**Designation: F3617 – 22**

# Standard Guide for
# Foreign Object Elimination (FOE) Elements of Basic Awareness and Personnel Certification[1]

## 1. Scope

1.1 The purpose of this guide is to address the fundamental activities and functions for professionals engaged in Foreign Object Elimination (FOE) program activities.

1.2 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.3 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

## 2. Referenced Documents

2.1 *ASTM Standard:*[2]
F3060 Terminology for Aircraft

## 3. Terminology

3.1 *Basic Terms and Definitions (Level 1)* (see Table 1)*:*

3.1.1 *Consumables/MSP (Miscellaneous Small Parts)/PLS (Production Line Stock), n*—supplies provided to workers that are expendable.

3.1.1.1 *Discussion*—Examples are:

*(1)* Issued apparel (for example, gloves, hair nets, snoods, booties, etc.)

*(2)* Safety glasses and shop coats

*(3)* Glue, paint, sealant

*(4)* Rags, gauze pads, swabs

*(5)* Sandpaper, brushes, applicators, paper, pens, plastic covers

*(6)* Stock items (for example, rivets, washers, fasteners, and other hardware)

*(7)* Perishable tools (for example, drills, reamers, apex tips)

3.1.2 *FOD Barriers, n*—devices such as edge protectors, caps, plugs, and protective covers used for hoses, cables, ducts, electronic components, and other hardware exposed to potential damage.

3.1.3 *FOD Prevention Area Designation, n*—the area designation process ensures the appropriate level of control is assigned to each applicable area in the FOD Prevention Program, based on several factors for the area being categorized including, but not limited to, the criticality of the area's product, process and equipment, and specific customer requirements.

3.1.4 *FOD Prevention Area Focal, n*—Site, Program, and Product of Function personnel assigned to provide guidance, support, FOD prevention initiatives, and ensure coverage with sufficient authority, time, budget, and organizational freedom to identify and implement FOD prevention measures.

3.1.5 *FOD Prevention Designated Areas, n*—product areas with products or systems in which the application of housekeeping cleaning processes and inspections will help prevent migration and ensure that no foreign objects will be passed on or impact testing or development.

3.1.6 *FOD Prevention Program Leader, n*—the person with the responsibility and authority for establishment, implementation, and maintenance of the FOD Prevention Program.

3.1.7 *FOD Prevention Program Responsibility, n*—any and all persons who work on or around aerospace products.

3.1.8 *FOD Walk/Sweep, n*—physical inspection and removal of FO in an assigned area or a zone.

3.1.9 *Foreign Object (FO), n*—an alien substance or article (examples include, but are not limited to, tools, consumables, hardware, product protective devices, personal items, product process debris, operations debris, environmental debris) that could potentially enter and/or migrate into or on a product or system, potentially causing damage if not removed and controlled.

**TABLE 1 Knowledge Level Definitions**

| LEVEL 1 | A familiarization with the principal elements of the subject. |
|---|---|
| | Objectives: |
| | • The applicant should be familiar with the basic elements of the subject. |
| | • The applicant should be able to give a simple description of the whole subject, using common words and examples. |
| | • The applicant should be able to use typical terms. |
| LEVEL 2 | A general knowledge of the theoretical and practical aspects of the subject. |
| | An ability to apply that knowledge. |
| | Objectives: |
| | • The applicant should be able to understand the theoretical fundamentals of the subject. |
| | • The applicant should be able to give a general description of the subject using, as appropriate, typical examples. |
| | • The applicant should be able to use mathematical formulae in conjunction with physical laws describing the subject. |
| | • The applicant should be able to read and understand sketches, drawings, and schematics describing the subject. |
| | • The applicant should be able to apply his knowledge in a practical manner using detailed procedures. |
| LEVEL 3 | A detailed knowledge of the theoretical and practical aspects of the subject. |
| | A capacity to combine and apply the separate elements of knowledge in a logical and comprehensive manner. |
| | Objectives: |
| | • The applicant should know the theory of the subject and interrelationships with other subjects. |
| | • The applicant should be able to give a detailed description of the subject using theoretical fundamentals and specific examples. |
| | • The applicant should understand and be able to use mathematical formulae related to the subject. |
| | • The applicant should be able to read, understand, and prepare sketches, simple drawings, and schematics describing the subject. |
| | • The applicant should be able to apply his knowledge in a practical manner using manufacturer's instructions. |
| | • The applicant should be able to interpret results from various sources and measurements and apply corrective action where appropriate. |

3.1.10 *Foreign Object Damage (FOD), n*—any damage or incident attributed to a foreign object that can be expressed in physical or economic terms, and that may or may not degrade a product or system's required safety and/or performance characteristics.

3.1.11 *Foreign Object Debris (FOD), n*—any foreign object that has entered and/or migrated into/on a product or system and could potentially cause FOD if not removed or controlled.

3.1.12 *Foreign Object Elimination (FOE), n*—a program or process used to assure an FOD-free product or system.

3.1.13 *Foreign Object Occurrence (FOO), n*—the condition where a foreign object has been discovered and has entered and/or migrated into/on the product or system. Foreign object occurrence should be recorded but typically does not trigger an investigation until there is a reoccurrence, or the occurrence has the potential to become an FOD incident.

3.1.14 *Housekeeping, n*—the responsibility of employees to maintain a clean and orderly work area with necessary tools, materials, and equipment in their places of orderly arrangement.

## 4. Significance and Use

4.1 This guide is intended to be used by individuals and organizations who wish to document an understanding of FOE through a certification program. It is intended to be used in candidate preparation in concert with a certification provider's structure and materials for certification management, including exam delivery and certification administration.

## 5. FOD Prevention Program Responsibilities – (Level 1)

5.1 *Demonstrate a familiarization with the principal elements of the subject.* (See Table 1.)
5.1.1 FOD Prevention Program Leader
5.1.2 FOD Prevention Area Focal

## 6. Consumables, Hardware, and Personal Items Accountability and Control – (Level 1)

6.1 *Demonstrate a familiarization with the principal elements of the subject.* (See Table 1.)

6.1.1 Consumables, Hardware, and Personnel Items
6.1.2 Kitted Hardware
6.1.3 Hardware Removal, Control, Replacement
6.1.4 Hardware Storage
6.1.5 Tote Trays and Containers

## 7. Housekeeping and Clean-As-You-Go – (Level 2)

7.1 *Demonstrate a general knowledge of the theoretical and practical application aspects of the following subjects.* (See Table 1.)

7.1.1 Clean-As-You-Go Process
7.1.1.1 Prior to maintenance operation
7.1.1.2 During maintenance operation
7.1.1.3 During work stoppage
7.1.1.4 Following a maintenance operation
7.1.1.5 At shift change/end
7.1.2 Housekeeping
7.1.3 FOD Cans and Containers
7.1.3.1 FOD Bags
7.1.4 Personal Pack
7.1.5 Sort, Straighten, Shine, Standardize, and Sustain (5S) Methodology
7.1.6 Permanent Tooling
7.1.7 Production Support Equipment

## 8. Lost Tool/Items (Level 2)

8.1 *Demonstrate a general knowledge of the theoretical and practical application aspects of the following subjects.* (See Table 1.)

8.1.1 Reporting of Missing, Lost, or Found Tools/Items
8.1.2 Conduct Lost Tool/Item Search

## 9. Material Handling (Level 2)

9.1 *Demonstrate a general knowledge of the theoretical and practical application aspects of the following subjects.* (See Table 1.)

9.1.1 Material Handling
9.1.2 FOD Control Techniques
9.1.3 Material Characteristics

9.1.3.1 Compatibility with environmental and physical stresses

9.1.3.2 Sensitivity to electrostatic conditions

9.2 Container Condition

9.2.1 Visual Inspection

9.2.2 Packaging methods, materials, and processes

9.2.3 Opening and closing containers

9.2.4 Storage of containers

9.2.5 Transportation of containers with FOD-sensitive products

## 10. Parts Protection (Level 1)

10.1 *Demonstrate a familiarization with the principal elements of the subject.* (See Table 1.)

10.1.1 FOD Prevention Devices

10.1.2 FOD Barriers

10.1.2.1 Caps, plugs, and protective covers

10.1.2.2 Barrier removal prior to part use

10.1.3 Electrostatic Discharge (ESD)

## 11. Physical Entry and Personnel Control (Level 1)

11.1 *Demonstrate a familiarization with the principal elements of the subject.* (See Table 1.)

11.1.1 General Entry

11.1.2 FOD Prevention Designated Area

11.1.3 Methods of determining a designated FOD prevention area

11.1.3.1 Types of FOD Prevention Designated Areas

11.1.3.2 FOD Awareness

11.1.3.3 FOD Critical

11.1.3.4 FOD Control

## 12. Reporting and Investigating (Level 1)

12.1 *Demonstrate a familiarization with the principal elements of the subject.* (See Table 1.)

12.1.1 Reporting Foreign Object Damage

12.1.1.1 Identify established company reporting procedures

12.1.1.2 FOD Investigating Process

12.1.1.3 Investigation

12.1.1.4 Cause

12.1.1.5 Corrective Action

12.1.1.6 Follow Up

## 13. Tool Accountability and Control (Level 2)

13.1 *Demonstrate a general knowledge of the theoretical and practical application aspects of the following subjects.* (See Table 1.)

13.1.1 Tool Control

13.1.1.1 Purpose

13.1.1.2 Responsibility

13.1.1.3 Control of Tools

*(1)* Hand Tools

*(2)* Power Tools

*(3)* Test Kits

*(4)* Contract Tools

*(5)* Production Aids

13.1.2 Shadow Box/Shadow Board

13.1.2.1 Types

13.1.2.2 Inventory times

13.1.3 Tether

13.1.3.1 Types

13.1.3.2 Application

13.1.3.3 Inspection

13.1.4 Chit System

13.1.4.1 One-for-One Policy

13.1.4.2 Chit Control

13.1.5 Tool Inventory Sheets/Logs

13.1.6 Tool Pouches/Tool Pockets/Tool Bags

13.1.7 Tool Identification

13.1.7.1 Tags

13.1.7.2 Sensors (Radio-frequency Identification (RFID))

13.1.7.3 Bar Codes

13.1.7.4 Laser Etching/Engraving

13.1.7.5 Color Code

13.1.8 Consolidated Tool Kits (CTK)

13.1.8.1 Purpose

13.1.8.2 Inventory Responsibility

13.1.9 Tool Condition

13.1.9.1 Inspection of Tools

13.1.9.2 Disposition of worn, broken, or damaged tools

13.1.10 Sponge Count

13.1.11 Electronic Tool Accountability System

13.1.11.1 Types

13.1.11.2 Advantages/Disadvantages

## 14. Prerequisite Requirements

14.1 There are no prerequisite requirements for the FOE Elements of Basic Awareness and Personnel Certification

## 15. Keywords

15.1 5S; clean-as-you-go; FO; FOd; FOD; FOE; FOO; housekeeping