National Aeronautics and
Space Administration

John C. Stennis Space Center
Stennis Space Center, MS 39529-6000

SPR 8730.6 Rev A-1
August 2021

COMPLIANCE IS MANDATORY

John C. Stennis Space Center
Foreign Object Elimination Program

RELEASED - Printed documents may be obsolete; validate prior to use.

Document History Log

Status/Change/ Revision	Change Date	Originator/Phone	Description
Basic	October 3, 2011	Ralph Gonzalez / 228-688-2101	Initial Release
Basic-1	July 10, 2013	Ralph Gonzalez / 228-688-2101	Administrative Changes
Rev A	August 16, 2016	Rachel Harrison-Woodard / 228-688-1682	Changed FOE Program Manager designation to Facility/Project FOE Manager. Combined FOE Monitor responsibilities with Facility/Project FOE Manager and SMA responsibilities. Added COD paragraph 1.3 and ETD paragraph 1.4 responsibilities sections. Paragraph 2.1, third paragraph statement added. Paragraph 2.3 added details for a, c-h. Added Appendix B & E. Added a reference to SOI-8080-0030, *Contamination Prevention and Sample Control Procedure.*
Rev A-1	August 2021	Neil Toupin / 228-688-1109	Paragraph 2.2.b, reworded area definition. Paragraph 2.3.a, added equivalency.

Table of Contents

PREFACE **4**

P.1 PURPOSE 4
P.2 APPLICABILITY 4
P.3 AUTHORITY 4
P.4 APPLICABLE DOCUMENTS 4
P.5 MEASUREMENT/VERIFICATION 4
P.6 CANCELLATION 5

CHAPTER 1. ROLES AND RESPONSIBILITIES **6**

1.1 All Organizations 6
1.2 NASA Safety and Mission Assurance (SMA) 6
1.3 Center Operations Directorate (COD) 6
1.4 Engineering and Test Directorate (ETD) 7
1.5 Facility/Project FOE Manager 7

CHAPTER 2. GENERAL REQUIREMENTS **8**

2.1 General 8
2.2 FOD Sensitive Area Designations 8
2.3 FOD Control Area Requirements 8
2.4 FOD Incident Documentation Requirements 10

CHAPTER 3. CONTROL OF RECORDS **11**

3.1 Quality Records 11

APPENDIX A – DEFINITIONS **12**

APPENDIX B – ACRONYMS **13**

APPENDIX C – FOD CONTROL AREA SIGNAGE **14**

APPENDIX D – FOD SENSITIVE AREA ASSESSMENT (EXAMPLE) **15**

APPENDIX E – LOST ITEM REPORT - FORM SSC-906 (EXAMPLE) **16**

RELEASED - Printed documents may be obsolete; validate prior to use.

PREFACE

P.1 PURPOSE

This Stennis Procedural Requirement (SPR) establishes the requirements for the prevention of Foreign Object Damage and Foreign Object Debris (FOD) to John C. Stennis Space Center (SSC) products and constitutes the Foreign Object Elimination (FOE) Program.

P.2 APPLICABILITY

a. This SPR is applicable to NASA and NASA Direct Contractor personnel at SSC.
b. This SPR applies to activities performed at the locations identified as FOD Sensitive Areas through use of the FOD Sensitive Area Assessment. This SPR addresses the requirements up to the facility interface. Any additional FOE requirements are to be levied by the applicable customer.
c. It is a program or project's prerogative to implement a FOE Program Plan in accordance with the guidance provided in Chapter 2 of the document. However, should an event occur that jeopardizes mission success, NASA may require a FOE Program Plan.

P.3 AUTHORITY

a. NASA-STD-6016, *Standard Materials and Processes - Requirements for Spacecraft*
b. NAS-412, *Foreign Object Damage/Foreign Debris Prevention*
c. NPD 8730.5, *NASA Quality Assurance Policy*
d. SPR 1280.1, *SSC Management System Requirements*

P.4 APPLICABLE DOCUMENTS

All citations are assumed to be the latest version unless otherwise specified.

a. SPR 1400.1, *SSC Document Preparation, Numbering and Management*
b. SPR 8730.1, *SSC Control of Nonconforming Product*
c. SCWI-8715-0005, *SSC Safety, Health, Housekeeping and Essential Item Inspections*
d. SCWI-3410-0003, *SSC Training/Certification Plan and Schedule Report*
e. SOI-8080-0030, *SSC Contamination Prevention and Sample Control Procedure*

P.5 MEASUREMENT/VERIFICATION

Compliance with this procedure shall be monitored through the SSC Management System (SMS) and Safety and Mission Assurance Directorate (SMA) by conducting audits to ensure the FOE Program is being properly and effectively utilized.

RELEASED - Printed documents may be obsolete; validate prior to use.

P.6 CANCELLATION

SPR 8730.6 Rev A

Signature on File

Richard J. Gilbrech, Ph.D.
Director

DISTRIBUTION
Approved for public release via NODIS and TechDoc; distribution is unlimited.

RELEASED - Printed documents may be obsolete; validate prior to use.

CHAPTER 1. ROLES AND RESPONSIBILITIES

1.1 All Organizations

All organizations who support operations in FOD Control Areas shall:

a. Eliminate the potential for FOD either through design or through application of procedures or work instructions.
b. Perform tasks in a manner that provides for prevention, detection, and removal of FOD.
c. Clearly understand responsibilities within their organizations associated with ensuring FOD prevention during the execution of tasks.
d. Report and document any FOD or FOD-related issues expeditiously to reduce downstream effects.
e. Ensure FOD processes, methodologies, and tools are provided to assure successful FOD prevention.

1.2 NASA Safety and Mission Assurance (SMA)

SMA shall:

a. Issue and maintain FOE Program requirements.
b. Provide oversight and support to the FOE Program.
c. Designate an SMA FOE Program Manager who will ensure the requirements of SPR 8730.6 are fulfilled.
d. Conduct audits to ensure the FOE Program is being properly and effectively executed.
e. Approve FOE Program Plans written by the Facility/Project FOE Manager(s).
f. In coordination with Facility/Project FOE Manager(s), participate the in decision process for designation of FOD Sensitive Areas.
g. Maintain a SSC FOD Sensitive Area matrix, which is a listing of all applicable facilities and their FOD Sensitive Area classifications.
h. Retain the original FOD Sensitive Area Assessment (Appendix D).

1.3 Center Operations Directorate (COD)

COD shall:

a. In coordination with ETD, COD shall appoint, in writing, a Facility/Project FOE Manager for each designated facility(ies) of assigned responsibility. The Facility/Project FOE Manager may be responsible for one or more facilities or projects.

1.4 Engineering and Test Directorate (ETD)

ETD shall:

a. Coordinate with SMA and COD on the assignment of Facility/Project FOE Manager(s).
b. Facilitate implementation of the FOE Program to meet SSC and customer requirements.

1.5 Facility/Project FOE Manager

For facilities and/or test projects of assigned responsibility, the manager shall:

a. Based on activities being performed and types of hardware located at the facility, determine the FOD Sensitive Area designation(s) per Section 2.2 with coordination from NASA SSC SMA, COD, and ETD. The designation shall be documented on the FOD Sensitive Area Assessment (Reference Appendix D), which is retained by NASA SMA. Any reclassifications shall undergo the same approvals and be submitted to NASA SMA for update of the SSC FOD Sensitive Area matrix.
b. Coordinate with the project customer to determine the facility interface line(s), as applicable.
c. Establish a facility/test project FOE Program Plan in accordance with the key elements listed in Section 2.3 and 2.4.
d. Develop or revise FOE procedures for the facility or test project based on the requirements of SPR 8730.6 and the unique requirements of the facility or test project.
e. Assist facility and test project personnel in reporting and documenting any FOD incidents.
f. Review FOD incidents and ensure they are thoroughly documented.
g. Assign/coordinate effective and timely cause and corrective action determination.
h. Ensure specific areas of responsibility are monitored for FOD.
i. Promote FOD awareness and check for potential FOD hazards.
j. Ensure FOD incidents are reported in the applicable nonconformance system in accordance with SPR 8730.1.

RELEASED - Printed documents may be obsolete; validate prior to use.

CHAPTER 2. GENERAL REQUIREMENTS

2.1 General

Most FOD damage/incidents can be attributed to poor housekeeping, facility deterioration, improper maintenance, or inadequate operational practices. An effective FOE program identifies potential problems, provides awareness, effectively trains employees, and uses industry "lessons learned" for continued improvement. SSC management is committed to the highest standards to ensure the quality and safety of its products and services.

The requirements listed in Section 2.3 provide the core elements of a successful FOE Program and shall be incorporated into the facility or test project specific FOE Program Plan as appropriate. The facility or test project specific FOE Program Plan shall meet the requirements of SPR 1400.1, *Document Preparation, Numbering and Management*.

SMA, COD, and ETD will coordinate with each project/contractor/commercial customer to ensure commonality and differences in the customer requirements are understood and mitigated in the specific FOE Program Plan.

2.2 FOD Sensitive Area Designations

Areas are assigned one of two designations:

a. **FOD Awareness Area** - Areas with negligible potential for FOD entrapment or migration. Other than housekeeping, no additional FOD control measures are needed. Housekeeping shall meet the requirements of Stennis Common Work Instruction (SCWI)-8715-0005. A facility or test project specific FOE Program Plan is not required.
b. **FOD Control Area** - Areas with a high potential for FOD entrapment and/or migration to the final product, and would potentially cause system or product failures due to deterioration, malfunction, or damage. These areas require specific FOE methods be applied to prevent or eliminate Foreign Object (FO) introduction. See Section 2.3 for requirements.

2.3 FOD Control Area Requirements

FOD Control Areas require a facility or test project specific FOE Program Plan which encompasses the following requirements:

a. FOD Control Areas shall be marked/bounded with signage as listed in Appendix C, or equivalent.
b. Housekeeping shall be conducted per the requirements of SCWI-8715-0005. Inspection, buildup, teardown, and packaging of clean hardware should be performed only in areas in

which general good housekeeping exists, and the area is free of unnecessary equipment or personnel.

c. Contamination prevention shall be conducted in accordance with SOI-8080-0030, *Contamination Prevention and Sample Control Procedure*. Before opening, uncovering or disconnecting any port in a clean system, the surrounding areas shall be inspected. Any activities that could potentially contaminate the clean system shall be ceased, or mitigating steps shall be taken to prevent contamination of the clean system.

d. FOD training
   (1) Control of FOD, SMA-QE-WBT-244 or equivalent, (as determined by the NASA certification board) shall be included as a minimum annual training requirement.
   (2) Additional FOD prevention training shall be developed and provided, as required, to ensure that personnel are sensitive to potential FOD issues unique to a facility, component or project.

e. Tool accountability/tool control
   (1) It is sometimes necessary to introduce such items as tools, files, grinders, and probes into a propellant or pressurant system. Each such tool shall be documented per the facility or project requirements as it is introduced into the system, inspected upon removal and shall be verified to be intact, or all pieces accounted for, as it is removed.
   (2) Any tool inspection requirements shall be performed as a Mandatory Inspection Point (MIP).

f. Control of consumable and expendable items
   (1) All consumable materials (materials/supplies used during facility operations, which are typically expended or consumed, such as Aclar®, Teflon™, tape, clean wipes, gloves, etc.) brought into the FOD Control Area shall be documented per the facility or project plan.
   (2) It is sometimes necessary to introduce foreign material into a propellant or pressurant system such as rags to catch drill chips or weld spatter or wipe material to clean the interior of a duct. Each consumable shall be documented per the facility or project requirements as it is introduced into the system, inspected upon removal and shall be verified to be intact, or all pieces accounted for, as it is removed.
   (3) Inspection of consumables before and after the job shall be a MIP.

g. Dress code/personal item restrictions
   (1) All loose personal items, with some exceptions below, shall be removed prior to entering FOD Control Areas. Examples of loose personal items include recognition pins, sunglasses, jewelry and watches, center identification badges, and any other item that is likely to fall.
      (a) Loose items which are not required to be removed are hats/caps (with no recognition pins or loose items), prescription glasses, personal protective equipment, and medical devices such as medical identification bracelets, pacemakers, monitors, and insulin units.
      (b) Personal items may be worn if they are tethered/strapped, taped over or covered by a tight fitting glove to prevent loss.

(2) Pockets above the waist must be empty.

h. Control of food and drink: No food, drink, chewing gum, or usage of any tobacco products shall be allowed in a FOD Control Area.

i. FOD sweeps
   (1) An inspection of the work area shall be performed to ensure all foreign objects and debris have been removed prior to performing a FOD sensitive operation.
   (2) At a minimum, an independent FOD sweep shall be performed monthly within the FOD Control Area to inspect for general housekeeping and the presence of FOD. The sweep shall be documented in Safety, Health, and Environmental Tracking System (SHEtrak).
   (3) Items found during FOD sweeps shall be evaluated by NASA and SACOM operations and the origin assessed. A nonconformance shall be generated if required to document a nonconforming condition on the facility. If the item could affect customer hardware, the customer shall be notified to initiate an evaluation per the customer's requirements.

j. Requirements for documenting FOD incidents are provided in section 2.4.

2.4 FOD Incident Documentation Requirements

a. Any item lost or suspected to be lost in a FOD Control Area shall be documented on a *Lost Item Report*, Form SSC-906 or equivalent. If the item is not found within 24 hours, a nonconformance shall be written in accordance with SPR 8730.1, *Control of Nonconforming Product*, using the appropriate nonconformance document. Other parties outside of NASA and NASA Direct Contractors, such as a test article customer, shall be notified of the event for evaluation of possible impact to their systems or hardware.

b. FOD incidents resulting from facility operations and creating nonconforming conditions to the facility systems shall be documented as a nonconformance, per SPR 8730.1. All FOD incidents resulting from facility operations shall also be annotated in the SHEtrak for metric reporting.

c. FOD incidents resulting in a nonconformance from one organization that affects another organization shall be documented in both organizations' nonconformance systems.

NOTE: Items (tools, hardware, consumable materials, o-rings, etc.) dropped while working in a FOD Control Area and witnessed falling outside of the FOD Control Area will not be declared as Lost Items or a FOD incident, and do not require documentation on a *Lost Item Report*, Form SSC-906, or in the nonconformance reporting systems (e.g., falls through grating).

CHAPTER 3. CONTROL OF RECORDS

3.1 Quality Records

The records generated as a result of this document are classified as Quality Records per SPR 1440.1 and shall be stored and managed per the requirements of the SMRI-1440-QA00, *Master Records Index for the Safety and Mission Assurance Directorate*.

APPENDIX A – DEFINITIONS

Foreign Object (FO) - A substance or article alien to the product or assembly that has been allowed to or potentially can invade the product or assembly. A FO can also be a tool, consumable material and/or hardware not intended by product specification to be left within the product or assembly.

Foreign Object Debris (FOD) - An article or substance alien to the hardware or assembly that has been allowed to invade the product. (Anything left where it doesn't belong, which has the potential to cause damage to hardware and/or injury to personnel).

FOD Incident – Any detrimental condition that is directly attributable to FOD. FOD incidents are reported using the applicable nonconformance system as outlined in this document.

Foreign Object Elimination (FOE) Program - A formal, documented and disciplined program designed to prevent and eliminate FOD.

FOD Sweep – An inspection of the work area to ensure all foreign objects and debris have been removed. FOD sweeps should be conducted at the appropriate time, such as the end of the work shift or prior to moving hardware into the area.

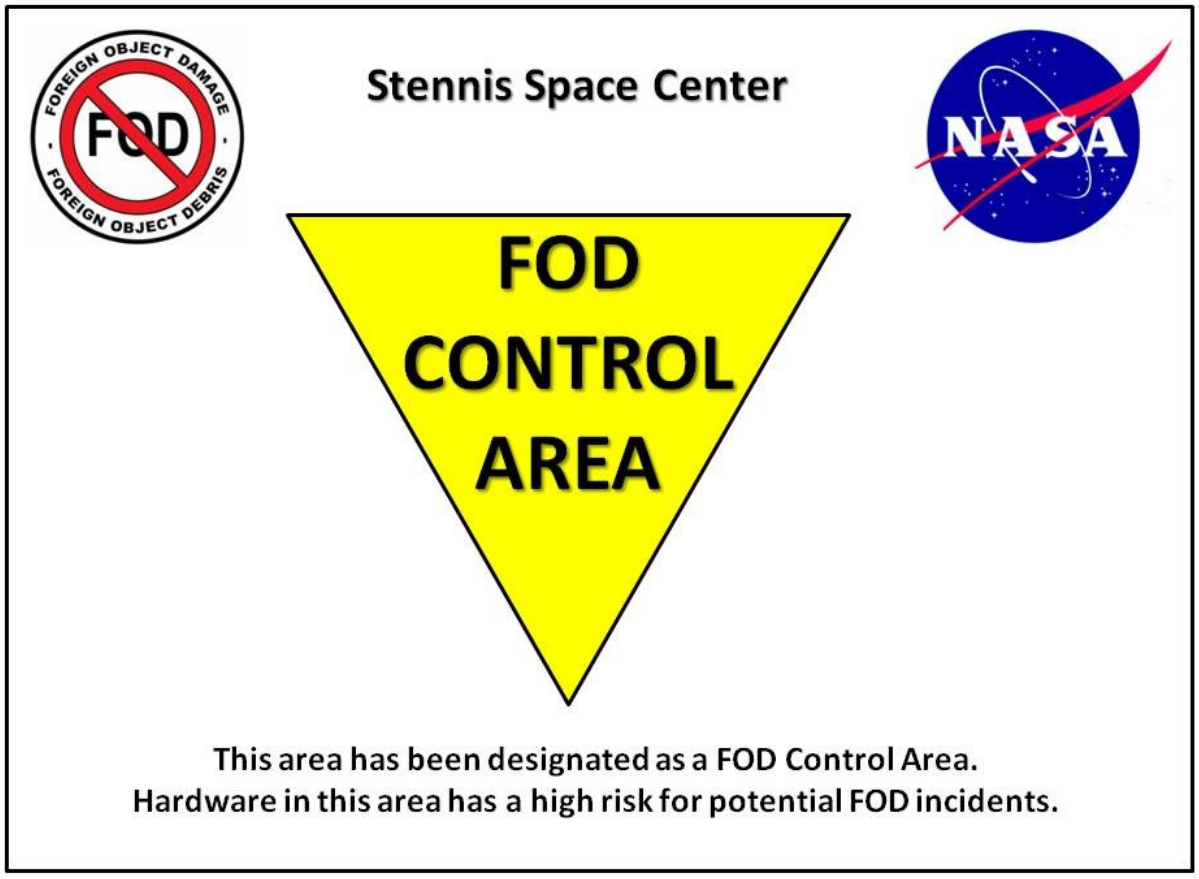
RELEASED - Printed documents may be obsolete; validate prior to use.

APPENDIX B – ACRONYMS

COD	Center Operations Directorate
ETD	Engineering Test Directorate
FO	Foreign Object
FOD	Foreign Object Debris
FOE	Foreign Object Elimination
MIP	Mandatory Inspection Point
NASA	National Aeronautics and Space Administration
PR	Problem Report
SACOM	Synergy Achieving Consolidated Operations and Maintenance
SCWI	Stennis Common Work Instruction
SHEtrak	Safety, Health, and Environmental Tracking
SMA	Safety and Mission Assurance Directorate
SMS	Stennis Space Center Management System
SPR	Stennis Procedural Requirements
SSC	John C. Stennis Space Center
SOI	Stennis Organizational Instruction
WAD	Work Authorizing Document

RELEASED - Printed documents may be obsolete; validate prior to use.

APPENDIX C – FOD CONTROL AREA SIGNAGE



FOD Control Sign.pptx

APPENDIX D – FOD SENSITIVE AREA ASSESSMENT (EXAMPLE)

Foreign Object Debris (FOD) Sensitive Area Assessment (Implemented by SPR 8730.6)	
Date:	**Facility (Bldg. #):** Facility name and number
Program / Project (If Applicable): List program or project	**Process:** What processes are being performed?
FOD Awareness Area Designations: What portions of facility are FOD Awareness areas?	**FOD Control Area Designations (FOE Program Plan is required):** What portions of facility are FOD Control areas?
Remarks:	

Concurrence:

Facility/Project FOE Manager

_____ **Date:** _____

Engineering and Test Directorate Operations Chief

_____ **Date:** _____

Center Operations Directorate Chief, Operations and Maintenance Division

_____ **Date:** _____

Safety and Mission Assurance Directorate Chief, Operations Support Division

_____ **Date:** _____

RELEASED - Printed documents may be obsolete; validate prior to use.

APPENDIX E – LOST ITEM REPORT - FORM SSC-906 (EXAMPLE)

National Aeronautics and Space Administration John C. Stennis Space Center Stennis Space Center, MS 39529-6000	**Lost Item Report**
WAD Number / Step Number:	
Created By:	
Date:	
Item(s) Lost	
Description of Event	
Record Item(s) Found Within 24 Hours *(If Any)*	
If Item is not Found Within 24 Hours	
Record PR Number:	
Test Article Contractor Personnel Notified:	
_____ Concurrence to Close Test Director	

SSC-906 (November 2014)

NOTE: The latest version of this form is found in the NASA Electronic Forms system. Go to https://nef.nasa.gov and enter "906" in the search field.