PRACTICAL FACT SHEET

ASD – 0201/1

Standards	EN 9100: 2018	EN 9110: 2018	EN 9120: 2018
§	**8.1 *note*** **8.5.1 §o** **8.5.4 §b**	**88.1 *note*** **8.5.1 §k** **8.5.4 §b**	**8.1 *note*** **8.5.1 §l** **8.5.4 §b**

Issue raised:

How to audit the additional requirements of EN 91X0: 2018 regarding the prevention, detection and removal of FOD.

Answer

1 - Background:

These requirements have been added to prevent damage that could affect an Aerospace and/or Defense assembly or sub-assembly.
A foreign object means any type of substance, debris or component, whether mechanical or not, that is totally foreign to the assembly or sub-assembly or system but may cause damage to it.
It is more often known as FOD (Foreign Object Debris or Foreign Object Damage). It can cause a malfunction in the sense of product safety due to isolated debris (metal chips, plastic, shavings, ...) or the omission of parts (screws, bushings, tools ...) during manufacturing, assembly or maintenance operations (maintenance, overhaul, repair).

To fully understand this notion of "stranger", it is necessary to put it in perspective of risk and context.
For example: A chip during machining is normal. But a chip that has fallen into the avionics bay becomes FOD when a drilling operation has taken place.

2 - What questions can be asked for these additional requirements:

The following are examples of questions (Approach 5M):

➔ **5M - Method :**

- Do you have any customer requirements on FOD? How do you involve suppliers in meeting your FOD requirements?
- Does your risk analysis (FMEA example) take into account FOD at all stages of the product life cycle from design to production (including Supply Chain, co-activity), up to product release?
- What FOD prevention methods are in place?
- How did you identify risk areas for FOD?
- How do you handle complaints/alerts regarding FOD (including suppliers)?
- Does the analysis of internal and external non-conformities allow to loop back on the effectiveness of the FOD detection measures?

➔ **5M - Middle :**

- Observation: Is the work plan clean?
- Observation: What are your sources of FOD? (gas, insects, oil, tools, shavings, emissive building, ...)?
- Are there several works in progress in the same work area? Is the environment adapted to the activities carried out and the products? (ex: clean room,...)

➔ **5M - Medium :**

- Do you have appropriate detection/cleaning means for FOD?
- Are access modalities defined as access security (FOD zone, restricted access),
- Is the prevention of the risks of co-activities ensured by the provision of adapted equipment? For example: just the right tooling, FOD pockets, FOD clothing, inventory, tool pick-up/return sheet, recording of given parts, removal of all pockets, cleaning/inspection/visit of areas.
- Is the information made available? Accessible?

➔ **5M - Labor :**

- Are you aware of the risks related to FOD linked to your activity?
- Has the personnel concerned by the risk undergone training/awareness training on FOD?

Including temporary workers, auditors.

- Are postings understood by staff?

➔ **5M - Material :**

- Are raw materials and/or components and/or consumables managed taking into account the risk of FOD?
- Are there any detachable parts? Dust, particles, assembly waste, glue, pins, ...

3 - What examples of evidence of compliance can be provided?

(demonstrate the veracity of the audited organization's answers to our questions above)

- Existence of identified customer and/or regulatory requirements (and suppliers)
- Risk analysis
- Counting of elements at risk before/after operation: tools, components, cleaning equipment, etc.
- Marking of zones according to a criticality level
- Authorizations given to staff
- Work instructions
- Audit report, 5S,
- Evidence of awareness, training and integration (subcontractors, temporary workers, etc.)
- Interviewing staff and observing work spaces
- Analysis of NC due to FOD,
- monitoring of the maintenance of knowledge of FOD risks, ...
- Recording of cleanings, controls, ...

4 - What examples of evidence of non-compliance could be detected:

- Lack of risk analysis
- Absence or non-respect of the defined provisions (e.g. cleaning, storage,
- Observation of FOD on products
- Absence / lack of awareness / staff training
- No knowledge of FOD operators
- Customer complaints (or disregard of requirements)
- Unsuitable means for the detection of FOD
- Mechanical parts in wooden case with detachable particles, leaves, insects;
- Surplus grease, glue, ... during assembly;
- Pins and cable cuts in equipment not recovered during cabling;

It should be noted that the notion of "FOD" is an integral part of product safety issues (see PFS n°0109).

Keyword(s): FOD

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