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Quality Requirements for Supplies of Ammunition, Exploding Devices and Weapons

SUMMARY:

This document defines the specific quality requirements to be met by Leonardo-SDI suppliers when supplying ammunition and exploding devices and for supplies of weapons or parts thereof.

The general quality requirements for supplies to Leonardo-SDI are defined in the PQA004-L procedure.

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AMENDMENT RECORD

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1 INTRODUCTION

1.1 Purpose

The purpose of this document is to define the quality requirements to be met by suppliers of ammunition or exploding devices and suppliers of weapons or parts thereof in supplies to Leonardo-SDI.

More general quality requirements applicable to all supplies are defined in the PQA004-L document

1.2 Applicability

This document applies to **Type E** supplies as identified in document PQA004-L, (ammunition, exploding devices and weapons, produced on the basis of technical documentation provided by Leonardo-SDI or available from the catalogue).

If the supply contains parts designed by the Supplier, the quality requirements defined in documents PQA010-L (Design and Development) and PQA011-L (Software Development) shall be applied.

1.3 Supply Classification Index

As provided for in document PQA004-L, each supply is characterised not only by its Type but also by a Classification Index (CI), which, together, help to identify the applicable quality requirements and the activities and documents required of the supplier.

*For example, the code **E3** indicates supplies of* Ammunition/Exploding Devices *(Type E) and in particular Standard Catalogue Products (CI= 3).*

The following are the values and meanings of the Classification Index for Type E supplies. The related activities and documents required from the supplier are described in the following paragraphs.

Classification Index	Characteristics of the supply
1	Ammunition/Exploding devices - Complex/critical products produced using Leonardo-SDI technical documentation
2	Ammunition/Exploding devices - Simple products produced using Leonardo-SDI technical documentation
3	Ammunition/Exploding devices - Standard catalogue products
4	Weapons or parts of weapons - Standard catalogue products

For each supply, the Type and Classification Index are indicated in the Purchase Order.

2 REFERENCES

2.1 Documents

Code	Title
AER-Q-2110 Ed April 2005	DGAA (Directorate General for Aeronautical Armaments) Quality Assurance Requirements for design, development and production.
AQAP 2070	NATO Mutual Government Quality Assurance (GQA) Process
AQAP 2110 Ed D	NATO Quality Assurance Requirements for Design, Development and Production
AQAP 2210 Ed A	NATO Supplementary Software Quality Assurance Requirements to AQAP-2110
AQAP-2131 Ed 2	NATO Quality Assurance Requirements for Final Inspection
UN EN 9100:2018	Quality Management Systems-Requirements for Aviation, Space and Defense Organizations.
ISO 10012:2003	Measurement Management Systems – Requirements for measurement processes and measuring equipment.
ISO 9001:2015	Quality Management System – Requirements.
ISO/IEC 17025:2005	General requirements for the competence of testing and calibration laboratories
NAV-50-9999-0026-13-00B000	Obligations of Italian Industry towards technical bodies of the MMI (Italian Navy)
SAE AS9102	Aerospace First Article Inspection Requirement
STANAG 4107	Mutual acceptance of government quality assurance and usage of the allied quality assurance publications (AQAP).
PQA004-L	Quality Requirements for Supplies to the Defence Systems Division of Leonardo S.p.A.
PQA008-L	Quality requirements for the supply of Special Processes
PQA010-L	Quality requirements for the supply of Design and Development
PQA011-L	Quality requirements for the supply of Software Design and Development
QUA017-T	The approved suppliers list of Special/CND Processes and their sub-supply chain comprehensive of internal processes

2.2 Template/Form/Checklist

Code	Title
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3 DEFINITIONS AND ACRONYMS

3.1 Definitions

See document PQA004-L

3.2 Acronyms

Acronym	Description
AQAP	Allied Quality Assurance Publication
ISO	International Standardization Organization
REACH	Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)
SAU	Safety and Arming Unit

4 GENERAL REQUIREMENTS

The following requirements, as set out in PQA004-L, shall apply to all supplies covered by this document:

- Supplier evaluation and monitoring;
- Transmission of supply requirements;
- Leonardo-SDI interfaces with the Supplier;
- Documentation;
- Determining and reviewing requirements;
- Design and Development (where applicable)
- Management of supplies from sub-tiers;
- Identification and traceability;
- Configuration Management;
- Control of nonconforming products;
- Product preservation
- Management of materials belonging to Leonardo-SDI

5 AMMUNITION AND EXPLODING DEVICES - COMPLEX/CRITICAL PRODUCTS (INDEX 1)

This paragraph applies to supplies of ammunition and exploding devices (complex/critical products) produced using Leonardo-SDI technical documentation.

In this context, the following products are defined as complex/critical[4]:

a. Blank projectile;
b. Empty projectile;
c. Loaded projectile;
d. Loaded warhead;
e. Cartridge case;
f. Primer;
g. Propellant;
h. Fuse or Igniter (SQUIB);
i. SAU
j. Luminous tips (tracers);
k. Electronics and homing section (of the munitions);
l. Flash charge;
m. Sabot;
n. Explosive charge;
o. Complete cartridge;
p. Containers and transport boxes.

5.1 Quality System Organization

The supplier shall implement and maintain for the entire duration of the supply a Quality System which complies with ISO 9001:2015.

The supplier's Quality System shall incorporate, where applicable, the additional requirements of UNI EN 9100:2018 and those specific to the publications AQAP-2110 (with particular reference to configuration management aspects), AER-Q-2110 (for aeronautical products) and AQAP-2210 (for supplies of software to be incorporated such as self-guiding or in-flight piloting systems of "*smart ammunition"* designed by Leonardo-SDI).

5.2 Manufacturing planning and control

The supplier shall plan and implement a control system suitable for demonstrating the activities carried out to control the realisation of the supply.

Before starting work, the supplier shall send to Leonardo-SDI: the Quality Plan, the time schedule of the activities (GANTT), the schedule of the batching of the parts which make up the supply, the Product Baseline and the information required to ensure the traceability of the supply.

The production process shall be defined in a Manufacturing and Control Plan (MCP) that shows the sequence of the various production phases for the product, identifying the supplies, the inbound tests, the internal and external processing, the control points to be made with or without the presence of Leonardo-SDI and the records to be kept.

For supplies of complete ammunition, the manufacturing documentation shall also ensure traceability of the components of the ammunition (e.g. internal order number/sales order number).

The supplier shall submit the MCP to Leonardo-SDI for approval.

The MCP shall include the necessary Machining, Assembly and Control Procedures describing the manufacturing process and the product acceptability criteria.

[4] Non-exhaustive list

It is the supplier's responsibility to ensure the availability of suitable equipment, resources and personnel for the manufacturing of the products requested, as well as for ensuring that the timescales set out in the contractual documents are complied with.

At the end of production, the supplier shall compile a special dossier with the necessary records to demonstrate the correct application of the production process.

The above documentation shall ensure the traceability of the components of the ammunition and shall be in full compliance with the manufacturing requirements set out in the Leonardo-SDI technical documentation (drawings, special process specifications, ammunition technical specifications, etc.)

In the case of the supply of complete ammunition, when the MCP is first applied, Leonardo-SDI personnel will carry out an Audit of the manufacturing process.

Leonardo-SDI reserves the right to carry out checks during the production activities.

All records of incoming tests/inspections, and records of production intermediate and final tests/inspections shall be stored and retained for at least 10 years from the end of the supply, unless otherwise specified in the order. This documentation shall allow for the traceability of all data relating to the tests carried out on the product, starting from those performed by sub-tiers up the final test.

Note: all applicable acceptance testing instructions/procedures shall be those provided in the Leonardo-SDI technical documentation (ammunition technical specifications, drawings and technical bills of materials, special process specifications).

5.3 Validation of production processes (FAI)

For a production process implemented for the first time, if requested in the order, the supplier shall carry out a verification of this process on the first article produced or on the first production batch (First Article Inspection).

This verification involves an inspection by Leonardo-SDI, according to the methodologies described in Appendix A.

5.4 Special Processes

Where the manufacturing activity involves *special processes*, the requirements set out in PQA008-L shall apply.

5.5 Final Testing and Acceptance Testing

Convocation for acceptance testing

The supplier shall notify to Leonardo-SDI a convocation for the acceptance tests at least 10 working days before the scheduled date.

Acceptance testing

Leonardo-SDI (and its customer if requested) will take part to final acceptance tests.

Acceptance tests will be conducted according to documents (instructions, procedures or sheets) issued by Leonardo-SDI. It shall be a right of Leonardo-SDI to select the sample components/munitions submitted to tests.

During the acceptance test an audit shall be conducted to verify that all products have passed the final production test of the supplier (and eventual sub-suppliers).

Leonardo-SDI will man the trials for the final firing testing.

Supplier production Testing

Leonardo-SDI shall be allowed, on request, to witness the intermediate/final production testing of the supplier, and to select the samples submitted to test.

Records and Non Conformities

The results of production tests and acceptance tests shall be recorded and maintained by the supplier according to PQA004-L indications.

Any non-conformity detected during the production or acceptance testing shall be recorded and managed by the supplier according to PQA004-L indications. Nonconforming products shall be resubmitted to Leonardo-SDI after a documented analysis has been carried out and adequate corrective actions have been introduced.

5.6 Product identification

The products shall be identified in accordance with the technical documentation supplied by Leonardo-SDI.

The conformity of the identification shall be verified by the Supplier's Quality function, which shall record this activity along with all other testing activities.

5.7 Handling

The products shall be handled in compliance with the contractual requirements and applicable legislation, in order to safeguard both the product and the personnel involved, from entry into the factory and throughout all the manufacturing/control stages up to delivery.

5.8 Packaging and its identification (marking of boxes)

The products shall be packaged in compliance with the requirements indicated on the PO or on the attached technical documentation and in any case in compliance with the legal requirements, both in terms of the conformity of the box and its identification. The conformity of the packaging and its identification shall be verified by the Supplier's Quality function, which shall record this activity along with all other testing activities.

The Supplier shall document on the Quality Plan or other applicable documentation the identification and marking criteria of the boxes and submit it for approval by Leonardo-SDI.

5.9 Test documentation and certification of the supply

Depending on the type of product, the Supplier shall make available and provide Leonardo-SDI with copies of the following documents on request:

- firing test recording forms for batched and/or serialised components (including those from Sub-tiers, if applicable);
- firing test recording forms for batched and/or serialised components (e.g. propellant, primers, cartridge cases, explosive, discharged projectiles, loaded projectiles, complete ammunition);
- fuse/SAU factory test recording forms;
- fuse/SAU firing test recording forms;
- complete cartridge factory test recording forms;
- complete cartridge firing test recording forms.

This documentation, together with all the documentation relating to the supply shall be filed and retained by the Supplier in accordance with the provisions of paragraph 5.2 above.

At the end of the acceptance test, the following documents shall be sent to Leonardo-SDI:

a) Certificate of Conformity of the supply, signed by the head of the Quality function or the head of the Company (drawn up in accordance with the form shown in Annex B of AQAP-2070);
b) a copy of the certificates of conformity of any batched components;
c) a copy of the required test recording forms;
d) identification codes of the products/materials included in the supply which contain hazardous substances under the REACH regulation and the relevant safety data sheets.

5.10 Shipping to Leonardo-SDI site or its customer site

The material cannot be shipped until the verification of the packaging, the identification of the packaging and the accompanying documentation has been successfully completed. Such conformity shall be verified by the Supplier's Quality department, which shall record it together with all the other testing activities.

The supplier may only ship the supply, in accordance with the requirements of the order, after receiving formal authorization from Leonardo-SDI. If the supplier dispatches the product directly to Leonardo-SDI's customer, it may only do so against the Certificate of Conformity issued by the Division and all contractual information relating to the shipment.

The Supplier shall be responsible for ensuring that the carriers apply all regulations for ammunition with reference to the legal requirements or those contained in the Leonardo-SDI technical documentation.

6 AMMUNITION AND EXPLODING DEVICES - SIMPLE PRODUCTS (INDEX 2)

This paragraph applies to supplies of ammunition and exploding devices (simple products) produced using Leonardo-SDI technical documentation.

In this context, simple products are defined as all those not included in the list of complex/critical products (e.g. Spacers or cardboard parts; loose metal parts)**.**

For such products, in addition to the general requirements referred to in paragraph 4, the specific requirements defined in the following sub-paragraphs shall apply.

6.1 Quality System Organization

The supplier shall implement and maintain for the entire duration of the supply a Quality System which complies with ISO 9001:2015.

6.2 Production and testing

The activities necessary to comply with the requirements of the Leonardo-SDI order shall be planned in a manufacturing/control cycle that provides for the recording of the applied controls. The supplier shall also make available the list of authorised testers according to their respective competencies and carry out the tests specified according to the procedures supplied by Leonardo-SDI or drawn up by the supplier (according to the technical documentation indicated in the order).

On request, the supplier shall provide evidence of the outcomes of the controls and tests carried out during manufacture.

All records of incoming tests/inspections on purchased products, and records of production intermediate and final inspections/tests shall be stored and retained for at least 10 years from the end of the supply unless otherwise specified in the Leonardo-SDI order.

6.3 Documentation for the certification of the supply

The following documentation shall accompany the supply when delivered:

a. Original Certificate of Conformity for the supply;
b. any other certification specified in the order;
c. identification codes of the products/materials included in the supply which contain hazardous substances under the REACH regulation and the relevant safety data sheets.

If the certification indicated for the various cases is not attached to the shipping list, the supply may not be accepted and will be returned with the related expenses to be met by the Supplier.

6.4 Despatch

The material may only be despatched after verification of the packaging, the identification of the packaging and the accompanying documentation has been successfully completed. Such conformity shall be verified by the Supplier, which shall record it together with all the other testing activities.

7 STANDARD CATALOGUE AMMUNITION (INDEX 3)

There are two types of standard catalogue ammunition:

a. Ammunition for Leonardo-SDI customers to complete their supplies;
b. Ammunition for Leonardo-SDI tests.

For such products, in addition to the general requirements referred to in paragraph 4, the specific requirements defined in the following sub-paragraphs shall apply.

7.1 Quality System Organization

The requirement defined in PQA004-L ('General requirements for the supplier's quality system') shall apply.

7.2 Ammunition for Leonardo-SDI Customers

In this case, Leonardo-SDI ensures the quality of the products supplied through its own monitoring. The requirements indicated for ammunition and/or parts thereof produced using Leonardo-SDI technical documentation remain valid with the exception that all activities are carried out under the primary responsibility of the Supplier with supervision of the manufacturing/control process by Leonardo-SDI.

On request, the Supplier shall be able to demonstrate, under its own responsibility, the validation of the Product supplied.

7.2.1 Manufacturing control

The requirements of this document paragraph 5.2 shall apply.

7.2.2 Submission for acceptance testing

The supplier shall notify to Leonardo-SDI an invitation to attend the acceptance tests at least 10 working days before the scheduled date.

7.2.3 Final tests

Acceptance tests

Leonardo-SDI (and its customer if requested) will take part to the final firing trials of complete projectiles.

If it not otherwise specified in the PO, the acceptance tests shall be carried out according to supplier procedures approved by Leonardo-SDI. It shall be a right of Leonardo-SDI to select the sampling submitted to tests.

During the acceptance tests an audit shall be conducted to verify that all products have passed the final production test of the supplier (and eventual sub-suppliers).

Supplier production Testing

Leonardo-SDI shall be allowed, on request, to witness the intermediate/final production testing of the supplier, and to select the samples submitted to test.

Records and Non Conformities

The results of production tests and acceptance tests shall be recorded and maintained by the supplier according to PQA004-L indications.

Any non-conformity detected during the production or acceptance testing shall be recorded and managed by the supplier according to PQA004-L indications. Nonconforming products shall be resubmitted to Leonardo-SDI after a documented analysis has been carried out and adequate corrective actions have been introduced.

7.2.4 Handling

The products shall be handled in compliance with the contractual requirements and applicable legislation, in order to safeguard both the product and the personnel involved from the incoming of the material and throughout all the manufacturing/control stages until delivery.

7.2.5 Packaging and its identification (marking of boxes)

The products shall be packaged in accordance with the requirements of the technical documentation and in any case in compliance with legal requirements. The conformity of the packaging and its identification shall be verified by the Supplier's Quality Department, which shall record this activity along with all other testing activities.

7.2.6 Test Documentation and Certification of the Supply

At the end of the acceptance test for the items covered by the order, the following documents shall be sent to Leonardo-SDI:

a) Certificate of Conformity of the supply, signed by the head of the Quality function or the head of the Company (drawn up in accordance with the form shown in Annex B of AQAP-2070);
b) a copy of the certificates of conformity of any batched components;
c) a copy of the required test recording forms;
d) identification codes of the products/materials included in the supply which contain hazardous substances under the REACH regulation and the relevant safety data sheets.

7.2.7 Despatch to the End Customer

The material shall only be shipped after the verification of the packaging, the identification of the packaging and the accompany documentation has been successfully completed. Such conformity shall be verified by the Supplier's Quality department, which shall record it together with all the other testing activities.

The supplier may only ship the supply, in accordance with the requirements of the order, after receiving formal authorization from Leonardo-SDI. If the supplier dispatches the product directly to Leonardo-SDI's customer, it may only do so against the Certificate of Conformity issued by the Division and all contractual information relating to the shipment.

The Supplier shall be responsible for ensuring that the carriers apply all regulations for ammunition with reference to the legal requirements or those contained in the Leonardo-SDI technical documentation.

7.3 Ammunition for Leonardo-SDI Tests

In this case, the Supplier shall be responsible for ensuring the conformity of the supply. Leonardo-SDI reserves the right to approve the final testing procedure and to participate in the final tests.

On request, the Supplier shall be able to demonstrate, under its own responsibility, the validation of the Product supplied.

7.3.1 Final tests

Acceptance testing

Leonardo-SDI will take part to final firing tests of complete projectiles.

If it not otherwise specified in the PO, the testing will be conducted on base of supplier procedures approved by Leonardo-SDI with definition of samples plan.

If it not otherwise specified in the PO, the acceptance tests shall be conducted according to supplier procedures, including sampling plans, approved by Leonardo-SDI.

During the acceptance tests Leonardo-SDI shall have the right to select the samples for testing trials; furthermore, if specified in the PO, an audit shall be conducted to verify that all products have passed the final production test of the supplier (and eventual sub-suppliers).

Records and Non Conformities

The results of production tests and acceptance tests shall be recorded and maintained by the supplier according to PQA004-L indications.

Any non-conformity detected during the production or acceptance testing shall be recorded and managed by the supplier according to PQA004-L indications. Nonconforming products shall be resubmitted to Leonardo-SDI after a documented analysis has been carried out and adequate corrective actions have been introduced.

7.3.2 Submission for Testing

The supplier shall notify to Leonardo-SDI the convocation for the acceptance tests at least 10 working days before the scheduled date.

7.3.3 Handling

The products shall be handled in compliance with the contractual requirements and applicable legislation, in order to safeguard both the product and the personnel involved, from the incoming of the material and through all stages of manufacture/control, until delivery.

7.3.4 Packaging and its identification (marking of boxes)

The products shall be packaged in accordance with the requirements of the technical documentation and in any case in compliance with legal requirements. The conformity of the packaging and its identification shall be verified by the Supplier's Quality Department, which shall record this activity along with all other testing activities.

7.3.5 Shipping to the Site Specified by Leonardo-SDI

The material shall only be shipped after the verification of the packaging, the identification of the packaging and the accompany documentation has been successfully completed. Such conformity shall be verified by the Supplier's Quality department, which shall record it together with all the other testing activities.

The supplier shall ship the supply, in accordance with the requirements of the order, after receiving formal authorisation from Leonardo-SDI.

The Supplier shall be responsible for ensuring that the carriers apply all regulations for ammunition in reference to the legal requirements or those contained in its own technical documentation.

7.3.6 Documentation for the Certification of the Supply

At the end of the acceptance test for the items covered by the order, the following documents shall be sent to Leonardo-SDI:

a) Certificate of Conformity of the supply, signed by the head of the Quality function or the head of the Company (drawn up in accordance with the form shown in Annex B of AQAP-2070);
b) a copy of the certificates of conformity of any batched components;
c) identification codes of the products/materials included in the supply which contain hazardous substances under the REACH regulation and the relevant safety data sheets.

8 CATALOGUE WEAPONS OR PARTS OF WEAPONS (INDEX 4)

Weapons refers to military products such as: weapons of various calibres and weapons systems listed in the technical specifications categories of the manufacturer (catalogue), which can be fitted on naval mountings and turrets for land vehicles or portable to complement the equipment of an armoured vehicle.

The Supplier shall also ensure, at its own responsibility, the conformity of the supply.

For such products, in addition to the general requirements referred to in paragraph 4, the specific requirements defined in the following sub-paragraphs shall apply.

8.1 Quality System Organization

The requirement defined in PQA004-L ('General requirements for the supplier's quality system') shall apply.

8.2 Product Validation

On request, the Supplier shall be able to demonstrate, under its own responsibility, the validation of the product supplied.

8.3 Final Tests

The acceptance tests shall be carried out according to supplier procedures approved by Leonardo-SDI.

The Supplier shall notify to Leonardo-SDI the invitation to attend the acceptance tests at least 10 working days before the scheduled date. Leonardo-SDI may decide whether or not to witness the tests.

The testing results shall be recorded and maintained by the supplier according to indications of PQA004-L.

If the result is negative, the Nonconformities shall be recorded and managed according to the indications of PQA004-L. The product shall be re-submitted to Leonardo-SDI following documented analyses of the Nonconformities and the introduction of Corrective Actions shared with Leonardo-SDI.

8.4 Handling

The products shall be handled in compliance with the contractual requirements and applicable legislation, in order to safeguard both the product and the personnel involved, from the incoming of the material and through all stages of manufacture/control, until delivery.

8.5 Packaging and its Identification (Marking of Boxes)

The products shall be packaged in accordance with the requirements of the technical documentation and in any case in compliance with legal requirements. The conformity of the packaging and its identification shall be verified by the Supplier's Quality Department, which shall record this activity along with all other testing activities.

8.6 Shipping to the Site Specified by Leonardo-SDI

The material shall only be shipped after the verification of the packaging, the identification of the packaging and the accompany documentation has been successfully completed. Such conformity shall be verified by the Supplier's Quality department, which shall record it together with all the other testing activities.

The Supplier shall ship the supply, in compliance with applicable national/international laws, in accordance with the requirements of the order, after receiving formal authorisation from Leonardo-SDI.

The Supplier shall be responsible for ensuring that the carriers apply all transport regulations in reference to the applicable national/international laws, or other applicable additional requirements, and those contained in its own technical documentation.

8.7 Documentation for the Certification of the Supply

At the end of the acceptance test for the items covered by the order, the following documents shall be sent to Leonardo-SDI:

a) Certificate of Conformity of the supply, signed by the head of the Quality function or the head of the Company (drawn up in accordance with the form shown in Annex B of AQAP-2070);
b) identification codes of products/supplies containing hazardous substances according to REACH and the relevant safety data sheets
c) technical specifications including interface specifications, installation drawings and reference configuration
d) design and development validation certificate
e) full acceptance procedure test report
f) documentation for logistics support including user and maintenance manual and nomenclature catalogue.

9 RIGHT OF ACCESS AND SUPPORT FOR THE CUSTOMER AND GQAR

The requirement defined in PQA004-L shall apply.

In the case of orders subject to Government Quality Assurance, the requirement includes the right of the GQAR to participate in the acceptance tests of the supplies.

Appendix A - FIRST ARTICLE INSPECTION (FAI)

B.1. Introduction

B.1.1. Purpose

The purpose of First Article Inspection (FAI) is:

1. To validate the Supplier's production processes, confirming on a piece from the first production batch that the manufacturing processes used are capable of producing products that comply with the applicable requirements and technical documentation
2. To verify that production processes are applied systematically and are therefore stable and repeatable.

The purpose of this appendix is to define:

- ✓ The requirements to be met by the supplier when checking the first part (hereinafter First Article Inspection) on products supplied to Leonardo-SDI,
- ✓ The documentation required to demonstrate the checks carried out on the cycle and the equipment used.

B.1.1. Applicability

This appendix applies to all supplies of raw materials and semi-finished products in which the execution of the FAI is expressly indicated in the purchase order.

B.2. Glossary

Definition	Description
Attribute	The result of the control of a characteristic or property that is evaluated only as to whether it conforms or does not conform to the requirement but is not numerically quantified (e.g. pass-not pass or conforms-does not conform).
Balloon drawing	A drawing in which each characteristic or requirement is clearly marked with a unique identification number. The number can be within a circle or box for easy visual identification
Design Characteristic	“Design Characteristics" are all of the dimensional, visual, functional (mechanical, electrical, embedded software, etc.) and property or performance characteristics of the materials constituting the object, as specified in the design documentation. “Design Characteristics" include process variables (e.g. heat treatment temperature and time), acceptability criteria (e.g. inspection class with penetrating liquids, acceptability standards), control procedures and welding sequences.
Drawing Requirements	These are the requirements indicated in the drawing, the bill of materials (if not mentioned in the drawing), the specifications or the purchase documents according to which the article is produced. They also include all notes, specifications and lower-level drawings.
Evaluation	Measurement, inspection or test to determine conformity of a characteristic with the requirements of the design.
FAI	A complete, independent and documented physical and functional verification process to confirm that the production methods adopted have produced an acceptable item as specified in the drawings, purchase order, technical specifications and/or other applicable documents.
FAIR	FAIR is a set of documents and records, issued or drawn up for each individual part and/or assembly constituting the object of the FAI and organized according to a specific standard set out in standard UNI EN/AS 9102.
First Production Batch **(First Production Run)**	The first group of one or more parts which are the result of a defined production process which is to be used for the future production of the same part. Prototype parts or parts made using methods other than those envisaged by the production process shall not be considered as part of the First Production Run.
Inaccessible Characteristic	A characteristic that can only be assessed when it is generated without sacrificing the part. For example, inaccessible dimensions such as internal dimensions of castings or welded joints Or inaccessible non-dimensional characteristics such as chemical and physical properties
FAI Planning	All of the activities that shall be carried out before production begins and that are included in a document called an FAI Plan
Fit, Form and Function (3F or FFF)	Often called 3F or FFF, these define the characteristics of a component. If the fit, form and function requirements are the same then the parts are interchangeable.

B.3. REQUIREMENTS

The forms to be used are those indicated in the UNI EN 9102 standard (see paragraphs B5, B6 and B7) available on the SAE website; other forms may be used that contain the same fields as those provided for in the above standard, with the exception of those indicated as optional (O).

In case of conflict between UNI EN 9102 and this requirement document, the latter shall take precedence.

Requirement 1

The outcome of the FAI is binding for the continuation of standard production and shall be performed on a representative article from the first production batch. The Supplier shall not proceed with delivery before the FAI has been approved by Leonardo-SDI. The FAI requirement shall be extended to all sub-tiers.

Requirement 2

The Supplier shall send the FAI Plan to Leonardo-SDI within one month of receiving the order. The document shall contain the activities carried out by the sub-tiers.

The FAIs carried out by sub-tiers are an integral part of the FAI for the material covered by the PO and shall be sent with it.

Requirement 3

The FAIs carried out on the individual items (Detail FAI Form 1 field 13) constituting the material covered by the PO are an integral part of the FAI for the assembly (Assembly FAI Form 1 field 13).

Requirement 4

The Supplier shall inform Leonardo-SDI of the start of planned activities at least 15 working days before the activities are carried out.
Leonardo-SDI reserves the right to participate in any phase indicated in the FAI Plan.
In addition, the supplier shall notify Leonardo-SDI in writing of its intention to apply amendments to the FAI Plan at least 10 working days prior to their actual application.

Requirement 5

The Supplier shall carry out the FAI on the first production batch: any exceptions shall be authorized in writing by Leonardo-SDI.

Requirement 6

The Supplier shall carry out the FAI in whole or in part when:

1. Design changes are made that affect interchangeability (3F);
2. Modifications are made to the production process, control methods, production site, source materials and equipment that could affect interchangeability (3F);
3. Changes are made to numerical control programs or other programming languages that could affect interchangeability (3F);
4. Natural events or events caused by human factors occur that could affect the production process;
5. More than two years have passed since the last batch was produced or as otherwise specified by Leonardo-SDI.

Requirement 7

The FAI requirement can be satisfied by a partial FAI (Partial FAI - Form 1 field 14), instead of a total FAI (Full FAI - Form 1 field 14), relating only to the differences between the current configuration and a previously approved configuration, provided that all the other cases of the previous requirement are respected.

The FAI requirement can be fulfilled by a previously approved FAI carried out on identical characteristics of a similar product produced with the same equipment, the same production cycle, the same materials and at the same site.

Requirement 8

FAI does not apply to:

1 COTS materials;
2 “Deliverable” software;
3 Commercial metallic and non-metallic raw materials;
4 Prototypes;
5 Repaired materials.

Requirement 9

The FAI is not complete (Not Complete - form 1 field 19) until all nonconformities on the item have been closed and until all the corrective actions necessary to eliminate the causes have been taken. Partial FAI (Partial FAI - form 1 field 14) shall be repeated only on nonconforming characteristics.

Requirement 10

The Supplier shall complete the forms in accordance with 0 the UNI EN 9102 standard, filling in all of the fields as indicated in the standard itself.

The FAI documentation shall include the records required for verifying that the product fully meets the requirements.

Requirement 11

The Supplier shall properly retain the FAI documentation for at least 10 years unless otherwise indicated in the PO and shall provide Leonardo-SDI with a copy of the FAI if requested, at no additional cost unless provided for in the PO.

Requirement 12

If the FAIR is incomplete, partially incorrect or not passed, Leonardo-SDI reserves the right to have the Supplier partially or completely repeat the FAI at no additional cost.

Requirement 13

The item which undergoes FAI shall be identified by marking according to the drawing (if the drawing does not provide for identification, a label shall be used to identify the item or to refer to its identification on its packaging).

B.4. KEY FEATURES OF THE FAI

B.4.1. Action plan for conducting the FAI

The Supplier shall carry out the FAI under its own responsibility, on one or more representative items (if agreed with Leonardo-SDI) from the first production batch.

The FAI action plan is all of the activities to be carried out before starting the production process of a supply subject to FAI. The plan shall provide for:

1. Verification that the applicable configuration referenced in the PO matches what has been received; Identification of all of the characteristics to be checked, as indicated in the applicable technical documentation. These characteristics shall be tracked during the FAI process and shall be identified in the drawings (e.g. Balloon Drawing), specifications and all applicable technical documentation and shall be copied down in Form 3 of the FAIR.
2. Identification of the key characteristics to ensure that these are properly verified during the production process;
3. Definition of the methods for validating the 3D measurement programs, with relevant evidence to be provided in support of the validation of the measurement program;
4. Review of the manufacturing plans, working instructions and applicable technical documentation to verify their clarity and detail and the definition of the control sampling methods;
5. Verification that the qualifications of the personnel assigned to the activities indicated in the production process are suitable for the operations and special and critical processes envisaged;
6. Verification that the sub-tiers providing parts of the supply are able to provide all the evidence in support of the FAI;
7. Verification that sub-tiers of special, critical and NDT processes are in document QUA017-T. Identification of the equipment to be used to support the production process and verification that the calibrations are still valid during the period of use, according to procedures of its Quality Management System;
8. Verification of the presence of the functional test procedure and sending it to Leonardo-SDI for approval;
9. Verification of the presence of the packaging and shipping procedure, according to the procedures provided for by the supplier's Quality Management System and sending it to Leonardo-SDI for approval;
10. Checking for the presence of any nonconformities recorded in the past (if any), making the appropriate corrections to the manufacturing process.

B.4.2. FAI Plan

The supplier shall send the FAI Plan to Leonardo-SDI within one month of receipt of the PO, the schedule is essentially a table or a GANTT chart that shows:

1. The date of availability at the supplier's premises of the materials procured for carrying out the activities, appropriately identifying all the components of the supply;
2. The dates of the processes reported in the MCP with particular emphasis on those relating to special processes and all inspections (with identification of holding points and witness points). Remember that the FAI Plan and the MCP shall contain the sequences of controls necessary for performing the appropriate checks on the characteristics shown on the drawings by the "ballooning" method;
3. The delivery date of the MCP, ATP and FAIR;
4. The dates of the final tests.

On a monthly basis (to be agreed with the supplier), joint audits will be carried out with Leonardo-SDI and the supplier in order to verify the effective performance of the planned activities. In the event of significant deviations between the plan and progress, the frequency of the progress meetings shall be increased.

B.4.3. Preliminary activities for the FAI

The approval by Leonardo-SDI of the following documents is required prior to the conduct of FAI activities:

1. FAI Plan;
2. Test procedure (ATP);
3. Production control documents (e.g. MCP).

B.4.4. Conduct of the FAI

1 The FAI shall be performed on one or more items (if agreed with Leonardo-SDI) which are representative of the first production batch, known as the First Production Run;
2 The FAI shall be performed on all of the components which make up the assembly;
3 The FAI shall be performed and documented in accordance with UNI EN 9102 and this document;
4 Each FAI shall be accompanied by a FAIR, drawn up in accordance with the forms listed in the UNI EN 9102 standard;
5 The supporting evidence for all checks referred to in the FAIR shall be an integral part of the FAIR;
6 The FAI shall be performed after the Product Readiness Review (PRR) when requested in the order.

B.4.5. Status of the FAI

The FAI status is 'not complete' (FAI Not Complete - Form 1 field 19) when:

1 Nonconformities relating to the item are still open and any corrective action still needs to be taken,
2 The supplier shall only repeat the FAI for nonconforming characteristics.

B.4.6 Completion of FAI forms

The forms shall be filled in according to these instructions and standard UNI EN 9102 either in Italian or English.

All fields of the forms have cells which are colour coded and a font-based code on the text:

Required (R)	“Yellow" background and **bold** font
Required, under certain conditions (CR)	"Blue” background and ***bold italic*** font
Optional (O)	“White” background 2 regular font

Form 1 - Part Number Accountability

Used to identify the item which is subject to FAI and related sub-assemblies; see Appendix B.5. for details on how to complete this form.

Form 2 - Product Accountability (Raw Material, Specifications and Special Process(s), Functional Testing)

Used to identify materials and/or special processes and/or functional tests that have been defined as "design requirements"; see Appendix B.6 for details on how to complete this form.

Form 3 - Characteristic Accountability, Verification and Compatibility (Evaluation)

Shall be used to record the results of inspections carried out; see Appendix B.7 for details on how to complete this form.

B.5. Form 1, EN 9102

Form 1 EN9102 - P/N Accountability

1. Numero della parte Part number	2. Nome della parte Part Name	3. *Numero di serie* *Part Serial Number*	4. Numero Rapporto FAI *FAI Report Number*
5. *Revisione della parte* *Part Revision Level*	6. *Numero del disegno* *Drawing Number*	7. *Revisione disegno* *Drawing revision level*	8. *Modifiche aggiuntive* *Additional Changes*
9. Rif. processo di produzione Manufacturing Process Reference	10. Nome fornitore Organization Name	11. Codice del fornitore Supplier Code	12. N°. Ordine P.O. Number

13. FAI di un particolare Detail FAI ☐ FAI di assieme Assembly FAI ☐	14. FAI Completo Full FAI ☐ FAI parziale Partial FAI ☐	Numero della distinta della parte (incluso la revisione) Baseline Part Number including revision level
		Motivo del FAI parziale: Reason for Partial FAI:

a) Se la parte sopracitata è un particolare procedere al punto 19
a) If above part number is a detail part only, go to Field 19
b) Se la parte sopracitata è un assieme procedere alla sezione "INDICE" seguente
b) if above part number is an assembly, go to the "INDEX" section below.

ELENCO dei componenti o sottoassiemi richiesti per formare l'assieme sopracitato
INDEX of part numbers or sub-assembly numbers required to make the assembly noted above

15. *Numero della parte* *Part Number*	16. *Nome della parte* *Part Name*	17. *Serial Number parte* *Part Serial Number*	18. Numero del FAI *FAI Report Number*

1) La firma indica che tutte le caratteristiche descritte soddisfano le richieste del disegno o sono adeguatamente documentate per la disposizione.
Signature indicates that all characteristics are accounted for meet drawing requirements or are properly documented for disposition.

2) Indicare se il FAI è completo (vedi par. 5.4): ☐ **FAI completo** ☐ **FAI non completo**
Also indicate if the FAI is complete per Section 5. 4 : ☐ **FAI complete** ☐ **FAI not complete**

19. Firma Signature	20. Data Date
21. Controllato da *Reviewed by*	22. Data *Date*
23. Approvazione del cliente *Customer Approval*	24. Data *Date*

B.6. Form 2, EN 9102

Form 2 EN9102 - Product Accountability

Responsabilità del prodotto – Materiale grezzo, Specifiche e Processi speciali, Collaudo funzionale
Raw Material, Special Process, Functional Testing (Materiali grezzi, processi speciali, test funzionali)

1. *Numero della parte* *Part number*	2. Nome della parte Part Name	3. *Numero di serie* *Part Serial Number*	4. Numero Rapporto FAI FAI Report Number

5. *Materiale o processo* *Material or process Name*	6. *Numero della specifica* *Specification Nr.*	7. Codice Code	8. *Codice del processo del fornitore* *Special Process Supplier Code*	9. *Approvazione del cliente* *Customer Approval Verification* (Yes/No/NA)	10. *Numero del certificato* *Certificate of Conformance nr.*

11. *Numero prova funzionale* *Functional Test Procedure Number*	12. *Numero del rapporto di accettazione (se applicabile).* *Acceptance report number, if applicable.*

13. Note. Comments.	
14. Preparato da Prepared by	15. Data Date

B.7. Form 3, EN 9102

Form 3 EN9102 - Characteristic Accountability

Verification and Compatibility Evaluation

1. Numero della parte Part number				2. Nome della parte Part Name			3. *N°. di serie* *Part S/n*	4. Numero Rapporto FAI FAI Report Number
Caratteristiche da controllare *Characteristic Accountability*				Controllo / Valore ottenuto *Inspection / Test result*			Campo facoltativo *Optional Field*	
5. N° *Char N°*	6. *Riferimento* *Reference Location*	7. *Criticità attribuita* *Charateristic Designator*	8. Caratteristica richiesta Requirement	9. Valore ottenuto Result	10. *Strumento usato* *Designed Tooling*	11. *Numero della non conformità* *Non Conformance Number*	14. Inserire colonne, ecc, come richiesto dall'Organizzazione o dal Cliente Insert columns, etc, as required by Organization or Customer	

La firma indica che tutte le caratteristiche descritte soddisfano le richieste del disegno o sono adeguatamente documentate per la disposizione.
The signature indicates that all characteristics are accounted for meet the drawing requirements or are properly documented for disposition.

12. Compilato da Prepared by	13. Data Date