by the date the requirement went into effect and by the date the construction plans were approved by the Center's AHJ. (See NFPA 101 definition for "Existing" for more information.)*

5.10.3 Emergency egress path from individual offices and other areas that serve six (6) or less employees, have a length of less than 50 feet, and is made up of movable partitions and furniture, shall not be less than 18 inches at and below a height of 38 inches and not less than 28 inches above a height of 38 inches in accordance with NFPA 101, Chapter 7, section for "Minimum Width."

## 5.11 Fire Prevention Inspections

5.11.1 Fire prevention inspections shall:

5.11.1.1 Be performed for all renovated or new construction prior to occupancy.

a. Final fire prevention inspections validate that all fire protection and life safety systems have been completed, inspected, successfully tested, and approved, and all outstanding fire and life safety deficiencies have been corrected to afford a reasonable degree of safety to building occupants from fire and similar emergencies.

b. Final fire prevention inspections are documented on MSFC Form 4665, Certificate of Occupancy, and issued to the MSFC Project Manager upon successful completion.

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5.11.1.2 Be performed at least annually for all Center buildings/facilities by employees trained to recognize conditions in the workplace that have a potential to create a fire hazard and fire-related issues. (See 29 CFR pt 1960.57, NPR 8715.1, Chapter 4 and NASA STD 8719.11, Appendix A for more information.)

*NOTE: These inspections may be a standalone inspection or be included as part of an annual building safety inspection following the process described in MWI 8715.12. (See MPR 8715.1 for more information.)*

5.11.1.3 Be performed more frequently for buildings/facilities identified to contain a high or moderate risk for a fire.

*NOTE: Normally these inspections are performed semi-annually by the Center's Safety Office, but in some cases, these inspections are determined by the Center's Safety Office to be performed more frequently, such as quarterly if materials, substances, or activities increase the likelihood of an accidental fire occurring or there is greater potential for employee injury. Fire prevention inspections may be included as part of the building/facility SHE inspection that also includes compliance with OSHA standards.*

5.11.2 Employees performing fire prevention inspections shall be trained to recognize conditions in the workplace that have a potential to create a fire hazard in accordance with NPR 8715.1 and 29 CFR pt 1960.

## 5.12 Area Orderliness/Housekeeping

5.12.1 Work areas/rooms shall be maintained in a clean, orderly, and sanitary condition so that they do not pose an increased risk to the ignition of a fire in accordance with NFPA 1, Chapter 10, 29 CFR pt 1910.22, NASA STD 8719.11, Appendix A and MPR 8715.1, Chapter 10.

*NOTE: Maintaining area orderliness/housekeeping includes limiting the accumulation of combustible materials (e.g., waste paper or corrugated boxes) to a minimum, and the combustible materials that are accumulated are stored in a neat and orderly manner.*

5.12.2 Furniture, equipment, supplies, or other large objects shall not be stored in building egress corridors and passageways, or obscure the view of, obstruct, prevent, or delay access to, or the use of, fire protection equipment. (See NFPA 101 Chapters 4 and 7 for more information.)

*NOTE: Storage may be permitted in lobbies, recessed areas, or other spaces specifically designed for such purpose, so long as the stored items do not interfere with or delay access to the egress exit. Contact Center's Safety Office for more information.*

## 5.13 Fire Retardant and Waste Containers

5.13.1 Fire retardant containers shall be provided, identified, maintained, and emptied in accordance with 29 CFR pt 1910.106, 29 CFR pt 1910.125, 29 CFR pt 1910.144, 29 CFR pt

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1926.252 if they are intended to store oily and/or solid waste from flammable/combustible liquids in the work area.

*NOTE 1: Contact the Center's Environmental Office to determine if the combustible or flammable waste meets the requirements for a Satellite Accumulation Area. (See MWI 8550.1 for more information.)*

*NOTE 2: Fire retardant containers are equipped with self-closing lids.*

5.13.2 If a Satellite Accumulation Area is not required for combustible or flammable rags, the rags shall be discarded in the building trash dumpster located outside the building.

5.13.3 Rags contaminated or saturated (thoroughly wet or when held at arm's length, the liquid drips) with flammable or combustible liquids shall be disposed of in a fire retardant container and not in the regular building trash dumpster or with the normal building waste.

5.13.4 A sufficient number of waste receptacles appropriate for the type waste generated shall be provided in all work areas.

#### 5.14 Memorandum of Agreement (MOA) to Issue Hot Work Permits

5.14.1 Hot work permits shall be issued by employees that have been trained in fire preventive measures after the area/operation where the hot work will be performed has been inspected to ensure adequate fire prevention measure have been implemented as noted on the hot work permit. (See 29 CFR pt 1910.252 and CH1 of this MWI for more information.)

*NOTE 1: At MSFC, hot work permits (MSFC Form 1155, "Hot Work Permit") are issued by the Center's Safety Office unless authorization has been given to a contractor to issue these permits through a Memorandum of Agreement (MOA).*

*NOTE 2: At MAF, hot work permits [FM Global Form F2630, "Hot Work Permit" (only applicable to MAF) or similar permit] are issued by the New Orleans Fire Department.*

*NOTE 3: Contractors located on the Center may be authorized to issue hot work permits for hot work operations performed by their employees and subcontractors. Authorization to issue hot work permits cannot be delegated from the prime contractor to a subcontractor unless approved by the Center's Safety Office and noted on the MOA. (See Appendix F for more information.)*

5.14.2 MOAs to issue hot work permits shall:

5.14.2.1 Be forwarded to the Center's Safety Office for approval.

5.14.2.2 Be reviewed when changes to this process are identified and revised if needed.

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5.14.2.3 Not be issued to contractors whose work is demolition or construction.

5.14.3 Any violation discovered for hot work operations being performed under the MOA shall be subject to result in termination of the MOA and any additional action deemed appropriate by the Contracting Officer's Representative in accordance with the contract requirement and/or MSFC's Disciplinary Program.

5.14.4 The process for issuing hot work permits is described in CH1 of this MWI.

#### 5.15 Fire Protection for Construction Operations

5.15.1 Appropriate fire prevention measures shall be implemented and enforced during construction, alteration, and demolition operations to protect against potential fire hazards in accordance with NFPA 241.

*NOTE: See Chapter 6 of this MWI for the use of portable heaters and stoves at construction sites for more information.*

#### 5.16 Asphalt/Tar Kettle and Similar Fired Equipment, and Torch-Applied Roofing

5.16.1 Asphalt/Tar kettle and similar fire equipment, and torch-applied roofing operations shall:

5.16.1.1 Require an approved hot work permit prior to the start of work.

5.16.1.2 Be maintained and operated, and torch-applied roofing applied in accordance with NASA STD 8719.11, Appendix A.8 and NFPA 241.

5.16.1.3 Be barricaded (rope, warning tape, or other suitable means) at least 20 feet (6.1 meters) from the tar kettle to keep unauthorized personnel from entering the area.

*NOTE: Signs are recommended to be posted along with the barricade to communicate the hazardous conditions to employees in the area. (See 29 CFR pts 1910.144 and 145, and American National Standards Institute (ANSI) Z535.2, Z535.3, Z535.4 and Z535.5 for more information on sign format, color combinations, signal words or symbols, and basic messages.)*

#### 5.17 Flammable/Combustible Liquids and Gases

5.17.1 Flammable/combustible liquids and gases shall be stored, maintained, dispensed, and disposed of in accordance with NFPA 13, 30, 51, 54 and 58, 29 CFR pt 1910.106, 29 CFR pt 1910.109, 29 CFR pt 1910.110, and NASA STD 8719.11, Appendix A.9.

5.17.2 Ordinary combustibles, commodities and products (e.g., Safety Data Sheet, or rags and similar commodities) shall not be stored in, on, or near flammable storage cabinets. (See NASA STD 8719.11, Appendix A.9 for more information.)

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*NOTE 1: Products that are shipped in Department of Transportation approved paper/cardboard containers for hazardous transportation are permitted to be inside flammable liquid storage cabinets. Contact the Center Safety Office for assistance if needed.*

*NOTE 2: Recommend a minimum of 3 feet be maintained between a flammable storage cabinet and the storage of combustible materials.*

#### 5.18 Plastics and Polyurethane

Material used for tents or temporary clean rooms shall have a flame resistant rating identified for the application for which they are being used or have a flame spread rating of 25 or less.

#### 5.19 Combustible Metals

5.19.1 Areas where magnesium is handled and/or machined shall:

5.19.1.1 Be provided with Class D portable fire extinguishers in accordance with NFPA 484, NASA STD 8719.11, Chapter 9.

5.19.1.2 Be provided with metal drums marked “Magnesium Only” that have a lid or cover so that the magnesium chips and shavings can be placed in them until the chips and shavings can be removed from the building.

5.19.2 Magnesium chips and shavings shall be removed from the building daily, at a minimum.

5.19.3 Metal drums containing magnesium shall be stored separate from other scrap.

#### 5.20 Portable Structures

5.20.1 Portable structures (Trailers, Mobile Homes, or Relocatable Buildings) shall:

5.20.1.1 Be constructed, located, set-up, maintained, and operated in accordance with NASA STD 8719.11, Chapter 10.

5.20.1.2 Have the same fire protection requirements as those for permanent structures at the Center.

5.20.1.3 Be located so they do not block roads, access to any building, or fire hydrants.

5.20.1.4 Be supported and anchored in accordance with the local codes specific to portable structures.

*NOTE: An exception to this is permitted for single trailers.*

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5.20.2 Trailers brought to the Center and used as offices and material storage areas shall:

5.20.2.1 Be located as designated by the Center’s FMO.

5.20.2.2 Be maintained and anchored in accordance with local codes specific to portable trailers.

5.21 Interior Finishes

5.21.1 Center building interior finishes, contents and furnishings, including draperies, curtains, and other similar loosely hanging furnishings and decorations, shall meet the minimum combustible requirements identified by federal, state and local building code requirements in accordance with NASA STD 8719.11, Chapter 8 and NFPA 101 Chapter 10.

5.22 Building/Room Identification/Marking

5.22.1 Building identification/number shall be placed on or near each building and be visible from the street and/or main entrance.

5.22.2 Buildings used to store or handle explosives shall be identified/marked to clearly identify the explosives stored in the building in accordance with NASA STD 8719.12.

*NOTE: Rooms/areas within buildings that contain materials that may be hazardous to emergency response personnel are recommended to be identified to provide a general idea of the hazards associated with the materials and the severity of these hazards as they relate to emergency response personnel. (See NFPA 704 for more information.)*

5.23 Asphyxiants, Inert Gases and Cryogenics

5.23.1 Any area where an asphyxiant, inert gas, or cryogenic is introduced or amount increased, shall be evaluated by the Occupational Health Office to determine the need for oxygen depletion monitoring.

5.23.2 The Occupational Health Office’s evaluation and recommendation shall be sent to the Authority Having Jurisdiction (AHJ) for review and approval.

*NOTE: The installation of oxygen deficiency monitors is made on a case-by-case basis.*

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## **6. CANCELLATION**

MWI 8715.11M-5, Fire Safety Program, dated December 15, 2015.

*Electronically concurred by*

Steven C. Miley for  
Jody Singer  
Director

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## **CHAPTER 1: HOT WORK OPERATIONS**

CH1.1 For the purpose of this MWI, Hot Work shall refer to the following: Welding, Cutting, Brazing, Torch Soldering, Grinding, Thawing pipe, Powder-driven fasteners, Hot riveting, and other similar applications producing or using a spark, flame, or heat.

CH1.1.1 Hot work operations shall be performed in an area specifically designated for hot work operations when feasible.

*NOTE: The Center designated hot work areas are identified by a Center Designated Hot Work Area sign.*

CH1.1.2 When the hot work operations need to be performed in an area not specifically designated for hot work operations, a hot work permit shall be requested. (See NASA STD 8719.11, Chapter 11 and NFPA 51B for more information.)

CH1.1.3 The area/operation requiring the hot work permit shall be inspected prior to issuing the hot work permit ensure adequate fire prevention measure have been implemented as noted on the hot work permit by Center's Safety Office or organization designated to issue the hot work permit.

CH1.1.4 Fire preventions precautions identified on the hot work permit shall be implemented by the organization performing the work prior to the start of the hot work operation and throughout the duration of the hot work operation.

CH1.1.4.1 The area/operation may be inspected randomly throughout the duration of the hot work operation by the Center's Safety Office or organization designated to issue the hot work permits to ensure fire prevention measures are effective.

### **CH1.2 Operations Requiring a Hot Work Permit**

CH1.2.1 A hot work permit shall be required for the following:

CH1.2.1.1 Any operation mentioned in CH1.1, when performed outside of a designated Hot Work Area.

CH1.2.1.2 Use of a portable charcoal or propane grill within 25 feet (7.6 meters) of any Center building.

CH1.2.1.3 Use of a deep fryer within 25 feet (7.6 meters) of any Center building.

CH1.2.1.4 Torch-Applied Roofing, Tar Kettle/Tar Pot Operations, and Hot Tar Operations, in general

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CH1.2.1.4.1 Tar Pot Hot Work shall be performed in accordance with NASA-STD-8719.11 A.8.7

CH1.2.1.5 Use of portable heaters or stoves when the heater/stove is located within 25 feet (7.6 meters) of combustible materials, is used within an enclosed area, or is fueled by flammable or combustible liquids (kerosene, oil-fired, gas or propane/butane). (See Chapter 6 of this MWI for more information on the use of these heaters/stoves for more information.)

CH1.2.2 A hot work permit is not required for the type of operations that are performed in laboratories and shops that use heat-producing devices that do not produce an open flame (e.g., electric soldering irons, heat guns, heat sealers, solder melting pots, and other similar heat-producing type laboratory and shop equipment) and those listed in this section that are performed in a Center Designated Hot Work Area.

### CH1.3 Hot Work Permit

CH1.3.1 A Hot Work Permit shall:

CH1.3.1.1 Be requested prior to the start of work by the organization performing the hot work operation.

*NOTE 1: At MSFC, the permit can be obtained from the Industrial Safety Branch, or an organization approved to issue hot work permits and use MSFC Form 1155, "Hot Work Permit."*

*NOTE 2: At MAF, the permit can be obtained from the MAF Protective Services Office (PSO) and use FM Global Form F2630, "Hot Work Permit" (only applicable to MAF) or similar permit.*

CH1.3.1.2 Be initiated for a specific hot work operation or location where several similar hot work operations are performed in the same location by the same organization.

CH1.3.1.3 Be valid for the day of the job or a limited number of days that the hot work is expected to be performed.

*NOTE: The preferred method is for the permit to be issued on a daily basis and not to exceed the time the work is expected to be performed. However, some jobs (i.e., construction or modification to equipment) are scheduled for an extended period of time. The allowance for the permit to be issued for a longer period of time is at the discretion of the Center's AHJ.*

CH1.3.1.4 Not issued to exceed a 30-day period.

*NOTE: In cases where a hot work permit is issued for 30 days, random walk-throughs of the area will be performed throughout the length of the job by representatives from the Center's Safety Office to observe the hot work operation and ensure the implementation*

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*of the fire prevention precautions noted on the hot work permit.*

CH1.3.1.5 Be requested at least 24 hours in advance of when the actual hot work is scheduled to start.

*NOTE: This 24-hour notice is intended to schedule a time when the issuing organization is able to issue the permit in order to prevent work stoppage or the possibility of delays in completing scheduled work. This advance notice does not include emergencies.*

CH1.3.1.6 Be posted in a conspicuous location or kept in a readily-available location at the job site.

CH1.3.2 A new hot work permit shall be issued when changes are made to the hot work operation or new hazards are discovered during the hot work operation.

#### CH1.4 Designated Hot Work Area

*NOTE: Areas that are specifically constructed for the purpose of performing operations that produce open flames or produce heat and/or sparks including grinding, brazing, cutting, soldering with a torch, or welding, and are recommended to be designated as a Center Designated Hot Work Area. Hot work operations performed in these designated areas do not require a hot work permit.*

CH1.4.1 Center Designated Hot Work Area shall:

CH1.4.1.1 Comply with NFPA 51B to minimize the possibility of a fire during hot work operations.

CH1.4.1.2 Be identified with the Center Designated Hot Work Area requirements sign and a NOTICE - Center Designated Hot Work Area approval sign, form MSFC 4707.

*NOTE 1: The NOTICE - Center Designated Hot Work Area approval sign includes concurrence from the Center's Safety Office.*

*NOTE 2: At MSFC, also includes concurrence from EEOH.*

CH1.4.1.3 Prior to the start of hot work in a designated area, at a minimum, the hot work operator shall verify all of the following:

- a. The location is fire resistant.
  - b. Combustibles are relocated at least 35 ft. in all directions from hot work area.
- (1) If relocation is impractical, combustibles are shielded by a barrier constructed of noncombustible materials or otherwise protected by a listed welding curtain, welding blanket,

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welding pad, or equivalent.

(2) Edges of covers at the floor are tight, including at the point where covers overlap.

- a. Fire extinguishers are in working condition and readily available.
- b. Ventilation is working properly.
- c. Hot Work equipment is in proper working order.

#### CH1.5 Designated Fire Watch for Hot Work Operations

CH1.5.1 During Hot Work operations, the fire watch shall watch for fires in all exposed areas and try to extinguish them only when the fires are obviously within the capacity of the equipment available. If the fire watch determines that the fire is not within the capacity of the equipment, the fire alarm is to be activated immediately.

CH1.5.2 Employees designated to serve as a “fire watch” during hot work operations shall:

- a. Be trained to recognize the inherent hazards of the work site and hot work operations.
- b. Ensure safe conditions are maintained during hot work operations.
- c. Have the authority to stop hot work operations if unsafe conditions develop.
- d. Be familiar with the facilities and procedures for sounding an alarm in the event of a fire
- e. Be familiar with and trained in the general principles and use of portable fire extinguishers use in accordance with NFPA 51B.

*NOTE 1: Training may be accomplished by the completion of SHE 115 and SHE 116, or an equivalent that provides an overview in general principles and use of portable fire extinguishers.*

CH 1.5.3 The fire watch shall be permitted to perform additional tasks, but those tasks cannot distract him or her from fire watch responsibilities.

*NOTE 2: Supervisors are to ensure their employees are familiar with the general principles and use of portable fire extinguisher use prior to designating them to serve in the role of a “fire watch.”*

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## **CHAPTER 2: FIRE PROTECTION SYSTEMS AND EQUIPMENT**

### **CH2.1 Fire Protection Systems and Equipment**

CH2.1.1 Fire protection systems and equipment shall be designed, equipped, installed, identified, tested, inspected, and maintained in accordance with manufacturer's requirements, NFPA 1, 10, 25, 45, 72, and 96, 29 CFR pt 1910.155 through 165, and NASA STD 8719.11, Chapter 9, ASME A17.1, and general consensus standards requirements applicable for the system and equipment.

*NOTE 1: Fire protection systems include systems and equipment designed and installed to detect a fire, notify building occupants to evacuate the area, and extinguish the fire.*

*NOTE 2: The fire protection systems are included in the Center's periodic maintenance program.*

CH2.1.2 The operating configuration of the Center's fire protection system shall not be changed or modified without concurrence from the Center's AHJ.

### **CH2.2 Permanently-Installed Fire Extinguishing Systems**

CH2.2.1 Permanently-installed fire extinguishing systems shall:

CH2.2.1.1 Be designed, equipped and installed, so that they activate the building's fire alarm system when they are activated.

CH2.2.1.2 Be equipped with at least one manual activation/pull station.

*NOTE: The manual pull station is normally located along the normal means of egress from the area.*

CH2.2.1.3 Be installed, maintained, tested, and inspected at the frequency identified by the applicable standards listed in CH2.1 by the Center's FMO. (See the NFPA requirements that are applicable for the system being maintained.)

CH2.2.1.4 At MAF, be designed, equipped, and installed to provide total flooding of an area and be provided with a pre-discharge alarm that provides sufficient reaction time for employees to safely egress the area.

CH2.2.1.5 Clean Agent or Inert Gas Systems shall not be installed in Essential Information Technology Equipment areas without first installing an aspirating smoke detection system and emergency power disconnecting means, required by NASA-STD-8719.11 and NFPA 75, respectively.

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## CH2.3 Automatic Fire Detection, Notification, and Suppression/Extinguishing Systems and Equipment

CH2.3.1 Automatic fire detection, notification, and suppression/extinguishing systems and equipment shall:

CH2.3.1.1 Be designed, equipped, installed, and configured to allow for remote monitoring by the Center's central fire alarm system and to automatically notify the Center's PSO (Security dispatch) and/or the local fire department.

*NOTE: At MAF, the PSO Dispatch notifies the Fire Department.*

CH2.3.1.2 Be installed and configured so that there is a reduced likelihood of the system initiating false alarms and nuisance alarms signaling emergency personnel to respond to the building or for building occupants to evacuate. (See NFPA 72 for more information.)

CH2.3.1.3 Be designed, installed, and configured to detect a fire in its incipient stage and activate the notification and extinguishing systems.

CH2.3.1.4 Pre-action sprinkler systems shall not be used in lieu of wet-pipe sprinkler systems, except for Essential Information Technology Equipment areas protected by an early-warning aspirating smoke detection system, emergency power disconnecting means, and clean agent or inert gas extinguishing systems.

## CH2.4 Portable Fire Extinguishers

CH2.4.1 Portable Fire Extinguishers shall:

CH2.4.1.1 Be located, installed, inspected, maintained, operated, and tested in accordance with NFPA 10, 29 CFR pt 1910.157, NASA STD 8719.11, Chapters 4 and 9 as well as Appendices E and H of this MWI. (See Appendix G of this MWI for more information.)

CH2.4.1.2 Be visually inspected, at least monthly, and the inspection documented. (See NFPA 10 Chapter 7 for more information.)

*NOTE 1: At MSFC, the inspection is performed by the Building Manager, Assistant Building Manager, or Center organization assigned to the area where the portable fire extinguisher is located, and documented on MSFC Form 549. The MSFC Form 549 is attached to the portable fire extinguisher. Contact ISB to obtain the MSFC Form 549 tags or a local vendor for a general type inspection tag. A general inspection tag that identifies the employee performing the inspection and date of inspection may be permitted for use in place of the MFSC Form 549 with concurrence from ISB. (See MWI 8715.5 for more information.)*

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*NOTE 2: At MAF, the inspection is performed by an organization designated to perform these inspections, or by the area supervisor or designee of the organization assigned to the area where the portable fire extinguisher is located, and documented on an inspection tag attached to the portable fire extinguisher or other method that documents the monthly inspection. (See MWI 8715.5 for more information.)*

*NOTE 3: Visual inspection criteria for portable fire extinguishers are provided on MSFC Form 549 or may be obtained from NFPA 10, Chapter 7.*

*NOTE 4: At MSFC, the MSFC Logistics Services Office (LSO) schedules the annual maintenance and hydrostatic testing of portable fire extinguishers.*

*NOTE 5: The Center's AHJ allows the portable fire extinguisher to be inspected at any time during the month. This allowance may sometimes result in the date listed on the tag to be more than 30 days between inspection dates.*

CH2.4.1.3 Be a multi-purpose dry chemical extinguisher with a minimum rating of 2A:10BC, unless deemed inappropriate by the Center's AHJ for use against a known hazard.

CH2.4.1.4 Be located in MSFC building equipment rooms in accordance with Chapter 5 of this MWI.

## CH2.5 Building Fire Alarm

CH2.5.1 Building fire alarm shall:

CH2.5.1.1 Be designed, equipped and installed to initiate fire alarm signal to alert employees for the need to evacuate the building when smoke/heat detectors are activated.

CH2.5.1.2 Have a signal that is distinctive, recognizable as an evacuation alarm, and capable of being heard or seen above ambient noise/light levels.

CH2.5.1.3 Be configured to provide sufficient reaction time for employees to safely egress the area when it is initiated.

CH2.5.1.4 Be tested on regular intervals. (See the NFPA requirements that are applicable for the system being tested. The tests are for both supervised and non-supervised alarm systems.)

CH2.5.1.5 Be deactivated during the hot work, demolition and construction, and reactivated as soon as the hot work is completed.

## CH2.6 Planned Fire Protection System Outage

CH2.6.1 Are performed following the processes and regulations described in NFPA 1, NASA STD 8719.11 and this MWI.

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CH2.6.2 Are classified as tier 1, 2 or 3 with regard to the type for the purposes of this procedure. (See definitions for tier 1, 2 and 3 in this MWI for more information.)

CH2.6.2.1 Final designation of tier classification shall be determined by the Center’s AHJ or by the outage coordinators for the Center’s FMO or SMA.

CH2.6.3 Shall be recorded on MSFC Form 4651.

CH2.6.3.1 All unplanned fire protection system outages that exceed ten (10) hours shall be recorded on MSFC Form 4651.

CH2.6.4 The outage coordinator shall be the designated representative from the organization that is familiar with the procedures, policies, and risks associated with performing outages of fire safety systems and components. The outage coordinator may or may not be directly responsible for the work where a potential conflict of interest could occur.

CH2.7 Fire Protection System Impairment Plans

CH2.7.1 All fire protection system outages that exceed four (4) hours in durations shall require an approved impairment plan (MSFC Form 4651).

CH2.8 Impairment Plan Approval/Concurrence

CH2.8.1 Tier 1 Impairment plans shall receive approval/concurrence from the Center’s AHJ, Center’s Safety Office Impairment Coordinator, Center Safety Office representative assigned to the building or Center’s FMO Impairment Coordinator.

CH2.8.2 Tier 2 Impairment plans shall receive approval/concurrence from the Center’s AHJ, Center’s Safety Office Impairment Coordinator or Center Safety Office representative.

CH2.8.3 Tier 3 Impairment plans shall receive approval/concurrence from the Center’s AHJ or Center’s Safety Office Impairment Coordinator.

*NOTE: The Center’s AHJ or designee serves as the Center’s Safety Office Impairment Coordinator.*

CH2.9 Fire Protection System Outage Notification

CH2.9.1 The Center’s FMO outage coordinator shall ensure employees directly involved in fire protection system outage are notified.

*NOTE 1: At MSFC the following are notified.*

*NOTE 2: At MAF, contact the MAF SMA Manager/QD12.*

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CH2.9.2 Tier 1 outages shall require notification to the following:

CH2.9.2.1 Center's AHJ

CH2.9.2.2 AS24 Area Project Manager

CH2.9.2.3 Center's FMO Maintenance and Operations contractor's Safety Lead

CH2.9.2.4 Center's FMO Construction Management Inspector Lead

CH2.9.3 Tier 2 and 3 outages shall require notification to the following:

CH2.9.3.1 Building Manager

CH2.9.3.2 Center's Safety Office Impairment Coordinator

CH2.9.3.3 Center Safety Office representative

CH2.9.3.4 Center's J911 Center

CH2.9.3.5 Building occupants shall be notified of planned fire protection system outages by posting signs on the doors of each building entrance or e-mail, verbal communication, or public announcement to building occupants of the outage.

*NOTE: A "NOTICE" sign or a similar method of alerting is the preferred method of ensuring all building occupants receive notification as they enter the building that the building's fire protection system is inoperable. (See ANSI Z535.2, Z535.3, and Z535.4 for more information on sign format, color combinations, signal words or symbols, and basic messages.)*

CH2.9.4 During an outage, building occupants shall be informed to be alert for any sign of fire or smoke and call 911 if fire or smoke is noticed.

CH2.9.4.1 At MAF, call 911 on a MAF network phone, or call 504-257-2333 if on a non-MAF network phone.

CH2.9.4.2 If fire or smoke is noticed, ensure the building fire alarm pull station is activated if not already in the alarm mode, use direct voice communication to alert other employees to evacuate the building, or listen for voice fire notification that may be provided via the warning system provided with the building's fire alarm panel.

CH2.9.5 The Center's PSO shall be notified to perform additional walk-throughs of the buildings during non-normal working hours when a related fire protection system has been taken out of service for service/maintenance.

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*NOTE: There may be times where Center's Emergency Warning System may be used by the Center's PSO or Center's EOC to temporarily notify building occupants in the event of a fire if the building's Emergency Warning System is designed to allow for this type of use.*

## CH2.10 Fire Alarm Panels

CH2.10.1 Fire alarm panels shall be designed and maintained so that there is a low likelihood of alarm trouble codes.

*NOTE: Trouble codes will be investigated and corrected.*

## CH2.11 Demolition

CH2.11.1 Facilities permanently disconnected from Center fire protection system service shall:

CH2.11.1.1 Be cleared for demolition by SMA.

CH2.11.1.2 Have all significant levels of combustibles removed from the facility prior to disconnection.

CH2.11.1.3 Be removed from the monitoring by the central station prior to being disconnected at the facility.

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## **CHAPTER 3: PORTABLE CHARCOAL/PROPANE GRILLS AND DEEP FRYERS/BOILING POTS**

### **CH3.1 Portable Charcoal or Propane Grills**

CH3.1.1 Grills shall:

CH3.1.1.1 At MSFC, require a hot work permit when used within 25 feet (7.6 meters) from the building. At MAF, a hot work permit is required for all uses, regardless of location.

*NOTE: A hot work permit is not required if the grill is located at the MSFC designated picnic area.*

CH3.1.1.2 Be attended at all times while in use.

CH3.1.1.3 Not be equipped with glass viewing windows in the cover.

CH3.1.1.4 Be inspected/checked for their safety condition prior to use (Propane grill - valves, fittings, and hoses).

CH3.1.1.5 Be turned off or extinguished after use. (Charcoal grills extinguished with water to eliminate the possibility of the residue charcoal smoldering. Propane grills turn the propane tank to off.)

*NOTE: Do not empty the charcoal ashes from the grill in areas where combustible material exists, such as a trash container or dumpster, until 24 hours after use.*

CH3.1.1.6 Be allowed to be stored inside Center buildings (if propane tank is removed, if applicable).

CH3.1.2 Propane tanks shall be stored in an area approved for flammable compressed gas cylinders.

*NOTE: An exception to this is permitted for propane tank(s) to be stored with the gas grill when the grill is stored over 25 feet (7.6 meters) from the building or in a designated picnic area.*

CH3.1.3 Charcoal stored in Center buildings shall be stored in a metal cabinet away from any sources of ignition and not be more than one 20-pound bag.

CH3.1.4 Lighter fluid stored at the Center shall be stored in a flammable storage cabinet.

### **CH3.2 Deep Fryers/Boiling Pots**

CH3.2.1 Fryers/Boiling Pots shall:

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CH3.2.1.1 At MSFC, a hot work permit is required when used within 25 feet (7.6 meters) from the building. At MAF, a hot work permit is required for all uses, regardless of location.

*NOTE: A hot work permit is not required if the fryer is located at the MSFC designated picnic area.*

CH3.2.1.2 Be attended at all times while in use.

CH3.2.1.3 Not be used inside buildings.

*NOTE: This does not prevent the use of deep fryers in pavilions or similar type buildings such as in a cafeteria if they are part of the appliances used on a regular basis.*

CH3.2.1.4 Be placed in an open area away from all walls, fences, or any other structure that has the potential to catch fire.

CH3.2.1.5 Be inspected/checked for their safety condition prior to use (valves, fittings, and hoses).

CH3.2.1.6 Be placed so there is at least 2 feet (0.6 meters) of space maintained between the propane gas tank and fryer burner.

CH3.2.1.7 Be placed so any wind will blow the heat of the fryer/boiling pot burner away from the propane tank.

CH3.2.1.8 Contain the proper amount of oil as identified in the Manufacturer's instructions.

CH3.2.1.9 Not have oil added to the pot while the pot is hot.

CH3.2.1.10 Have the pot centered over the fryer burner during use.

CH3.2.1.11 Have the oil temperature checked frequently while in use.

CH3.2.1.12 Have the gas supply turned off immediately if the oil begins to smoke.

CH3.2.2 The oil shall be cooled completely before discarding.

*NOTE: Contact the Center's Environmental Office for the proper disposal requirements when disposing of used cooking oil.*

CH3.2.3 The propane gas tank shall be stored in an area approved for flammable compressed gas cylinders.

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## **CHAPTER 4: PORTABLE APPLIANCES**

### **CH4.1 Portable Appliances**

CH4.1.1 Portable appliance used in the general office environment, including break rooms, for food preparation that contain a heating element and may pose an increased risk of initiating a fire if they are left “on” and unattended, shall require a portable appliance permit MSFC Form 3798. (See NASA STD 8719.11, Appendix A for more information.)

*NOTE: Portable appliances may be permitted for use so long as the building’s electrical system is capable of supporting the load needed for these types of appliances.*

CH4.1.2 Portable appliance shall have evidence (label or tag) of testing by a Nationally Recognized Testing Laboratory (NRTL) [e.g., Underwriters Laboratory, Wyle Laboratories, or Applied Research Laboratory] and is being used for its intended purpose, unless approval for use has been obtained from the Center’s Safety Office.

CH4.1.3 Portable appliance shall be individually permitted.

### **CH4.2 Portable appliances Requiring a MSFC Form 3798**

CH4.2.1 Portable appliances requiring a MSFC Form 3798 shall include the following:

CH4.2.1.1 Coffee makers, including those that are plumbed to building’s water supply

CH4.2.1.2 Desk-type coffee warmers

CH4.2.1.3 Portable electric heaters

CH4.2.1.4 Hot plates used to cook or heat food

CH4.2.1.5 Pop-up Toasters

*NOTE 1: MSFC Form 3798 is located on the NASA’s Explornet page,” select “Center,” select “Marshall,” select “Marshall Integrated Document Library (MIDL),” select “Forms Management-MSFC Forms.” Contact the Center’s Safety Office for any questions for portable appliances not listed in the section above.*

*NOTE 2: There are cases where the MSFC Form 3798 is revised. In these cases, a new MSFC Form 3798 does not need to be issued unless changes are made such as appliance type, location, or owner.*

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### CH4.3 Electric appliances Not Permitted for Personal Use Inside Center Buildings

CH4.3.1 Electric appliances not permitted for personal use inside Center buildings shall include the following:

CH4.3.1.1 Electric appliances that are capable of reaching high temperatures and considered to contain a high likelihood to cause a fire if they or their contents were to come in contact with combustible materials, contain items considered as a high hazard, or have been recalled by the manufacture because of high potential to cause fires (e.g., halogen torchiere-style floor lamp).

CH4.3.1.2 Toaster ovens are not permitted for use.

*NOTE: A toaster oven is an appliance that can be used as either a toaster or an oven, is normally equipped with a door and a wire rack for horizontal toasting, but is not a pop-up or conveyor style toaster.*

### CH4.4 Portable appliances Not requiring a MSFC Form 3798

CH4.4.1 Portable appliances not requiring a MSFC Form 3798 shall include the following:

CH4.4.1.1 Microwave oven, refrigerators, and similar type appliances that do not contain a heating element. Contact the Center's Safety Office for a determination if other similar appliances require a permit.

CH4.4.1.2 Heat-producing devices (i.e., soldering irons, bag sealers, laminators) used as part of normal work-related activities.

CH4.4.1.3 Heat-producing appliances such as electric grills, stoves, and similar type appliances that are designed and constructed for use in a designated kitchen/break room.

*NOTE: This does not include any of those appliances listed in Chapter 3 of this MWI, regardless of their location unless they are located in a cafeteria. Electric grills and similar type cooking appliances that heat and use grease for cooking inside a building are limited to use only in kitchen/break rooms that have access to a portable fire extinguisher and are attended at all times while in use.*

### CH4.5 Portable Appliance Permit

CH4.5.1 Portable appliances shall:

CH4.5.1.1 Be used and operated in accordance with the instructions listed in the approved portable appliance permit.

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*NOTE: The permit is located on the NASA's Explornet homepage, select "Center," select "Marshall," select "Marshall Integrated Document Library (MIDL)," select "Forms Management-MSFC Forms" for the latest version of this form.*

CH4.5.1.2 Have the signed permit posted in plain view close to the appliance so it can be easily noticed.

*NOTE: Posting the permit under a desk or behind an object in the area is not considered as being posted in plain view.*

CH4.5.1.3 Only be used in the location designated on the permit.

CH4.5.1.4 Be shut off and/or unplugged when the appliance is left unattended and at the end of the workday, so that the thermostat cannot turn the heater "on" while no one is in the general area or during non-working hours.

*NOTE 1: Coffee makers are permitted to be left unattended during normal working hours and when employees are working after hours or weekends so long as it is shut off at the end of the shift or when the last person leaves.*

*NOTE 2: The preferred method is to unplug the portable appliance when left unattended and at the end of the work day.*

*NOTE 3: The portable appliance permit does not need to be updated unless the appliance is moved to another location, the appliance is changed, or when determined by the Building Manager or supervisor.*

*NOTE 4: Coffee makers that are designed, constructed, and NRTL-approved to keep the water reservoir "HOT" during periods of non-use are permitted to remain plugged in during non-working hours.*

*NOTE 5: At MAF, area supervisors may serve in an equivalent role as a Building Manager. (See MWI 8715.5 for more information.)*

#### CH4.6 Use of automatic timers

*NOTE: Automatic timers are permitted to help users ensure coffee makers are shut off during off-duty hours. Electing to use an automatic shut-off feature does not relieve the users of their responsibility for ensuring the coffee maker is turned off at the end of the work day. Automatic timers can be built into the unit or be a separate device to which the unit's power supply cord is connected.*

CH4.6.1 Automatic timers shall:

CH4.6.1.1 Be listed by an NRTL if not built-in to the appliance.

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CH4.6.1.2 Not be used as a method to turn the appliance on.

#### CH4.7 Revoke a Portable Appliance Permit

CH4.7.1 A portable appliance permit shall be revoked when Center’s PSO (Security) reports a portable appliance is discovered as left “on” after normal working hours or when no one is working for a period of 30 days.

*NOTE 1: At MSFC, SHE Committee adopted this rule, October 1, 1999.*

*NOTE 2: The building manager or assistant building manager normally revokes the appliance permit when contacted by the Center’s Safety Office.*

CH4.7.1.1 The portable appliance shall not be moved to another location and a new permit issued when the permit has been revoked.

#### CH4.8 Connecting Portable Appliances to the Power Source

CH4.8.1 Portable appliances shall be plugged directly into a permanently-mounted receptacle or to an NRTL (e.g., Underwriters Laboratory or Applied Research Laboratory) labeled extension cord with usage requirements and wire gauge equal to or greater than the appliance cord when permitted by the building manager.

*NOTE: A coffee maker and a heater are not permitted to be connected to the same power strip.*

#### CH4.9 Microwave Ovens

CH4.9.1 Microwave ovens shall be attended at all times while cooking.

CH4.9.2 A microwave oven shall be removed from service for 30 days if the Fire Department responds to a fire in a microwave oven due to unattended cooking.

*NOTE: At MSFC, the SHE Committee adopted this rule, October 1, 1999. At MSFC, the Building Manager or Assistant Building Manager, when made aware of the Fire Department’s response to the building, normally coordinates the removal of the microwave oven from the area or securing it so that it is unable to be operated with the supervisor of the employee who is responsible for the microwave oven.*

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## **CHAPTER 5: PORTABLE FIRE EXTINGUISHERS LOCATED IN MSFC MECHANICAL/EQUIPMENT ROOMS**

### **CH5.1 Mechanical/equipment rooms with direct access from the interior of the building**

CH5.1.1 A portable fire extinguisher shall be carried into the equipment rooms during maintenance operations if a multi-purpose dry chemical extinguisher is not located inside the building on the same floor level and is not within 75 feet (22.9 meters) of the equipment room doorway.

### **CH5.2 Mechanical/equipment rooms with exterior access only**

*NOTE: Multi-purpose, dry chemical extinguishers are permanently mounted on all service vehicles used to perform maintenance in areas containing mechanical/equipment rooms with exterior access.*

CH5.2.1 If the vehicle is parked within 75 feet (22.9 meters) of the equipment room doorway, then the fire extinguisher located on the service vehicle shall be sufficient for the required fire protection.

CH5.2.2 If the vehicle is parked over 75 feet (22.9 meters) from the doorway, then a fire extinguisher shall either be permanently mounted inside the equipment room, or maintenance personnel are required to bring one with them when performing maintenance operations in the room.

### **CH5.3 Equipment Rooms Exceeding 3,000 square feet (278.7 square meters), or Containing Flammable/Combustible Liquids or Gases**

CH5.3.1 Equipment rooms exceeding 3,000 square feet (278.7 square meters), or containing flammable/combustible liquids or gases, shall require additional extinguishers inside the area. In such cases, contact the Center's Safety Office for an evaluation to assure compliance with the requirements of NFPA 10.

### **CH5.4 Work in Mechanical/Equipment Room Requiring a Hot Work Permit**

CH5.4.1 Work in a mechanical/equipment room that requires a hot work permit shall require a portable fire extinguisher to be present.

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## **CHAPTER 6: PORTABLE HEATERS AND STOVES**

### **CH6.1 General Requirements for all heaters**

*NOTE: These requirements are applicable to all heaters (electric and fueled by flammable or combustible liquids) unless noted otherwise.*

#### **CH6.1.1 Heaters shall:**

**CH6.1.2** Be located on a firm-level noncombustible surface free from combustible materials so that they are unable to be easily turned over.

**CH6.1.3** Be located at least 3 feet (0.9 meters) from any wall and any other easily-ignitable combustible material such as combustible furniture, paper, curtains, clothing, or anything else that is easily ignited unless a greater distance is recommended by the manufacturer.

*NOTE: The carpet used at MSFC is fire resistant. Portable heaters are permitted to sit directly on the carpet.*

**CH6.1.4** Be turned “off” when unattended and at the end of the workday, so that the thermostat cannot turn the heater “on” while no one is in the general area or during non-working hours.

*NOTE: The preferred method is to unplug the heater when not in use.*

**CH6.1.5** Be inspected prior to use to ensure that they are in a safe working condition.

**CH6.1.6** Be listed by an NRTL (e.g., Underwriters Laboratory or Applied Research Laboratory).

**CH6.1.7** Be equipped to de-energize with an automatic mechanism (e.g., switch or thermostat) that can shut off the heater when tilted, turned over, or is overheated.

*NOTE: Self-contained oil-filled electric heaters do not require a turn-over or overheat switch.*

### **CH6.2 Portable Heaters and Stoves Fueled by Flammable or Combustible Liquids**

**CH6.2.1** Portable Heaters and Stoves Fueled by Flammable or Combustible Liquids (kerosene or oil-fired or gas or propane/butane) shall:

**CH6.2.1.1** Only be permitted in special situations such as construction sites and test areas and comply with all of the requirements listed in this Chapter and NASA STD 8719.11, Chapter 28.

*NOTE: Heaters fueled by flammable or combustible liquids are permitted in test areas such as on test stands and other outdoor/unheated areas during extreme winter weather months*

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*when use of such heaters is required. Contact the Center's Safety Office for more information on the use of these heaters.*

CH6.2.1.2 Require a hot work permit when located within 25 feet (7.6 meters) of combustible materials being used or stored.

CH6.2.1.3 Be equipped with a tip-over mechanism and/or built-in flame-out control that automatically shuts down all systems if the flame fails.

*NOTE: Self-contained, oil-filled electric heaters do not need to be equipped with turn-over or overheat switches.*

CH6.2.1.4 Be lit and refueled only by those employees that are familiar and knowledgeable with the operation of the specific heater being used.

CH6.2.1.5 Be shut off when left unattended.

CH6.2.1.6 Be cool before refueling and refueled outside the building.

*NOTE: Allow an adequate time for the heater to cool down prior to refueling.*

CH6.2.1.7 Require an oxygen deficiency monitor when used in enclosed areas within the test area.

*NOTE: The installation of oxygen deficiency monitors is made on a case-by-case basis. Contact the Center's Occupational Health Office to assist in this evaluation.*

CH6.2.1.8 Be placed in well-ventilated areas when in use.

CH6.2.1.9 Be placed so that there is adequate clearance from combustible materials and in no case less than the manufacturer's recommendations. A minimum clearance of 3 feet (0.9 meters) on all sides of kerosene heaters. A minimum clearance of 5 feet in front of forced-air (torpedo style) heaters.

### CH6.3 Kerosene Containers

Kerosene containers used to refuel heaters shall be blue, and clearly marked "KEROSENE USE ONLY."

### CH6.4 Stoves Fueled by Flammable or Combustible Liquids

A 10-pound, multi-purpose dry chemical fire extinguisher shall be located not less than 25 feet (7.6 meters) nor more than 75 feet (22.9 meters) from stoves fueled by flammable or combustible liquids.

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## **CHAPTER 7: HOLIDAY DECORATIONS AND FOOD WARMING DEVICES**

### **CH7.1 Holiday Decorations**

CH7.1.1 Natural trees (cut or balled) used for holiday decorations shall not be allowed inside Center buildings.

*NOTE: Natural trees are identified by NFPA as combustible vegetation. (See NFPA 1, Chapter 10 for more information.)*

CH7.1.2 Only flame-retardant artificial holiday trees shall be allowed inside buildings.

CH7.1.3 Electrical lights shall not be placed directly on metal holiday trees.

*NOTE: This does not include electrical lights that are manufactured as part of the artificial holiday tree.*

CH7.1.3.1 Metal holiday trees shall be illuminated only by an indirect light source, when needed.

CH7.1.4 All holiday electrical decorations shall bear an NRTL label for intended use.

CH7.1.4.1 The holiday electrical decorations label shall be the holographic type indicating that the decorative lighting meets the more recent NRTL standards.

*NOTE: These labels have a silver base with multi-colored shapes and an Underwriters Laboratory mark “appears to float” in a three-dimensional (3-D) background.*

CH7.1.5 All holiday electrical decorations used indoors shall be disconnected from the electrical outlet at the end of the workday.

### **CH7.2 Decorations or Food Warming Devices Using an Open Flame**

CH7.2.1 Candles, Sterno® tins, votive warming candles, and other similar devices when used in accordance with the following instructions, do not require a hot work permit (MSFC Form 1155). Contact the Center’s Safety Office if there are any questions or concerns.

*NOTE: At MAF, a hot work permit is required for all uses, regardless of location.*

CH7.2.2 Candles, when lit, shall not be permitted in any building except under the following conditions:

CH7.2.2.1 Only when used as holiday decorations or for ceremonial purposes at occupied tables.

CH7.2.2.2 Only when arranged so they are unable to make direct contact with or be exposed to any combustible materials and also positioned to eliminate the possibility of injury to employees.

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CH7.2.2.3 Only while the room or area is physically occupied and can be extinguished whenever the room or area is unoccupied, even momentarily.

CH7.2.2.4 Only when they are the type whose burning is inherently controlled and a size that resists tipping.

*NOTE: Short candles are preferred and recommended.*

CH7.2.2.5 Only when placed in a tip-resistant, noncombustible container constructed so as to not be easily tipped over and self-righting if placed in a free-standing position.

### CH7.3 Heat/Smoke Detectors

The heat/smoke detectors in the area where the candles are being used shall be disabled or the candles are arranged and located so as to not activate the building fire alarm.

*NOTE: Contact the Center's FMO.*

### CH7.4 Sterno® Tins, Votive Warming Candles, and "Canned Heat"

CH7.4.1 Sterno® tins, votive warming candles, "canned heat," and other types of open flame devices manufactured/intended for the purpose of keeping food warm at the tableside shall not be permitted except under the following conditions:

CH7.4.1.1 The devices are lit by a competent person who remains present at all times until the flames are extinguished.

*NOTE: These devices are normally lit by catering staff employees.*

CH7.4.1.2 The device is positioned to avoid direct contact with or exposure to combustible materials and also positioned to eliminate the possibility of injury to employees.

CH7.4.1.3 The device is shielded to prevent direct contact with or exposure to any combustibles including the tablecloths and clothing of employees attending the event.

*NOTE: This is normally accomplished by placing the warming device in a holder specifically designed for this purpose under the food tray. A noncombustible material is recommended to be placed between the bottom of the device and the tablecloth or tabletop to ensure adequate shielding.*

CH7.4.1.4 Each device is extinguished after the ceremony has concluded.

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## **CHAPTER 8: CARGO CONTAINERS AND RELOCATABLE BUILDINGS**

### **CH8.1 Approval for Cargo Containers and Relocatable Buildings**

CH8.1.1 Approval from Center's FMO shall be obtained prior to the purchase of any cargo containers or relocatable buildings intended for use at the Center. (See NPR 8800.15 for more information.)

CH8.1.2 Site sketch/plans of the proposed locations shall be submitted to the Center's FMO for approval prior to purchase and placement.

CH8.1.3 Potential safety issues or hazardous conditions shall be coordinated with Center's FMO and Center Safety Office.

CH8.1.4 Site location shall be provided on the delivery paperwork when the cargo container or relocatable building is processed through the Center's Central Receiving.

CH8.1.5 Existing cargo containers or relocatable buildings already in use at the Center shall comply with the requirements contained in this document unless an exemption is obtained from the Center's FMO and Center Safety Office.

### **CH8.2 Location of Cargo Containers and Relocatable Buildings**

CH8.2.1 Cargo Containers and Relocatable Buildings shall:

CH8.2.1.1 Have a Center unique identifier located in an easily visible location on the cargo containers or relocatable building identifying the cargo containers or relocatable building location, and responsible-users' contact information.

*NOTE 1: At MSFC, a Label 45 is used for this purpose.*

*NOTE 2: The user's contact information is needed if the cargo container or relocatable building is discovered unlocked or in event of emergency when user is not in the vicinity.*

CH8.2.1.2 Be located on pavement or concrete slabs to help control varmints/vegetation, and improve esthetics/stability.

*NOTE: An exception to this is when used for test operations within the MSFC Test Area, locations other than pavement or concrete slabs may be approved by the Center's FMO after appropriate coordination with the Center's Safety Office.*

CH8.2.1.3 Be locked using only approved (security) locks.

CH8.2.1.4 Security keys shall be controlled pursuant to the requirements in MPR 1600.1.

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CH8.2.1.5 Be located at least 25 feet from permanent buildings to prevent potential fire exposure and operational blockages unless approval for a closer location is obtained from Center’s FMO, Center Safety Office and the building manager.

CH8.2.1.6 Be kept in a single group not exceeding 1500 square feet in total floor area to reduce fire potential and maintain access.

CH8.2.1.7 Be located to maintain a minimum of 10 feet clear space between multiple cargo container or relocatable building groups.

*NOTE: An exception to this is to support ground maintenance activities, containers not located on a common pavement or concrete slab area will not be grouped.*

CH8.2.1.8 Be located to maintain a minimum of 10 feet clear space in front of the container’s or building’s doors.

CH8.2.1.9 Be used for storage only.

CH8.2.1.10 Not contain flammable or combustible liquids, and chemicals or equipment with tanks/reservoirs that hold chemicals.

*NOTE: At MSFC, an exception to this is cargo containers located within the Test Area are allowed to be used for test operations activities if they meet NFPA 101 requirements and the use is approved by the Center’s Safety Office.*

CH8.2.1.11 Not be provided with utilities such as water, electricity, and gas except as approved for test area operations.

CH8.2.1.12 Be included in the Center’s FMO, PSO (Security), area/building manager, supervisor, and SHE organizations inspection processes, as appropriate.

### CH8.3 User Organization

CH8.3.1 The Center’s user organization shall contact the Center’s FMO and Center Safety Office prior to relocating any cargo container and relocatable building.

*NOTE: At MAF, the Center’s Logistics Department, Environmental Office, PSO and Fire Department are also notified.*

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## **CHAPTER 9: AREAS OF REFUGE INSTRUCTIONS FOR PERSONNEL WITH DISABILITIES**

*NOTE: Areas of Refuge are provided in all MSFC multistory buildings and are identified on the building's Emergency/Evacuation Plan.*

### **CH9.1 Personnel Unable to Follow Standard Evacuation Protocol**

CH9.1.1 All employees that are unable to follow standard evacuation protocols shall have an alternate evacuation plan that includes, at a minimum, an evaluation of the notification, route to exit the building, use of the route to exit, and assistance.

*NOTE 1: These four elements represent the core of the ability of any individual to respond to an emergency.*

- *Notification: Does the employee understand the nature of the emergency?*
- *Route: Does the employee know the route to exit the building?*
- *Use of the route to exit: Can the employee exit the building unassisted?*
- *Assistance: What assistance (if any) does the employee need to exit the building?*

*NOTE 2: Alternate evacuation plan is developed by the supervisor and the Personnel with disabilities.*

### **CH9.2 Instructions for Personnel Requiring Assistance**

CH9.2.1 Instructions for personnel requiring assistance during the event of an emergency evacuation:

CH9.2.1.1 Egress the building either to a public way/assembly area or, if an accessible path is not available, to an area of refuge.

*NOTE 1: Evacuation to a public way/assembly area is always the first choice and to an area of refuge is the second choice.*

*NOTE 2: If the employee has an alternate evacuation plan that requires assistance, they should follow the pre-coordinated plan for contact and execution of the egress process.*

CH9.2.1.2 Where a phone is provided, the employee should dial 911, and tell the dispatcher/operator their name, location, building number and floor level.

*NOTE: Employees should dial 911 during building evacuation drills as they would during an actual emergency evacuation. This will help ensure the process is working and verify a clear communication path between the employee and PSO 911 dispatch.*

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CH9.2.1.3 If the path to the “Area of Refuge” is blocked or unsafe, proceed to the nearest accessible stairwell and, if possible, phone (i.e., cell phone, office phone, or floor below “Area of Refuge”) to notify the 911 dispatcher/operator of their location.

CH9.2.1.4 Remain near the area of refuge for further instructions (shelter-in-place, evacuate, or all is clear and it is safe to return back to normal duty location).

CH9.2.1.5 If the employee feels unsafe in the designated area of refuge, the employee should proceed to the nearest accessible stairwell and, if possible, call 911 to notify the 911 operator of the change in location.

*NOTE: Individuals providing assistance at an area of refuge have the option of remaining near the phone/stairwell with the employee, so long as they do not place themselves in immediate danger.*

CH9.2.1.6 If the employee is unable to locate the area of refuge, proceed to the nearest accessible stairwell and, if possible, phone (i.e., cell/office/conference room phone) to notify the 911 dispatcher of their location.

*NOTE: In the event of an emergency, an employee may not be able to readily locate the area of refuge if they are in a building they are unfamiliar with. In these situations, the employee should take the egress route of other personnel in the building.*

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## **CHAPTER 10: FIRE PROTECTION ENGINEERING**

### **CH10.1 Major Projects**

A “Major Project” is a project that includes any one of the following:

- a. Design or construction of a new Facility.
- b. Addition to an existing Facility.
- c. Change of Occupancy
- d. Change of Use that:
  - (1) Creates a higher hazard
  - (2) Exceeds 5,000sf of floor area
- e. Reconstruction in an existing Facility.
- f. New installation or Modification of an area of construction greater than 5,000sf of floor area that involves existing or new fire barriers, fire-rated construction, life safety systems, fire alarm or detection systems, or fire suppression systems.
- g. Installation of new fire alarm or detection or fire suppression system.
- h. Modification of 20 or more existing sprinklers.
- i. New installation or Modification of existing HVAC systems that remove or install the duct work passing through fire-rated or smoke partitions/barriers or interconnected plenum areas serving an area greater than 5,000sf of floor area.

*NOTE: Addition, Change of Occupancy, Change of Use, Modification, and Reconstruction are defined by NFPA 101.*

### **CH10.2 Qualified Fire Protection Engineer**

Major Projects require the design, review and oversight services of a Qualified Fire Protection Engineer (QFPE). A QFPE shall be involved in every aspect of the design, construction and testing/commissioning as it relates to fire protection and life safety. This includes, but is not limited to, building code analysis, life safety code analysis, design of automatic fire alarm, detection and suppression systems, water supply analysis, a multi-discipline review of the entire project, construction inspections and witnessing of fire protection acceptance testing/commissioning.

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*NOTE: The AHJ is permitted to reduce the scope of QFPE involvement in a project on a case by case basis.*

### CH10.3 Fire Protection Design Analysis

CH10.3.1 The QFPE shall complete a Fire Protection Design Analysis (FPDA) for all Major Projects.

CH10.3.2 The FPDA shall include all topics applicable to the project listed in NASA-STD-8719.11B §1.10.4.

CH10.3.3 The FPDA shall be submitted with the first design submittal, and updated with each subsequent design submittal.

### CH10.3.4 Preliminary Hydraulic Analysis

CH10.3.4.1 For Major Projects involving new or modified water-based suppression systems, the QFPE shall prepare a preliminary hydraulic analysis and submit it as part of the FPDA.

CH10.3.4.2 The analysis shall demonstrate that the anticipated water demand(s), including those for fire, domestic, and industrial needs, will be satisfied by the available water supply. Include a graphical analysis of the relationship between the Fire Water Demand and the available water supply.

### CH10.4 Code Compliance Plans

Code Compliance Plans (CCP) are required for Major Projects, and consist of the Code Compliance Summary Sheet, Life Safety Plan, and Code Compliance Site Plan. Code Compliance Plans shall be submitted by the designer of record with the first design submittal and updated with each subsequent submittal.

*NOTE: The AHJ is permitted to allow omission of CCP for projects with little or no fire protection or life safety considerations*

#### CH10.4.1 Code Compliance Summary Sheet

CH10.4.1.1 Provide a code compliance summary sheet that includes all applicable information listed in NASA-STD-8719.11B §1.10.4

#### CH10.4.2 Life Safety Plan

Provide a life safety plan that includes, at a minimum, all applicable information from the following list:

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- a. Capacity and number of occupants using each major means of egress component (e.g., stairs, stair doors, exterior doors, assembly exit doors).
- b. Maximum travel distance, dead-end corridor, common path of travel, accessible means of egress and exit components for each floor and occupancy classification. When suites are used, indicate type, location, area and arrangement.
- c. IBC and NFPA occupancy classification of each room, area or compartment (on the drawings or in tabular form). Include occupant load of each room, area or compartment. Similar occupancies can be grouped together for occupant load calculations.
- d. Location and rating of all fire walls, fire barriers, fire partitions, smoke barriers and smoke partitions (both horizontal and vertical).
- e. Location of hazardous materials storage, handling and use that exceed the maximum allowable quantities.
- f. Structural fireproofing locations and associated ratings.

#### CH10.4.3 Code Compliance Site Plan

Provide a code compliance site plan that includes, at a minimum, all applicable information from the following list:

- a. Line of encroachment identifying assumed property lines and minimum separation distances from adjacent buildings.
- b. Building perimeter used for frontage increases.
- c. Fire department access.
- d. Fire lane width, marking and locations, approach roads and turn radius and location.
- e. Intended fire department main entrance to facility.
- f. Location of fire department connections.
- g. Fire hydrants, post indicator valve or valves and their connected water distribution mains serving facility.
- h. Fire pump room.
- i. Water storage tanks.

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- j. Hazardous material spill containment tanks.
- k. Backflow prevention assembly or assemblies serving water-based fire protection systems (if located outside of building).

CH10.5 Emergency Lighting and Fire Alarm Upgrades for Minor Projects

CH10.5.1 A “Minor Project” is a project that does not meet the threshold for a Major Project.

CH10.5.2 Minor Projects that remove or install ceiling grid or ceiling-grid mounted light fixtures shall upgrade emergency lighting, egress lighting, and fire alarm notification in the work area to meet the current requirements of NFPA 101 and NFPA 72.

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## **APPENDIX A: DEFINITIONS**

Assembly Area An area designated for building employees to gather in the event of an evacuation from the building. These areas are identified on the building’s emergency/evacuation plan.

Assistant Building Manager (ABM) Individual assigned responsibility to aid the Building Manager (BM) in assuring that their assigned buildings and its surrounding areas are safe, healthful, and in compliance with housekeeping rules. Sometimes referred to as a floor manager.

Authority Having Jurisdiction (AHJ) The organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure.

Authorized Official Person familiar with and trained in the fire prevention techniques defined in NFPA and designated by the Safety & Mission Assurance (SMA) Directorate to issue an MSFC Form 1155, MSFC Hot Work Permit.

Building Manager (BM) Individual assigned by and responsible to the respective AM to assure that their assigned buildings and its surrounding areas are safe, healthful, and in compliance with housekeeping rules, and provides SHE-related assistance and support to their organization management and the Center’s Safety Office, Center’s Occupational Health Office and Center’s Environmental Office in ensuring the processes described in this MWI are communicated and implemented within their building. This is normally a SHE-related collateral duty. If possible, the BM is selected from employees located in the assigned building. (See MPR 8715.1, MWI 8715.12, and MWI 8715.13 for more information.)

Center NASA-owned property that has been designated as a NASA Center. In this MWI, the Center is MSFC or MAF.

Center Environmental Office The Center Office/Department/Branch that provides insight, oversight, and coordination of environmental-related issues with internal and external organizations to ensure compliance is maintained with all applicable federal, state and local environmental regulations, NASA and Center environmental requirements, and environmental-related Executive Orders, in accordance with NPD 8500.1, “NASA Environmental Management.” At MSFC, these functions are performed by the Office of Center Operations/ Environmental Engineering and Occupational Health (EEOH)/AS10. At MAF, these functions are performed by the MAF Environmental Lead/AS60 and the Synergy Achieving Consolidated Operations and Maintenance (SACOM) Environmental Services who ensure all environmental-related day-to-day functions identified in this MWI for EEOH are performed.

Center Facility Management Office (FMO) The Center Office/Department/Branch that provides insight, oversight, and coordination of facility operation and maintenance-related issues with internal and external organizations to ensure compliance is maintained with all applicable facility-related Executive Orders, federal, state, local, NASA and Center regulations in accordance with

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NPR 8831.2. At MSFC, these functions are performed by the Office of Center Operations/FMO/AS20. At MAF these functions are performed by the MAF Operations Office/AS60 and the SACOM Facilities Management Office Department (FMOD) who ensure all facility-related day-to-day functions identified in this MWI for FMO are performed.

Center Occupational Health Office The Center Office/Department/Branch that provides insight, oversight and coordination of occupational health-related issues with internal and external organizations to ensure compliance is maintained with all applicable occupational health-related Executive Orders, federal, state, local, NASA and Center regulations in accordance with NPR 1800.1. At MSFC, these functions are performed by the Office of Center Operations/EEOH/AS10. At MAF, these functions are performed by the MAF Emergency Management/PSO Operations Manager/AS50 and the SACOM Safety and Health Services who ensure all occupational health-related day-to-day functions identified in this MWI for EEOH are performed.

Center Protective Services Office (PSO) The Center Office/Department/Branch that provides insight, oversight, and coordination of security-related issues with internal and external organizations to ensure compliance is maintained with all applicable security-related Executive Orders, federal, state, local, NASA and Center regulations in accordance with NPR 1600.1. At MSFC, these functions are performed by the Office of Center Operations Office/PSO/AS50. At MAF, these functions are performed by the MAF Emergency Management/PSO Operations Manager/AS50 and the MAF PSO who ensure all protective service-related day-to-day functions identified in this MWI for PSO are performed.

Center Safety Office The Center Office/Department/Branch that provides insight, oversight, and coordination of safety-related issues with internal and external organizations to ensure compliance is maintained with all applicable safety-related Executive Orders, federal, state, local, NASA and Center regulations in accordance with in NPR 8715.1 and NPR 8715.3. At MSFC, these functions are performed by the SMA Directorate/ISB/QD12. At MAF, these functions are performed by the MAF SMA Manager/QD12 and the SACOM Safety and Health Services who ensure all safety-related day-to-day functions identified in this MWI for SMA and ISB are performed.

Certificate of Occupancy A document that provides concurrence from the Center's AHJ attesting that the building's fire protection and life safety systems have been inspected, successfully tested and are compliant with NASA/MSFC and NFPA fire protection and life safety rules and regulations, and is safe for occupancy.

Code Compliance Plans (CCP) Code Compliance Summary Sheet, Life Safety Plan, and Code Compliance Site Plan.

Collateral Duty (as applied to this MWI) A duty assigned to an employee that is performed in addition to and separate from the duties of the employee's regular position. In the scope of this MWI, serving as an AM, BM, ABM, or organization's SHE POC may (at times) require significant activity in support of the SHE Program. (See MPR 8715.1 for more information.)

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**Combustible Liquid** Any liquid that has a closed-cup flash point at or above 100 degrees Fahrenheit.

**Combustible Material** A material that, in the form in which it is used and under the conditions anticipated, will ignite and burn; a material that does not meet the definition of noncombustible or limited-combustible.

**Essential Information Technology Equipment** A facility's equipment, located in specific areas, that includes, but is not limited to, data and communication center equipment, command and control systems, and mission support equipment. Electronic equipment areas are areas containing telecommunication equipment that serves more than one facility, a portion of a Center, or the entire Center. This section does not apply to the room in a facility that contains the incoming telecommunications service for that specific facility or Incidental Electronic Equipment rooms.

**False Alarm** A fire/smoke detector is activated for a nonfire condition. A false alarm can occur when a smoke detector is activated, because of popcorn burning in a microwave oven or steam from cooking on a stove.

**Fire Protection Design Analysis (FPDA)** A written narrative covering the gamut of fire protection and life safety topics for a project.

**Fire Retardant Container** A nationally-recognized testing laboratory container of normally not more than 5.3 gallon (20 liter) capacity, having a self-closing lid and spout cover and so designed to safely relieve internal pressure when subjected to fire exposure.

**Fire Watch** A person identified for the express purpose of notifying the fire department and/or building occupants of an emergency, preventing a fire from occurring, extinguishing incipient stage fires, or protecting the public from fire and life safety dangers.

**Flammable Liquid** Any liquid that has a closed-cup flash point below 100 degrees Fahrenheit.

**Flame Spread Index** A comparative measure, expressed as a dimensionless number, derived from visual measurements of the spread of flame versus time for a material tested.

**Flash Point** The minimum temperature of a liquid at which sufficient vapor is given off to form an ignitable mixture with air, near the surface of the liquid or within the vessel used.

**Impairment** Any condition in a fire protection system which degrades or is likely to degrade its intended performance below the minimum operability requirements of the system.

**Impairment Plan** A fire protection system outage plan providing details of work to be performed and safety measures taken during the time of the outage.

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Incipient Stage Fire A fire in the initial or beginning stage that is able to be controlled or extinguished by portable fire extinguishers without the need for protective clothing or breathing apparatus (e.g., a trash can fire).

Limited-Combustible Material Building construction material not complying with the definition of noncombustible and includes either of the following: (1) materials having a structural base of noncombustible material with a surfacing not exceeding a thickness of 1/8 inch that has a flame spread index not greater than 50; or (2) materials in the form and thickness used (having neither a flame spread index greater than 25, nor evidence of continued progressive combustion) and such composition that surfaces that would be exposed by cutting through the material on any plane would have neither the flame spread index greater than 25 nor evidence of continued progressive combustion.

Nationally Recognized Testing Laboratory (NRTL) An OSHA program in OSHA’s Directorate of Science, Technology, and Medicine. It recognizes private sector organizations as NRTLs, and this recognition signifies that an organization has met the necessary qualifications specified in the regulations for the program. The NRTL determines that specific equipment and materials (“products”) meet consensus-based standards of safety to provide the assurance, required by OSHA, that these products are safe for use in the U.S. workplace. A current listing of OSHA approved NRTLs is located on the OSHA Web page. Go to site index A–Z index, select “N” and look under “Nationally Recognized Testing Laboratories.”

Noncombustible Material A material that, in the form which it is used and under the conditions anticipated will not ignite, burn, support combustion, or release flammable vapors, when subjected to fire or heat.

Nuisance Alarm A fire/smoke detector is activated caused by a mechanical failure, malfunction, improper installation, or lack of proper maintenance, or any alarm activation by a cause that cannot be determined.

Personnel With Disabilities A person, regardless of age or circumstance, who has a physical disability that limits their ability to walk, climb, descend, sit or rise, or other disability such as a sensory disability (vision or hearing impairment).

Planned Fire Protection System Outage An outage in which authorized personnel purposefully disable a fire safety system or system component(s) to facilitate repair, maintenance, construction, renovation, or other facility modification.

Public Way A street, alley, or other similar parcel of land essentially open to the outside air deeded, dedicated, or otherwise permanently appropriated to the public for public use and having a clear width and height of not less than 10 feet. A building’s assembly area is a public way.

Qualified Fire Protection Engineer (QFPE) An individual meeting one of the following conditions: (1) A registered professional engineer who has passed the fire protection engineering written examination administered by the National Council of Examiners for Engineering and

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Surveys, or (2) A registered professional engineer in a related engineering discipline with a minimum of 5 years of verified experience, dedicated to fire protection engineering. The QFPE is intended to be a member of the design team or a third-party reviewer, and should not be the person having enforcement responsibilities for the project as part of the AHJ staff. [NASA-STD-8719.11B §2.2.1]

Tier 1 A classification of a planned fire protection system considered as a “minor hazard outage” and meets “all” of the following criteria: Only devices within the work area are impaired; no hazardous operations or high/moderate risk operations, including hot work, are being performed in the work area; no hazardous materials are being stored in the work area; work area designated by the impairment plan is only occupied by the personnel requesting the impairment; and only one fire protection system is affected by the impairment plan (e.g., only sprinkler or only fire alarm, but not both).

Tier 2 A classification of a planned fire protection system considered as a “low to moderate hazard outage” and meets “all” of the following criteria: Only devices within the work area or a limited area around the work area are affected; no active hazardous operations or high/moderate risk operations, including hot work, are being performed except those that are properly authorized for hot work operations; no hazardous materials are being stored in the work area unless the hazardous materials are properly stored, protected or contained; and only one fire protection system is affected by the impairment plan (e.g., only sprinkler or only fire alarm, but not both).

Tier 3 A classification of a planned fire protection system considered as a “moderate to high hazard outage” and meets “all” of the following criteria: Entire system or building floor, or multiple fire protection systems are impaired during the outage; active hazardous operations or high/moderate risk operations are present within the area of impairment; the impairment is within a building or area deemed as mission critical per the Center’s emergency response plan; or otherwise does not meet the definition of a Tier 1 or Tier 2.

Satellite Accumulation Area An area in an individual laboratory, shop, or other facility designated by the generator for the accumulation of waste not to exceed 55 gallons of hazardous waste or 1 quart of extremely or acutely-hazardous waste. The area is at or near the initial point of waste generation.

Unattended No one in the vicinity where an appliance malfunction or fire could be noticed.

Unplanned Fire Protection System Outage An outage in which a fire safety system or system component(s) are discovered in a disabled state either by failure of the system or component, by actions of unauthorized personnel, or where procedures designed to return the system or components(s) to service were not followed, i.e., an improperly disabled component.

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## **APPENDIX B: ACRONYMS**

AHJ – Authority Having Jurisdiction

ANSI – American National Standards Institute

ASME – American Society of Mechanical Engineers

CCP – Code Compliance Plans

CFR – Code of Federal Regulations

DWF – Design Web Format

EEOH – Environmental Engineering and Occupational Health

EOC – Emergency Operations Center

FM – Factory Mutual

FMO – Facilities Management Office

FMOD – Facilities Management Office Department (Applicable to MAF)

FPDA – Fire Protection Design Analysis

HBK – Handbook

ISB – Industrial Safety Branch

LSO – Logistics Services Office

MAF – Michoud Assembly Facility

MIDL – Marshall Integrated Document Library

MOA – Memorandum of Agreement

MPR – Marshall Procedural Requirements

MSFC – Marshall Space Flight Center

MWI – Marshall Work Instruction

NASA – National Aeronautics and Space Administration

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NFPA – National Fire Protection Association

NPR – NASA Procedural Requirements

NRRS – NASA Records Retention Schedule

NRTL – Nationally Recognized Testing Laboratory

OSHA – Occupational Safety and Health Administration

PSO – Protective Services Office

QFPE – Qualified Fire Protection Engineer

SACOM – Synergy Achieving Consolidated Operations and Maintenance (applicable at MAF)

SATERN – System for Administration, Training, and Educational Resources for NASA

SHE – Safety, Health, and Environmental

SHetrak – Safety, Health, and Environmental-Finding Tracking System

SMA – Safety & Mission Assurance

STD – Standard

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## APPENDIX C: VERIFICATION MATRIX

Section	Brief Description	Verification			Comments
		Inspect	Document	Test	
5.1	MSFC Fire Safety Program	x	x		
5.2	Center's AHJ		x		
5.3	Fire is discovered	x			
5.4	Building fire alarm sounds	x			
5.5	Persons that require assistance to evacuate	x			
5.6	Areas of Refuge	x	x		
5.7	Building fire evacuation drills		x		
5.8	Building emergency/evacuation plans		x		
5.9	Emergency/evacuation assembly area	x	x		
5.10	Emergency Egress Path	x	x		
5.11	Fire Prevention Inspections	x	x		
5.12	Area orderliness/housekeeping	x			
5.13	Fire retardant containers	x			
5.14	MOA to issue hot work permits		x		
5.15	Fire protection for construction operations	x			
5.16	Asphalt/tar kettle and similar fired equipment and torch-applied roofing	x			
5.17	Flammable or combustible liquids and gases	x			
5.18	Plastics and polyurethane	x			
5.19	Combustible metals	x			
5.20	Portable structures	x			
5.21	Interior finishes	x	x		
5.22	Building/room identification/markings	x	x		
CH1	Hot work operations	x	x		
CH2	Fire protection systems and equipment	x	x	x	

**DIRECTIVE IS UNCONTROLLED WHEN PRINTED**  
Verify current version before use at <https://dml.msfc.nasa.gov/directives>

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CH3	Portable charcoals/propane grills and deep fryers	x			
CH4	Portable appliances	x	x		
CH5	Portable fire extinguishers located in MSFC mechanical /equipment rooms	x			
CH 6	Portable heaters and stoves	x			
CH 7	Holiday decorations and food warming devices	x			
CH8	Cargo Containers and relocatable buildings	x			
CH9	Areas of refuge instructions for personnel With Disabilities	x			
CH10	Fire Protection Engineering				Verify via plan review

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## APPENDIX D: RECORDS

<b>RECORD</b>	<b>REPOSITORY</b>	<b>RETENTION</b>
Fire System Impairment Plan (MSFC Form 4651)	Maintained by the Center's FMO	NRRS 8/56/C: Destroy when 3 years old, or when no longer needed, whichever is sooner.
MSFC Form 1155, "MSFC Hot Work Permit"	Original maintained by the organization performing the work at the job site.  At MAF, a copy is maintained by the MAF PSO	NRRS 1/123: Destroy on expiration of permit or when superseded.
Form 549, "Portable Fire Extinguisher Readiness Verification Tag" or similar type inspection tag.  DWF 3090-170 "Extinguisher Inspection Tag" ( <i>only applicable to MAF</i> )	Original maintained on the portable fire extinguisher until full with data, and then replace with new tag.	NRRS 1/123: Destroy on expiration of tag or when superseded.
MSFC Form 3798, "Permit for Portable Appliance"	Original posted and maintained by the user at the location of the portable appliance.	NRRS 1/123: Destroy on expiration of permit or when superseded.
Portable Fire Extinguisher Training	Per MPR 3410.1	Per MPR 3410.1
MOA (authorization permit)	Copy maintained by the Center's Safety Office  Original maintained by the contractor	NRRS 1/123: Destroy on expiration of permit or when superseded.
SHetrak Inspection Records	Original maintained by the Center's Safety Office	Per MWI 8715.12
MSFC Form 4665, "Certificate of Occupancy"	Original maintained by the Center's AHJ.	NRRS 1/117/A: Retire to Federal Records Center when related property is disposed of by NASA. Destroy 5 years after disposal.

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## **APPENDIX E: TRAINING FOR USE OF PORTABLE FIRE EXTINGUISHERS**

E.1 When portable fire extinguishers are provided in the workplace, training in the use of a portable fire extinguisher is **only required for those employees who have been formally designated to fight fires as part of an emergency/evacuation plan.** (See 29 CFR pt 1910.157(g)(3) for more information.)

E.1.1 No Center employees, including contractor employees, have been formally designated to, or are required to, use a portable fire extinguisher as part of the Center’s Fire Protection Program.

*NOTE 1: At MSFC, fire protection services are provided by the Redstone Arsenal Fire Department.*

*NOTE 2: At MAF, fire protection services are provided by the New Orleans Fire Department.*

E.2 Employees that have not been formally designated to fight fires are able to receive training in the general principles and use of a portable fire extinguisher if desired. This is accomplished by completing one of the following training courses.

E.2.1 SHE 115, “Fire Extinguisher Awareness” provides basic information concerning fire classes based on fuel type, principles used in extinguishing fire, an overview in the use of a portable fire extinguisher, and the safe practices to use during fire emergencies. This is a Web-based training posted on the System for Administration, Training, and Educational Resources for NASA (SATERN).

*NOTE: Contact the Center’s Training Office if unable to access SATERN.*

E.2.2 At MSFC, ISB may provide SHE 116, “Fire Extinguisher Use Training” as a way to give employees experience in the use of a portable fire extinguisher. This training is requested through SATERN or contact ISB to request this training.

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## **APPENDIX F: MEMORANDUM OF AGREEMENT TO ISSUE HOT WORK PERMITS**

### **MARSHALL SPACE FLIGHT CENTER SAFETY AND MISSION ASSURANCE DIRECTORATE**

**AND**

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**SUBJECT:** A Memorandum of Agreement (MOA) between Marshall Space Flight Center [MSFC or Michoud Assembly Facility (MAF)] and approved Contractor to allow the Contractor to issue a MSFC Form 1155, MSFC Hot Work Permit (or an equivalent form approved by MSFC) in accordance with MWI 8715.11, Fire Safety Program and NFPA 51B, Standard for Fire Prevention During Welding, Cutting and Other Hot Work for operations performed by the Contractor that involve the use of open flames, brazing, cutting, grinding, welding, and other operations that can pose an increase risk to initiate a fire.

**PURPOSE:** The intent of this MOA is to establish the responsibilities and relationship between the Center’s Safety Office and the Contractor that is approved to provide this service for their operations.

**RESPONSIBILITIES:** The Center’s Safety Office has overall responsibility to implement NASA’s Fire Protection Program at the Center in accordance with NASA STD 8719.11, Safety Standard for Fire Protection, and ensure all MSFC employees, Contractors, and visitors are provided with a safe and healthful working environment.

The Contractor shall ensure:

1. All safety precautions specified on MSFC Form 1155, MSFC Hot Work Permit (or equivalent form approved by MSFC), MWI 8715.11, Fire Safety Program, and NFPA 51B, Standard for Fire Prevention During Welding, Cutting and Other Hot Work are taken prior to any Hot Work being performed.
2. “Hot Work Permits” are only issued by employees designated by the Contractor and listed in this MOA as being “authorized” to issue the “Hot Work Permit.”
3. Contractor employees “authorized” to issue “Hot Work Permits” are familiar with and have received training in fire prevention techniques and have the ability to recognize conditions in the workplace that have a potential to create a fire hazard, and what actions can be taken to prevent the potential fire hazard.
4. Appropriate Personal Protective Equipment and firefighting equipment (e.g., portable fire extinguishers, leather gloves, aprons, welding hoods, and goggles, etc.) are provided and made available to employees performing the Hot Work operation.

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5. The MSFC Form 1155, MSFC Hot Work Permit (or equivalent form approved by the Center’s Safety Office) is issued in advance of commencing Hot Work operations and is only valid for the period of time the Hot Work operations are to be performed.
6. Hot Work operations are performed in accordance with all safety precautions identified on the MSFC Form 1155, MSFC Hot Work Permit (or equivalent form approved by the Center’s Safety Office).
7. Hot Work operations are performed in approved designated Hot Work Areas, when possible.
8. Flammable and combustible materials are properly protected with barriers or shields or moved at least 35 feet (10.67 meters) away from the Hot Work operation.
9. Hot Work equipment is inspected prior to use and removed from service when discovered in an unusable or unsafe condition.
10. A “Fire Watch” is designated and required anytime the Hot Work operation is performed outside of an approved designated Hot Work Area.
11. Employees designated to serve as “Fire Watches” are familiar with and have received training in the general principles of portable fire extinguishers use.
12. Fire detection system for the area where the Hot Work operation is being performed is disabled when required and restored to service as soon as possible after the work is completed or at the end of the shift, whichever is sooner.
13. Request to deactivate a Fire Detection System is coordinated with the Center Facilities Management Office or Operations Support Services contractor.
14. A copy of the Contractor’s Hot Work Permit program is provided to the Center’s Safety Office for review.
15. A record of all MSFC Form 1155, MSFC Hot Work Permits (or equivalent form approved by the Center’s Safety Office) issued under this MOA is maintained and made available to the Government upon request in accordance with MWI 8715.11.

This MOA shall be reviewed when changes to the Hot Work Permit process are identified and revised as needed.

Failure by the Contractor to comply with any of the requirements contained in MWI 8715.11, “Fire Safety Program,” or this MOA shall result in termination of this MOA and the contractor’s permission to issue MSFC Form 1155, MSFC Hot Work Permit, (or an equivalent form approved by the Center’s Safety Office), for its operations.

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Failure to comply with this MOA also presents the possibility of disciplinary action as deemed appropriate by the Contracting Officer’s Representative in accordance with the contract requirement and/or the Center’s Disciplinary Program.

The MOA is applicable only to the “prime contractor.” The contractor shall identify any subcontractors that are also being requested permission to issue “Hot Work Permits” under this MOA.

**Company Name** \_\_\_\_\_

**Contract Number** \_\_\_\_\_

Company Manager or Business Office  
(print) \_\_\_\_\_

(signature) \_\_\_\_\_

Phone \_\_\_\_\_ Date \_\_\_\_\_

**Subcontractor** (if applicable) \_\_\_\_\_

Company Manager or Business Office  
(print) \_\_\_\_\_

(signature) \_\_\_\_\_

Phone \_\_\_\_\_ Date \_\_\_\_\_

**Employees, including any subcontractor employees, designated by the Contractor as “authorized” to issue the “Hot Work Permit.”**

Name \_\_\_\_\_ Name \_\_\_\_\_

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**Center Contracting Officer Representative**

(print) \_\_\_\_\_ Date \_\_\_\_\_

(signature) \_\_\_\_\_ Date \_\_\_\_\_

**Center Contracting Officer**

(print): \_\_\_\_\_

(signature): \_\_\_\_\_ Date: \_\_\_\_\_

**Center Safety Office Manager (or designee)**

(print) \_\_\_\_\_

(signature) \_\_\_\_\_ Date \_\_\_\_\_

**Center SMA Directorate Director/Designee**

(print) \_\_\_\_\_

(signature) \_\_\_\_\_ Date \_\_\_\_\_

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## APPENDIX G: GENERAL PORTABLE FIRE EXTINGUISHER INFORMATION

### G.1 Portable Fire Extinguisher Class Identification

G.1.1 Portable fire extinguishers are identified with a label that clearly identifies the class or classes of fires for which the extinguisher is suited. This label is often a simple icon with A, B, C, D, or K designations or standard pictorial symbols.

G.1.2 Portable fire extinguishers suitable for more than one class of fire are identified by multiple letters and/or illustrations placed in a horizontal sequence.

G.1.3 Letters and/or illustrations on the extinguisher containing a diagonal line indicate the extinguisher is not recommended for that type of fire.

### Types of Fire Extinguishers



Class A extinguishers put out fires in ordinary combustible materials such as cloth, wood, rubber, paper, and many plastics.



Class B extinguishers are used on fires involving flammable liquids, such as grease, gasoline, oil, and oil-based paints.



Class C extinguishers are suitable for use on fires involving appliances, tools, or other equipment that is electrically energized or plugged in.



Class D extinguishers are designed for use on flammable metals and are often specific for the type of metal in question. These are typically found only in factories working with these metals.



Class K fire extinguishers are intended for use on fires that involve vegetable oils, animal oils, or fats in cooking appliances. These extinguishers are generally found in commercial kitchens, such as those found in restaurants, cafeterias, and caterers. Class K extinguishers are now finding their way into the residential market for use in kitchens.



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## **APPENDIX H: REFERENCES**

H.1 NASA Desk Guide for Table of Disciplinary Offenses and Penalties (5.3.2)

H.2 SHE Committee rule, October 1, 1999 (CH4.8.1 and CH4.10.1)

H.3 NFPA, Emergency Evacuation Planning Guide for People with Disabilities (5.5.1)