Israel Aerospace Industries Ltd
Systems Missiles & Space Group

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DOCUMENT TITLE:

Quality and Inspection Requirements: Production for IAI Yehud Campus Divisions

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List of Terms and Abbreviations

AOI	Automatic Optical Inspection
ATE	Automatic Test Equipment
ATP	Acceptance Test Procedure
BTP	Built to Print – the product is manufactured per the purchaser's design
BTS	Built to Spec – Design and manufacturing (including special processes) per the purchaser's technical specification
COC	Certificate of Compliance
COTS	Commercial Off the Shelf
End item data package (EIDP)	Documents attesting that the product(s) conform to specified requirements
Engineering change order (ECP)	Engineering document, specifying the change to be performed, which has not yet been implemented in the product drawing
Environmental Stress Screening (ESS)	A screening process of electronics subassemblies whose purpose is to expedite detection of latent defects
FOD	Foreign Objects Damage
HATS	Highly Accelerated Thermal Shock testing
IAI	Israel Aerospace Industries Inc.
Key Characteristics (KCs)	An attribute or feature whose variation has a significant effect on product fit, form, function, performance, service life or producibility, that requires specific actions for the purpose of controlling variation
Manufacturing file	The documents and information necessary for the manufacturing process
MRB	Material Review Board
NDT	Nondestructive Testing
OCM	Original Component Manufacturer
PO	Purchase Order
Product	A system, sub system, assembly, primary part or service for the Yehud campus products or that are supplied to Yehud campus customers
Product file	The documents specifying the product
Production batch	Definite quantity of items produced to the same design under conditions that are considered uniform
PRR	Production Readiness Review
PS	Process specification
Purchasing representative	The purchasing rep who initiated the source inspection.

QPL	Military Qualified Products List
Sample	One or more units drawn from a lot or batch to provide information about a lot or batch. It is important to verity that the sample is drawn randomly
SDS	Safety Data Sheet
SOW	Statement of Work – a contractual document detailing the project-specific activities, deliverables and timelines
Special process	A production process where the resulting output cannot be verified by subsequent monitoring or measurement. Examples include coating, thermal treatment, NDT, welding
Supplier	Subcontractor for Yehud Campus
Yehud campus	IAI divisions, located in Yehud campus: Technologies Division, Air& Missiles Defense Division, Space Division, Missiles Division, TMM Division. “The purchaser”
Yehud campus inspector	Inspector – authorized by Yehud campus to perform inspection in a particular technology. Some of the inspectors are employed by subcontractors for inspection services.

Table of Contents

1. GENERAL REQUIREMENTS

1.1 Introduction

1.1.1 This document specifies quality assurance and inspection requirements for subcontractors manufacturing for the IAI Yehud Campus.

1.1.2 Requirements in this document shall be considered as a part of the PO requirements.

1.1.3 Order of precedence of requirements:
In cases of conflict between requirements in this document and requirements in other purchase order documents, the following is the order of precedence:

- product file
- SOW, technical specifications
- this document.

1.1.4 The IAI supplier site Questions/ Answers module shall be used for any clarifications required.

1.1.5 It is the responsibility of the supplier to comply to requirements in this document.

1.1.6 Yehud Campus Quality Control and Inspection organization may inspect the product during all phases of manufacturing, with the necessary support by the supplier, at no additional cost:

1.1.6.1 During serial production: in process inspection/ final acceptance inspection

1.1.6.2 During FAI

1.1.7 The supplier shall verify manufacturing is per the latest revisions of all requirements documents. Any clarifications shall be obtained via the IAI supplier site Questions/ Answers module.

1.2 Document structure

1.2.1 This document specifies general requirements for quality assurance and inspection (detailed in this chapter) and technology-specific requirements.

1.2.2 The general requirements are mandatory for all suppliers manufacturing for the Yehud campus. Technology-specific requirements apply when the specific technology is used in manufacturing the product ordered.

1.2.3 Technology-specific requirements chapters are structured as follows:

- Applicable documents (specific to the technology)
- Requirements for the supplier
- Submissions to Yehud Campus Source Inspection
- Requirements for the Yehud Campus Inspector

1.3 Applicable documents

The following documents are general documents which apply to manufacturing for Yehud Campus. Additional documents, applicable to a specific technology, are detailed in the technological chapters of this specification

1.3.1 IAI General Purchase Terms and Conditions, found in the IAI supplier site.

1.3.2 AS 9100 QUALITY MANAGEMENT SYSTEMS – REQUIREMENTS FOR AVIATION, SPACE AND DEFENSE ORGANIZATIONS

1.3.3 AS 9102 FIRST ARTICLE INSPECTION REQUIREMENT

1.3.4 AS 9146 FOREIGN OBJECT DAMAGE (FOD) PREVENTION PROGRAM – REQUIREMENTS FOR AVIATION, SPACE AND DEFENSE ORGANIZATIONS

1.3.5 IAI document 8000117, Guidelines for Production Readiness Reviews (PRR)

1.3.6 ISO 17025 TESTING AND CALIBRATION LABORATORIES

1.4 General Quality Assurance requirements for a supplier manufacturing for Yehud Campus

1.4.1 Requirements in this document are additional to the requirements in the IAI General Purchase Terms and Conditions

1.4.2 The supplier shall conduct and document a contract review for every purchase order before submitting a quote and before approving the purchase order. The contract review shall verify understanding the requirements and the ability to meet the requirements of the purchase order.

1.4.3 When required by the purchaser, the supplier shall fully cooperate with improvement activities of processes affecting product quality. The supplier shall allow access to its production lines and to subcontractors, and make available any information required for process improvement, including: manufacturing files, work instructions and procedures, production records and any data collected for the variation management of key characteristics.

1.4.4 Handling Deviations from Requirements
The purchaser grants no authority to disposition product or process nonconformances to the supplier or its subcontractors. Any deviation from requirements shall be submitted to the purchaser for review and disposition. An MRB request shall be submitted via the Questions and Answers module in the IAI supplier site using the supplier's MRB form. The request shall include a detailed description of the deviation, root cause analysis and corrective action. The disposition shall be documented on Yehud Campus MRB report. The MRB report number shall be documented on the product serviceable tag and on the COC.
Note: an answer in the Questions and Answers module is not a valid disposition.

1.4.5 Key Characteristics shall be identified as such in Yehud Campus engineering documentation and/ or agreed during the PRR. The supplier shall measure 100% of features/ attributes identified as KCs

1.4.6 The supplier shall implement an FOD prevention program per PREN 9146

1.4.7 Changes in the product requirements shall be implemented by release of updated specifications/ drawings by Yehud Campus and updating the PO. In BTS POs, no

changes are allowed unless authorized by the purchaser after completion of the product qualification phase.

1.4.8 Calibration of test and measurement devices – the supplier shall use calibrated test and measurement devices. Calibration reports shall demonstrate traceability to an ISO 17025 certified calibration laboratory.

1.4.9 Raw materials/ electronic components/ fasteners shall be purchased from IAI certified suppliers only. A list of certified suppliers is found in the IAI supplier site.

1.4.10 Unless otherwise agreed in the SOW, Special processes shall be performed only at IAI certified Processors (certified to a specific process/ process specification).

1.4.11 Manufacturing for Yehud campus shall be governed by a manufacturing file prepared by the supplier, compliant to the PO requirements and detailing work instructions and inspection instructions for the product.

1.4.11.1 The manufacturing file shall be configuration controlled

1.4.11.2 The manufacturing file shall be reviewed and approved in the PRR when required in the PO, see paragraph 1.5.10

1.4.11.3 The manufacturing file shall include the following:

- Detailed manufacturing instructions and route cards
- Detailed inspection instructions explaining the inspection/ test method, measurement devices, and pass/fail criteria
- Key characteristics
- Required certifications of operators
- Methods/ instructions to prevent damage in handling and storage
- Instructions for preventing FOD
- Identification of articles/ materials requiring traceability

1.4.12 Production Readiness Review (PRR)

1.4.12.1 When required by the PO, a Production Readiness Review shall be held. Purchaser approval of the PRR is a prerequisite for the beginning of production.

1.4.12.2 The PRR review checklist is detailed in the PRR guidelines document (applicable document 1.3.6)

- The supplier shall fill-in the PRR checklist, add the required details and submit for review by the purchaser at least 1 week prior to the PRR.
- During the PRR, the production flow chart shall be reviewed, including inspection steps and the production file.
- Mandatory inspection points, where inspection by Yehud Campus inspectors is required, shall be agreed during the PRR.
- The First Article Inspection plan will also be agreed during the PRR.

1.4.13 First Article Inspection (FAI)

1.4.13.1 FAI shall be performed (full/ partial) when any of the following occurs:

- Production of the product for the first time – full FAI

- A change in manufacturing sources, processes, inspection methods, location of manufacture, tooling or materials – a partial FAI on affected characteristics may be performed
- A change in the product - a partial FAI on affected characteristics may be performed
- A lapse in production for two years – full FAI

1.4.13.2 FAI shall be performed and documented per the requirements of AS 9102

1.4.13.3 Additional requirements for performing and documenting the FAI:

- The FAI file shall include original COC documents for all purchased parts/ components in the product
- The FAI file shall include a full set of production records (for example: signed route cards, laboratory reports when required, charts/ output of loggers used in processes).
- The product inspected in the FAI shall be identified

1.4.13.4 Yehud campus inspectors shall verify the supplier's FAI, including review of the FAI file and repeating some of the measurements. FAI approval is a prerequisite for deliveries.

1.4.13.5 After FAI approval, the supplier shall report any change in the manufacturing process, including changes in key sub tier suppliers and subcontractors. A partial/ full FAI shall be required after such changes, Completion and approval of the FAI is mandatory before resuming production.

1.4.14 Supplier's inspection and test records

1.4.14.1 Inspection records shall detail compliance to requirements for every attribute inspected. Deviations shall be clearly indicated.

1.4.14.2 Actual values of measurement shall be documented

1.4.14.3 In products for space applications, all measurement results shall be recorded for every product. Documenting a range of results is not allowed unless otherwise specified

1.4.14.4 Source Inspection by Yehud Campus

1.4.14.5 Uploading the product data package demonstrating product compliance to requirements (as detailed in the technology-specific chapters) to the IAI suppliers' site or via the ASN mechanism in NIPENDO is a prerequisite for source inspection. When uploading documents to NIPENDO ASN, documents shall be uploaded in two parts:

- COC
- ATR – all other required documents.

1.4.14.6 Source inspection shall be conducted per mandatory inspection points agreed during the PRR or detailed in the PO.

1.4.14.7 The supplier shall notify the IAI purchasing contact of products ready for inspection at least 14 days before the requested inspection date.

1.4.14.8 In cases where the supplier has implemented sampling inspection, the inspected products shall be identified

1.4.14.9 After successful completion of source inspection, the Yehud Campus inspector shall issue a source inspection certificate for the products inspected, and a source inspection report. The supplier shall upload the certificate and report to IAI supplier site.

1.4.14.10 If discrepancies are found during source inspection, the products shall be rejected. The supplier is required to perform 100% sorting inspection of the products before re-submitting to source inspection.

1.5 Packaging and Delivery Requirements

1.5.1 Every product shall be separately packed in a package that would prevent damages, or as agreed in the PRR.

1.5.2 The package shall be identified per the product file/ drawing or as agreed in the PRR.

1.5.3 A copy of the source inspection certificate and a copy of the COC shall be attached to the package.

2. SPECIFIC QUALITY REQUIREMENTS FOR THE PRODUCTION OF ELECTRONIC AND ELECTRO-MECHANICAL PRODUCTS FOR DEFENSE APPLICATIONS

2.1 General

This chapter specifies specific quality requirements for electro-mechanical products for defense applications. For example: consoles, RF products, power supplies, pedestals, wagons. Requirements for the integrated products are specified in this chapter. Requirements for the primary parts constituting the product (such as: metal parts, assembled printed circuit boards, wire harness) are detailed in the respective chapters of this document.
The chapter includes:

- Specific requirements for manufacturing and inspection by the supplier – types of inspection and testing that shall be completed by the supplier prior to submitting the product to Yehud Campus source inspection
- Submissions for Yehud Campus Source Inspection – details how the supplier should submit the product for source inspection
- Detail of the inspection procedures to be followed by the Yehud Campus source inspector

2.2 Applicable Documents

The following documents, in their latest revision on the issue date of the purchase order, comprise a part of the manufacturing and inspection requirements in this chapter:

#	Document Number	Title
1	IPC-A-610	Acceptability of Electronic Assemblies, Class 3
2	IPC-A-620	Requirements and Acceptance for Cable and Wire Harness Assemblies, Class 3
3	PS474000E	Requirements & Procedures for Avoiding Counterfeit EEE parts
4	Product ATP	Product ATP document approved by Yehud Campus, as found in the supplier site engineering documents
5	Product ESS Spec	Product Environmental Stress Screening specification approved by Yehud Campus, as found in the supplier site engineering documents
6	ANSI ESD S.20.20	For the Development of an Electrostatic Discharge Control Program for – Protection of Electrical and Electronic Parts, Assemblies and Equipment (excluding electrically initiated explosive devices)
7	ANSI/ASQ Z1.4	Sampling procedures and tables for inspection by attributes

2.3 Specific requirements for manufacturing and quality control by the supplier

This paragraph details the requirements for manufacturing and inspection to be followed by the supplier before submitting the product for Yehud campus source inspection

2.3.1 Procured/ subcontracted parts

2.3.1.1 Parts shall be procured from IAI approved sources or as defined in the PO.

2.3.1.2 The supplier shall flow down applicable requirements from this document (general requirements and applicable technological requirements) to sub tier suppliers.

2.3.1.3 The supplier shall verify, during incoming inspection that correct data package is provided for every received part:

- For COTS – COC from the original supplier or franchised distributor
- For materials (for example: cleaning agents, adhesives) - COC from the original supplier or franchised distributor and SDS document as required.
- For subcontracted parts: see par requirements in the respective chapter of this document

2.3.1.4 In incoming inspection, the supplier shall verify that the parts meet requirements and are not damaged

2.3.2 Parts manufactured in-house by the supplier

See requirements in the respective technological chapter of this document

2.3.3 Integration by the supplier

2.3.3.1 Integration shall be performed according to a detailed manufacturing file, pre-approved by Yehud campus during the PRR. The manufacturing file shall include the following information as a minimum:

- Detailed work instructions and processes
- Inspection points

2.3.4 Test and inspection points

2.3.4.1 Test and inspection points shall be included in the integration flow and must include the following steps as applicable:

- Verification of correct assembly per work instructions, and engineering documents (for example: use of adhesives as per work instructions, cable routing as per drawings, application of markings)
- Visual inspection for workmanship defects (at relevant steps)
- FOD inspection – shall be performed when the inside of the product is still visible
- Final visual inspection to verify no damages to the product

2.3.4.2 Test and inspection points may also include the following steps, as applicable:

- Functional tests per Acceptance Tests Procedure (ATP)
- Environmental Stress screening (ESS)
- Verification of use of correct torque for tightening steps (tightening of screws, connectors, cables)
- Welding inspection
- Nondestructive testing

- Verification of correct assembly of safety wires
- Inspection of painting requirements as follows:
  - Paint only on required surfaces per drawing/ PMI
  - Paint type and shade according to PL
  - Paint shop report to include: thickness measurements, adhesion tests reports. Supplier to verify paint complies with PL requirements.

2.3.5 The supplier shall retain the documented information necessary to enable traceability as required in the PO.

2.3.6 As applicable, the supplier shall implement an Electrostatic Discharge Control Program for – Protection of Electrical and Electronic Parts, Assemblies and Equipment per ANSI ESD S20.20.

2.3.7 Operators and inspectors shall be trained and certified to perform their integration related tasks. As necessary, the supplier shall train and certify operators and inspectors to work on a specific product.

2.3.8 The supplier shall enable Yehud campus inspectors to conduct random in-process inspections with prior notice.

2.4 Submissions to Yehud Campus Source Inspection

2.4.1 The products shall be submitted to source inspection by Yehud campus after passing the suppliers inspection (in-process and final)

2.4.2 The supplier's manufacturing file shall be made available to the Yehud campus inspector per request.

2.4.3 The data package for the products shall include the following documents:

#	Required documents
1	Supplier's COC detailing all serial numbers in the lot
2	Yehud campus MRB approvals (when applicable)
3	Test reports for every product (ESS, ATP)
4	Signed-off routing cards
5	Traceability reports

2.5 Source inspection procedures for Yehud Campus inspectors (Verification inspection)

Inspection shall include:

#	Type of inspection/ test	Sample size	Pass/ fail criteria
1	Review of product data package	100%	Data package includes all required documents, test results meet requirements
2	Visual inspection	100%	Integrity of product, no visible damage
3	Electrical/ functional testing per product ATP	Per ANSI/ASQ Z1.4, table II-C, inspection level II, AQL 2.5%	Results meet requirements

3. SPECIFIC QUALITY REQUIREMENTS FOR MECHANICAL ASSEMBLIES FOR DEFENSE APPLICATIONS

3.1 General

This chapter details specific quality requirements for mechanical assemblies for defense applications. For example: mechanical assembly of consoles, wagons, canisters, or missile sections.
This chapter details the requirements for the assembly. Requirements for the primary parts assembled (such as: metal parts, composite parts, rubber parts) are detailed in the respective chapters of this document.

Clarification: All dimensions in drawings are final dimensions after coating and finish (painting), unless otherwise explicitly stated in the parts list.

The chapter includes:

- Specific requirements for manufacturing and inspection by the supplier – types of inspection and testing that shall be completed by the supplier prior to submitting the product to Yehud Campus source inspection
- Submission for Yehud Campus Source Inspection – details how the supplier should submit the product for source inspection
- Detail of the inspection procedures to be followed by the Yehud Campus source inspector

3.2 Applicable Documents

The following documents, in their latest revision on the issue date of the purchase order, comprise a part of the manufacturing and inspection requirements in this chapter:

#	Document Number	Title
1	ANSI/ASQ Z1.4	Sampling procedures and tables for inspection by attributes

3.3 Specific requirements for production and quality control by the supplier

This paragraph details the requirements for production and inspection to be followed by the supplier before submitting the product for Yehud campus source inspection

3.3.1 Procured/ subcontracted parts

3.3.1.1 Raw materials shall be purchased from IAI approved sources or as defined in the PO.

3.3.1.2 The supplier shall flow down applicable requirements from this document (general requirements and applicable technological requirements) to sub tier suppliers.

3.3.1.3 The supplier shall verify, during incoming inspection that correct data package is provided for every received part:

- For COTS – COC from the original supplier or franchised distributor
- For materials (for example: cleaning agents, adhesives) - COC from the original supplier or franchised distributor and SDS document as required.

- For subcontracted parts: see requirements in the respective chapter of this document

3.3.1.4 In incoming inspection, the supplier shall verify that the parts meet requirements and are not damaged

3.3.2 Parts manufactured in-house by the supplier

See requirements in the respective technological chapter of this document

3.3.3 Mechanical assembly by the supplier

3.3.3.1 Assembly shall be performed according to a detailed manufacturing file, pre-approved by Yehud campus during the PRR, and including the following information:

- Detailed work instructions and processes
- Test and inspection points

3.4 Test and Inspection points

3.4.1.1 Test and inspection points shall be included in the integration flow and must include the following steps as applicable:

- Verification of correct assembly per work instructions, and engineering documents
- Visual inspection for workmanship defects (at relevant steps)
- FOD inspection – shall be performed when the inside of the product is still visible
- Final visual inspection to verify no damages to the product

3.4.1.2 Test and inspection points may also include the following steps, as applicable:

- Dimensional inspection
- Functional tests per ATP
- Verification of torque used for tightening fasteners (tightening of screws, connectors, cables)
- Use of adhesives as per work instruction
- Welding inspection
- NDT
- Verification of safety wires assembly
- Inspection of painting requirements as follows:
- Paint only on required surfaces per drawing/ PMI
- Paint type and shade according to PL
- Paint shop report to include: thickness measurements, adhesion tests reports. Supplier to verify paint complies with PL requirements.
- Application of markings

3.4.2 The supplier shall retain the documented information necessary to enable traceability as required in the PO.

3.4.3 Operators and inspectors shall be trained and certified to perform their assembly related tasks. As necessary, the supplier shall train and certify operators and inspectors to work on a specific product as required.

3.4.4 The supplier shall enable Yehud campus inspectors to conduct random in-process inspections with prior notice.

3.5 Submissions to Yehud Campus Source Inspection

3.5.1 The products shall be submitted to Yehud campus source inspection by the supplier after passing the suppliers inspection successfully.

3.5.2 The supplier's or (sub-contractors') manufacturing file shall be made available to the Yehud campus inspector per request.

3.5.3 The data package for the products shall include the following documents:

#	Required documents
1	Supplier's COC detailing all serial numbers in the lot: - COC for raw material - COC for surface treatments - COC for NDT - COC for finish (primer/ top coat)
2	Yehud campus MRB approvals (when applicable)
3	Inspection and test reports for every assembly
4	Signed-off routing cards
5	Traceability reports as applicable

3.6 Source inspection procedures for Yehud Campus inspectors (Verification inspection)

Inspection shall include:

#	Type of inspection/ test	Sample size	Pass/ fail criteria
1	Review of product data package	100%	Data package includes all required documents, test results meet requirements Paint shop reports verify correct painting thickness and adhesion tests
2	Visual inspection	100%	Integrity of product, no visible damage, correct painting: shade and masked areas
3	Dimensional inspection	3 assemblies	Compliance to drawing requirements

#	Type of inspection/ test	Sample size	Pass/ fail criteria
4	Functional testing per product ATP/ drawing	Per ANSI/ASQ Z1.4, table II-C, inspection level II, AQL 2.5%	Results meet requirements

4. SPECIFIC QUALITY REQUIREMENTS FOR THE PRODUCTION OF PRINTED CIRCUIT BOARDS (PCB) FOR DEFENSE APPLICATIONS

4.1 General

The chapter includes:

- Specific requirements for manufacturing and inspection by the supplier – types of inspection and testing that shall be completed by the supplier prior to submitting the product to Yehud Campus source inspection
- Submission for Yehud Campus Source Inspection – details how the supplier should submit the product for source inspection
- Detail of the inspection procedures to be followed by the Yehud Campus source inspector

4.2 Applicable Documents

The following documents, in their latest revision on the issue date of the purchase order, comprise a part of the manufacturing and inspection requirements in this chapter:

#	Document Number	Title
1	IPC-A-600	Acceptability of Printed Boards, class 3
2	WS-000970	Procurement specification for rigid printed boards for military applications
3	WS-000980	Procurement specification for flex and rigid-flex printed boards for military applications
4	IPC-6018	Microwave End Product Board Inspection and Test, class 3
5	IPC-6013	Qualification and Performance Specification for Flexible Printed Boards, class 3
6	IPC-6012	Qualification and Performance Specification for Rigid Printed Boards, class 3
7		D5 Drawing
8		Cut out drawing

4.3 Specific requirements for production and quality control by the supplier

This paragraph details requirements and testing the supplier shall complete before submitting the products for Yehud Campus inspection:

4.3.1 PCB manufacturing shall comply to drawings and files included in the PO and requirements in WS-0000970 for rigid boards and WS-00980 for flex/ rigid-flex boards and per additional PO requirements.

4.3.2 In-process inspection and testing shall comply to the requirements in the product file.

4.3.3 HATS testing shall be performed per PO requirements and specific requirements by the Yehud Campus Technology expert.

4.3.4 Final inspection shall include electrical testing, coupons and visual inspection for 100% of boards in the production lot

4.3.5 Quality acceptance testing shall be performed per paragraphs 4.2 and 4.3 if IPC 6012 and IPC 6013, class 3.

4.3.6 Dimensional test – diagonals

The test shall be performed on both sides of the panel (PS and CS) per the following measurements:

4.3.6.1 The distance between the furthest pads on the panel on both sides (4 measurements) – this is the actual distance.

4.3.6.2 The distance between the furthest pads on the 'Gerber' for both sides (4 measurements) – this is the planned (should be) distance.

4.3.6.3 Difference between should be and actual dimension for each diagonal measurement shall not exceed 0.005".

4.3.7 HATS testing – per PO requirements

4.4 Submissions to Yehud Campus Source Inspection

4.4.1 The products shall be submitted for Yehud Campus inspection after passing all in-process and final tests and inspection by the supplier

4.4.2 The manufacturing file shall be made available to the Yehud campus inspector

4.4.3 Product data package shall include:

#	Required documents
1	Supplier's COC including a list of board serial numbers for the production lot
2	Yehud Campus Material review board reports for any waivers or concessions (if applicable)
3	Final test reports signed-off by the supplier
4	Test reports per IPC-A-600
5	Test reports: Mechanical tests, coupon microsegments tests, electrical tests and final inspection
6	Dimensional inspection report per Cutout drawing
7	Electrical test report
8	Hole diameters measurements per D5 drawing
9	COC for raw materials
10	Dimensional diagonal measurements
11	Solder coating thickness
12	Copper layers thickness (per microsections measurments)
13	Copper elongation
14	Solderability report
15	Controlled impedance report

4.4.4 Every lot shall be accompanied by microsection coupons (one parallel to X axis and one parallel to Y axis) and trails after thermal shock

4.4.5 Coupons shall be retained by the supplier for 7 years.

4.5 Source inspection procedures for Yehud Campus inspectors (Verification inspection):

4.5.1 Inspection shall include:

- In-process inspection
- Final inspection including acceptance testing

4.5.2 Final inspection:

4.5.2.1 Inspection shall be performed separately for every production lot.

4.5.2.2 Review of product data package

4.5.2.3 Verification of availability of coupons and trails as required (see par 4.4.4)

4.5.2.4 Visual inspection per of WS-000970/ WS-000980, sample size per table 1 below. The following shall be visually inspected with at least X5 magnification:

4.5.2.5 No visual discrepancies in the base material, pads, conductors. No delamination.

- Bow/ twist meet drawing requirements
- Solder coating uniform, without ridges that may disrupt solder paste, no shorts/ disconnects
- Silk screen per drawing
- Correct solder mask application

4.5.2.6 Two lots of the same product (part number) that were produced in the same week may be considered as one lot. The sample shall be drawn from the unified lot.

Table 1: Sample size for visual inspection and mechanical testing

Lot size	Sample size for visual inspection	Sample size for mechanical testing
1-150	5	3
151-280	8	3
281-500	13	3

4.5.2.7 Inspection of microsections in the X/Y axes:

- Verify microsections include buried vias, through vias plated vias/ non plated vias
- Board meets drawing requirements: thickness of layers, plating of holes.
- Insulation thickness between layers is larger than 90 microns, unless otherwise specified.

4.5.2.8 Mechanical test:

Mechanical testing shall be performed per D5 and cutout drawings. All types of holes in the board shall be inspected per D5 drawing. Plating/ non plating of holes shall be verified, Dimensional testing of main dimensions of the board, thickness and chamfers.

4.5.2.9 Marking: the inspector shall verify correct marking of boards including serial number, week and year of production and supplier code.

4.5.2.10 In case of discrepancy found in the lot, the lot shall be returned to the supplier for sorting inspection

5. SPECIFIC QUALITY REQUIREMENTS FOR ELECTRONICS PRINTED BOARD ASSEMBLIES FOR DEFENSE APPLICATIONS

5.1 General

This chapter details specific quality requirements for printed board assemblies for defense applications. The chapter includes:

- Specific requirements for manufacturing and inspection by the supplier – types of inspection and testing that shall be completed by the supplier prior to submitting the product to Yehud Campus source inspection
- Submission for Yehud Campus Source Inspection – details how the supplier should submit the product for source inspection
- Detail of the inspection procedures to be followed by the Yehud Campus source inspector

5.2 Applicable Documents

The following documents, in their latest revision on the issue date of the purchase order, comprise a part of the manufacturing and inspection requirements in this chapter:

#	Document Number	Title
1	PS471101E	Assembly and Soldering Process for Electronic PWB's and Assemblies
2	PS470001E	Bonding of Components and Wires to Printed Circuit Boards
3	PS470110E	Requirements for Acrylic Conformal Coating on PCB
4	J-STD-001	Requirements for Soldered Electrical and Electronic Assemblies, Class 3
5	IPC-A-610	Acceptability of Electronic Assemblies, Class 3
6	PS474000E	Requirements & Procedures for Avoiding Counterfeit EEE parts
7	ANSI ESD S.20.20	For the Development of an Electrostatic Discharge Control Program for – Protection of Electrical and Electronic Parts, Assemblies and Equipment (excluding electrically initiated explosive devices)
8	NASA-HANDBOOK-8739.21	Workmanship Manual for Electrostatic Discharge Control
9	ANSI/ASQ Z1.4	Sampling procedures and tables for inspection by attributes

5.3 Specific requirements for production and quality control by the supplier

5.3.1 Procurement of components is allowed only from original Component Manufacturers (OCM) or from their franchised distributors and according to PS474000E

requirements. Military parts shall be procured from approved sources of supply as specified in the relevant QPL

5.3.2 Procurement of obsolete components

5.3.2.1 Procurement of obsolete components may imply purchasing form a non-franchised source, purchasing components with incomplete certification (supplier COC rather than OCM COC) or not meeting component age requirements.

5.3.2.2 The supplier must obtain MBT component engineering approval before procuring an obsolete component. Quotes shall specify the date code of components to be supplied.

5.3.2.3 Requirements from PS 474000E apply, specifically: procurement from approved suppliers per PS 474000E par 8.2, inspection and testing of components in approved labs per PS 474000E par 8.4, requirements in
PS 474000E appB – if not otherwise specified, the default testing level for active components shall be B2.

5.3.3 Age requirements for procured components

5.3.3.1 Age of plastic encapsulated microcircuits and discrete semiconductors shall not exceed 12 months when received.

5.3.3.2 Age of all other components shall not exceed 24 months when received.

5.3.4 Packaging and identification requirements of procured components

5.3.4.1 Components shall be purchased in their original OEM/OCM package, carrying the OEM/ OCM or franchised distributor label with the following information: manufacturer, part number, quantity, date code. Moisture sensitive components shall be purchased in MBBs sealed by the OEM/ OCM

5.3.4.2 Loose components/ bulk packing is not allowed.

5.3.5 Required certificates for procured components

5.3.5.1 A COC issued by the OEM/OCM or their franchised distributor is required for every component purchased.

5.3.5.2 The COC shall include the following mandatory information: name of OEM, OEM part number, date code, lot number and serial number as applicable.

5.3.5.3 The supplier shall retain COC records for all components and materials used including: electronic components, cleaning agents, coating materials and adhesives.

5.3.6 The supplier shall maintain traceability records for all materials and components used for the assembly of a specific board.

5.3.7 Board assembly shall meet PS 471101E requirements and be performed according to a detailed production file including: route cards detailing all steps of the assembly and inspection processes and including detailed instructions. The production file shall be reviewed and approved by the purchaser before beginning of production.

5.3.8 The supplier shall implement an ESD prevention program per the following:

5.3.8.1 ESD S20.20 shall be implemented for boards with components that are defined as ESD class-1 (sensitive to electrostatic voltage over 250V)

5.3.8.2 NASA Handbook 8739.21 shall be implemented for boards with components that are defined as ESD class-0 (sensitive to electrostatic voltage under 250V)

5.3.9 Operators working on the assembly processes, soldering or inspection shall be certified to the current revision of IPC-A-610.

5.3.10 Supplier inspection is required for all process steps (for example: de-golding, set up of the SMT machine, verifying expiry dates of materials, application of solder paste, cleaning, AOI, electrical testing, bonding and coating).

5.3.11 At least one board of every batch shall undergo cleanliness testing per J-STD-001 paragraph 8.3

5.3.12 Unless otherwise specified, inspection of assembly and soldering shall be per J-STD-001 class 3, IPC-A-610 class 3 and PS 471101E.

5.3.13 Conformal coating shall be performed per PS470110E. Conformal coating is a special process and shall be performed only by suppliers certified by IAI for this process.

5.3.14 Bonding of components shall be performed per PS470001E.

5.3.15 The supplier shall enable Yehud Campus inspectors access to all phases of the production line – for random inspection and tests (with prior notice).

5.4 Submissions to Yehud Campus Source Inspection

5.4.1 **General**

The products shall be submitted to Yehud campus inspection according to PO requirements and in the following steps:

- Interim inspection: after completion of final visual inspection by the supplier, and before conformal coating (usually required only in FAI)
- Final inspection, after conformal coating and bonding of components

5.4.2 Products shall be submitted to Yehud campus inspection after passing the supplier's inspection steps and testing required per the production file.

5.4.3 The production file shall be made available to the Yehud campus inspector

5.4.4 Product data package

The data package for the production lot shall be submitted for final inspection and shall include the following documents

#	Required documents
1	Supplier's serviceable tag for every assembled board
2	Supplier's COC including a list of board serial numbers for the production lot
3	Yehud Campus Material review board reports for any waivers or concessions (if applicable)
4	Test reports for every assembled board (for example: JTAG, ICT, functional test and AOI)
5	COC for all components assembled (FAI only)
6	COC for coating materials, specifying expiry dates (FAI only)
7	COC for bonding materials, specifying expiry dates (FAI only)
8	Results of conformal coating thickness test and conformal coating adhesion tests
9	For bonding of components, COC according to PS 470001 appendix A
10	For conformal coating, COC according to PS 470110 appendix A

5.5 Source inspection procedures for Yehud Campus inspectors (Verification inspection)

5.5.1 Inspection by Yehud Campus shall be performed in two steps

- Interim inspection: after completion of final visual inspection by the supplier, and before conformal coating (usually required in FAI only)
- After supplier's final inspection, after conformal coating and bonding of components

5.5.2 The interim inspection step (before conformal coating) shall include the following:

#	Inspection/test method	Sample size	Pass/ fail criteria
1	Visual inspection for quality of assembly, soldering and bonding	ANSI/ASQ Z1.4, table II-A, inspection level II, AQL 2.5%	Compliance to product file Compliance to IPC-A-610 class 3 and PS 470001
2	Electrical/ functional test	1 assembled board	Meet ATP requirements

5.5.3 When interim inspection is required, boards shall undergo conformal coating only after approved by the Yehud campus inspector

5.5.4 Final inspection:

Final inspection shall include:

1. Review of product data package (including electrical/ functional test results for 100% of boards)
2. Inspection of conformal coating:

#	Inspection/test method	Sample size	Pass/ fail criteria
1	Coating inspection	ANSI/ASQ Z1.4, table II-A, inspection level II, AQL 2.5%	PS 470110 paragraph 10

6. SPECIFIC QUALITY REQUIREMENTS FOR WIRE HARNESS FOR DEFENSE APPLICATIONS

6.1 General

This chapter details specific quality requirements for wire harness production for defense applications.

The chapter includes:

- Specific requirements for manufacturing and inspection by the supplier – types of inspection and testing that shall be completed by the supplier prior to submitting the product to Yehud Campus source inspection
- Submission to Yehud Campus Source Inspection – details how the supplier should submit the product to source inspection
- Detail of the inspection procedures to be followed by the Yehud Campus source inspector

6.2 Applicable Documents

The following documents, in their latest revision on the issue date of the purchase order, comprise a part of the manufacturing and inspection requirements in this chapter:

#	Document Number	Title
1	PS 400200	Fabrication of wire/ cable harnesses
2	IPC-A-620	Requirements and acceptance for cable and wire harness assemblies, class 3

6.3 Specific requirements for production and quality control by the supplier

This paragraph details the requirements for production and inspection to be followed by the supplier before submitting the product to Yehud campus source inspection

6.3.1 Manufacturing Requirements

6.3.1.1 Wire harness assembly and cables manufacturing shall be compliant to PS 400200

6.3.1.2 Potting shall comply to requirement in the part list

6.3.1.3 The supplier shall retain original manufacturer COC documents for all components, wires and raw materials purchased. For items supplied by IAI, IAI serviceability tag shall be retained.

6.3.1.4 All operators working on wire harness and cables shall be certified to IPC-A-620

6.3.1.5 Wire harness and cable assembly shall follow a detailed manufacturing file to include route cards. Route cards shall detail the sequence of manufacturing including in-process inspection steps, required tools to be used per types of connectors wires etc. The manufacturing file shall be reviewed and approved by Yehud Campus representatives prior to beginning of production.

6.3.1.6 Ends of wires shall be individually identified using a shrink indicating the wire number per the wiring list.

6.3.1.7 When electronic components are handled as a part of the wire harness and cable assembly, the supplier shall implement an ESD control program based compliant to international standards.

6.3.2 Inspection and test requirements

6.3.2.1 Full inspection is required on 100% of wire harness/ cables manufactured

6.3.2.2 In-process inspection (before shrinking boots/ sleeves)

- Verification of items and materials assembled to the wire harness/ cable compliance to parts list
- Dimensional inspection
- Verification of marking
- Insulation resistance test (using a megohmmeter)
- Automatic continuity test per wiring list
- Visual inspection per IPC-A-620, class 3

6.3.2.3 In-process source inspection by Yehud Campus

Per agreement during the PRR, the supplier shall summon Yehud Campus source inspection for in-process inspection when the cables are still open, before closing of backshells, shrinking boots and sleeves, or potting.

6.3.2.4 Final inspection (after shrinking boots and sleeves)

- Verification of items and materials assembled to the wire harness/ cable compliance to parts list (if not already checked during in-process inspection)
- Dimensional inspection
- Automatic continuity test per wiring list
- Visual inspection per IPC-A-620, class 3
- Pull and retention tests (circular connector types)

6.4 Submitting for Yehud Campus Source Inspection

6.4.1 General

Wire harness and cables shall be submitted to source inspection in two phases:

- In-process, when the harness is open (before shrinking of boots/ sleeves, before potting, before closing of back shells)
- Final inspection

6.4.2 Wire harness and cables shall be submitted to Yehud Campus source inspection after successful completion of all inspection and test operations required by the supplier

6.4.3 The manufacturing file shall be made available to the Yehud Campus inspector.

6.4.4 The following data package shall be submitted during the final inspection:

#	**Required document**
1	Manufacturing file
2	Supplier Serviceable tag for every cable/ wire harness or for every lot
3	Supplier Certificate of Compliance detailing all serial numbers in the lot
4	Campus Yehud MRB approvals for every deviation (if applicable)

#	Required document
5	Final Test / inspection reports approved and signed by supplier Quality Control: • Results of automatic continuity tests • Results of insulation resistance tests • Results of visual inspection • Results of any other electrical tests required

6.5 Source inspection procedures for Yehud Campus inspectors (Verification inspection)

6.5.1 Inspection shall be performed in the following phases

- In-process: before termination of the wire harness/ cable after the supplier has completed in-process visual inspection and continuity tests
- After the supplier's final inspection

6.5.2 In-process verification inspection shall include:

#	Required inspection step	Sample size	Pass/fail criteria
1	Verification of suppliers in-process electrical testing	100%	Results meet requirements
2	Visual inspection to verify workmanship and correctness	Per ANSI/ASQ Z1.4, table II-A, inspection level II AQL 2.5%	IPC-A-620 class 3 Cable drawings, parts lists and wiring lists
3	Electrical test	1 cable/ wire harness, only during FAI	Compliance to requirements

6.5.3 Final Inspection

Final inspection by Yehud Campus source inspector shall include:

- Verification of the lot data package
- Verification of electrical testing results for all wire harness/ cables in the lot
- Electrical testing of one cable sampled from the lot
- Visual inspection to verify workmanship of 100% of cables

7. SPECIFIC QUALITY REQUIREMENTS FOR THE PRODUCTION OF METAL PRIMARY PARTS FOR DEFENSE APPLICATIONS

7.1 General

This chapter details specific quality requirements for metal primary parts for defense applications. The requirements in this chapter are applicable to the following technologies: machining, sheet-metal forming, Laser cutting, casting, forging, extrusion, manufacturing of springs, manufacturing of identification plates/signs
The chapter includes:

- Specific requirements for manufacturing and inspection by the supplier – types of inspection and testing that shall be completed by the supplier prior to submitting the product to Yehud Campus source inspection
- Submission to Yehud Campus Source Inspection – details how the supplier should submit the product to source inspection
- Detail of the inspection procedures to be followed by the Yehud Campus source inspector

7.2 Applicable Documents

The following documents, in their latest revision on the issue date of the purchase order, comprise a part of the manufacturing and inspection requirements in this chapter:

#	Document Number	Title
1	ANSI/ASQ Z1.4	Sampling procedures and tables for inspection by attributes

7.3 Specific requirements for production and quality control by the supplier

This paragraph details the requirements for manufacturing and inspection to be followed by the supplier before submitting the product to Yehud campus source inspection

7.3.1 Manufacturing of the parts in the purchase order shall comply to the 3D models, drawings and parts lists detailed in the purchase order.

Clarification: All dimensions in drawings are final dimensions after coating and finish (painting), unless otherwise explicitly stated in the parts list.

7.3.2 The supplier shall provide full documentation of raw materials (original COC, documentation of any special testing results if required), and full documentation of special processes including NDT (processor COC and results of inspection and testing)

7.3.3 The supplier shall complete inspection of the lot before submission to source inspection by Yehud campus. This inspection shall cover at least the following:

7.3.3.1 Requirements applicable to all metal primary parts:

#	Type of inspection/ test	Sample size	Pass/ fail criteria
1	Review of raw materials certificates	-	Compliance to parts list (PL) requirements
2	Review of of special processes certificates	-	Compliance to parts list (PL) requirements. Review of quality assurance results (per PS). For example: verification that process specimens passed required tests, verification of special process results (coating thickness, conductivity), for painting results of painting thickness and adhesion testing
3	Receiving inspection after special processes at subcontractors	-	Compliance to drawing/ 3D model, Verification (where possible) that treatments including painting were applied only on required surfaces In painting, verification of correct shade
4	Visual inspection for workmanship and burrs	100%	No burrs allowed No dents/ deformation or damage to the product
5	Verification of compliance to engineering requirements in drawings/ 3D models/ PL – dimensional inspection	Per ANSI/ASQ Z1.4, table II-A, inspection level II, AQL 2.5%	Compliance to requirements Every engineering requirement shall be detailed in the inspection report, CMM reports shall be printed. The sample tested shall be identified and separated from the lot 100% verification is required for KCs

7.3.3.2 Specific additional requirements applicable to casted metallic primary parts:

#	Type of inspection/ test	Sample size	Pass/ fail criteria
1	Chemical analysis of casting material	-	Compliance to requirements
2	Verification of mechanical attributes of casting	-	Compliance to requirements

7.3.3.3 Specific requirements for signs/ identification plates

#	Type of inspection/ test	Sample size	Pass/ fail criteria
1	Verification of compliance to engineering requirements in drawings/ 3D models – dimensional inspection and inspection of print	Per ANSI/ASQ Z1.4, table II-A, AQL 2.5% Inspection level S-4	Compliance to requirements Every engineering requirement shall be detailed in the inspection report, CMM reports shall be printed. The sample tested shall be identified and separated from the lot
2	Verification of shelf life of adhesives	-	Limited shelf life materials, shall have at least 90% of their shelf life remaining when supplied
3	Verification of packaging and identification of shelf life	-	Every package shall be clearly identified with the following details: part number, production date, expiration date and required storage environment

7.3.4 Suppliers inspection report shall document results of the inspection and tests required in par 7.3.3, and include results of the dimensional inspection. The report shall include the following details:

- Identification of part: Part number/ drawing number + revision, Purchase order number + line number, Identification of production lot number
- Quantity of parts in lot/ Quantity of parts produced
- For dimensional inspection report:
    - Sample size and serial numbers sampled (if applicable)
    - Reference to drawing (balloon, ref designator), required dimension + tolerance, result of measurement (when go-no go gages are used the result may be documented as “pass/fail”, otherwise actual results shall be documented. Any deviating dimension shall be clearly identified by an asterisk (“*”)
    - type of measuring device used
    - Dimensional results shall preferably be documented for every item, a range of results may also be reported
- The report shall be stamped and signed by the supplier’s inspector.
- Date of inspection

7.4 Submissions to Yehud Campus Source Inspection

7.4.1 The parts shall be submitted to source inspection by Yehud campus after successfully passing the suppliers inspection

7.4.2 The supplier's manufacturing file shall be made available to the Yehud campus inspector if requested

7.4.3 The data package for the production lot shall include the following documents:

#	Required documents
1	Supplier's COC and serviceable tag for the parts
2	Yehud campus MRB approvals (when applicable)
3	Supplier's final inspection reports complete and signed off by the supplier's QC
4	Required documentation per par 7.3.2

7.5 Source inspection procedures for Yehud Campus inspectors (Verification inspection)

Inspection shall include:

#	Type of inspection/ test	Sample size	Pass/ fail criteria
1	Review of raw materials certificates	-	Compliance to parts list (PL) requirements
2	Review of of special processes certificates	-	Compliance to parts list (PL) requirements. Review of quality assurance results (per PS). For example: verification that process specimens passed required tests, verification of special process results (coating thickness, conductivity), for painting results of painting thickness and adhesion testing
2	Verification of the supplier's inspection report	-	Compliance to engineering requirements
3	Visual inspection of painting	Per ANSI/ASQ Z1.4, table II-A, inspection level II, AQL 2.5%	Compliance to drawing requirements (shade, paint only on surfaces designated in drawing)
4	Visual inspection for workmanship and burrs	Per ANSI/ASQ Z1.4, table II-A, inspection level II AQL 2.5%	No burrs allowed No damages allowed
5	Verification of compliance to engineering requirements in drawings/		

#	Type of inspection/ test	Sample size	Pass/ fail criteria
	3D models according to the following:		
5.1	Inspection of all threads: including true position, and inspection of the thread using a go-no go gage	100% of threads shall be inspected on 3 parts (one part from the suppliers' sample, 2 parts from the rest of the lot)	Compliance to requirements
5.2	Dimensional inspection covering all dimensions and mechanical properties in drawing for example: flatness, . parallelism, roundness, angularity	3 parts (one part from the suppliers' sample, 2 parts from the rest of the lot)	

7.5.1 Specific inspection requirements for signs/ identification plates:

#	Type of inspection/ test	Sample size	Pass/ fail criteria
1	verification of shelf life of adhesives	-	Limited shelf life materials, shall have at least 90% of their shelf life remaining when supplied
2	verification of packaging and identification of shelf life	-	Every package shall be clearly identified with the following details: part number, production date, expiration date and required storage environment

8. SPECIFIC QUALITY REQUIREMENTS FOR THE PRODUCTION OF METAL PRIMARY PARTS FOR SPACE APPLICATIONS

8.1 General

This chapter details specific quality requirements for metal primary parts for space applications. The requirements in this chapter are applicable to the following technologies: machining, sheet-metal forming, Laser cutting, casting, forging, extrusion, and manufacturing of springs. The chapter includes:

- Specific requirements for manufacturing and inspection by the supplier – types of inspection and testing that shall be completed by the supplier prior to submitting the product to Yehud Campus source inspection
- Submission to Yehud Campus Source Inspection – details how the supplier should submit the product to source inspection
- Detail of the inspection procedures to be followed by the Yehud Campus source inspector

8.2 Applicable Documents

The following documents, in their latest revision on the issue date of the purchase order, comprise a part of the manufacturing and inspection requirements in this chapter:

#	Document Number	Title
1	ANSI/ASQ Z1.4	Sampling procedures and tables for inspection by attributes

8.3 Specific requirements for production and quality control by the supplier

This paragraph details the requirements for manufacturing and inspection to be followed by the supplier before submitting the product to Yehud campus source inspection

8.3.1 Manufacturing of the parts in the purchase order shall comply to the 3D models, drawings and parts lists detailed in the purchase order.

Clarification: All dimensions in drawings are final dimensions after coating and finish (painting), unless otherwise explicitly stated in the parts list.

8.3.2 The supplier shall provide full documentation of raw materials (original COC, documentation of any special testing results if required), and full documentation of special processes including NDT (processor COC and results of inspection and testing)

8.3.3 In parts where, different types of coating/ surface treatments are applied on different surfaces of the part, Yehud campus source inspection (MIP) is required after masking of the part at the special process supplier as a part of the FAI. In serial

production, the supplier shall verify correct masking of the part before application of coating/ surface treatments.

8.3.4 The supplier shall complete inspection of the lot before submission to source inspection by Yehud campus. This inspection shall cover at least the following:

8.3.4.1 Requirements applicable to all metal primary parts:

#	Type of inspection/ test	Sample size	Pass/ fail criteria
1	Review of raw materials certificates	-	Compliance to parts list (PL) requirements
2	Review of of special processes certificates	-	Compliance to parts list (PL) requirements. Review of quality assurance results (per PS). For example: verification that process specimens passed required tests, verification of special process results (coating thickness, conductivity), for painting results of painting thickness and adhesion testing
3	Receiving inspection after special processes at subcontractors	-	Compliance to drawing/ 3D model, Verification (where possible) that treatments including painting were applied only on required surfaces In painting, verification of correct shade. In cases where conductive and non-conductive coatings are applied, testing of electrical conductivity to verify correct coating areas (required results per coating process specification)
4	Visual inspection for workmanship and burrs	100%	No burrs allowed No dents/ deformation or damage to the product
5	Verification of compliance to engineering requirements in drawings/ 3D models/ PL – dimensional inspection	Per ANSI/ASQ Z1.4, table II-B, tightened inspection level II, AQL 1.5%, rejection number =1	Compliance to requirements Every engineering requirement shall be detailed in the inspection report, CMM reports shall be printed. The sample tested shall be identified and separated from the lot 100% verification is required for KCs * Sample shall represent the full production lot (beginning- mid-end)

8.3.4.2 Specific additional requirements applicable to casted metallic primary parts:

#	Type of inspection/ test	Sample size	Pass/ fail criteria
1	Chemical analysis of casting material	-	Compliance to requirements
2	Verification of mechanical attributes of casting	-	Compliance to requirements

8.3.4.3 Specific requirements for manufacturing of springs

#	Type of inspection/ test	Sample size	Pass/ fail criteria
1	Verification of spring rate	100%	Compliance to requirements, every result shall be documented

8.3.5 Suppliers inspection report shall document results of the inspection and tests required in par 8.3, and include results of the dimensional inspection. The report shall include the following details:

- Identification of part: Part number/ drawing number + revision, Purchase order number + line number, Identification of production lot number
- Quantity of parts in lot/ Quantity of parts produced
- For dimensional inspection report:
  - Sample size and serial numbers sampled (if applicable)
  - Reference to drawing (balloon, ref designator), required dimension + tolerance, result of measurement (when go-no go gauges are used the result may be documented as “pass/fail”, otherwise actual results shall be documented. Any deviating dimension shall be clearly identified by an asterisk (“*”)
  - Identification of measuring device used to include type, identification number and calibration date
  - Dimensional results shall be documented for every item
- The report shall be stamped and signed by the supplier’s inspector.
- Date of inspection

8.4 Submissions to Yehud Campus Source Inspection

8.4.1 The parts shall be submitted to source inspection by Yehud campus after successfully passing the suppliers inspection

8.4.2 The supplier’s manufacturing file shall be made available to the Yehud campus inspector if requested

8.4.3 The data package for the production lot shall include the following documents:

#	Required documents
1	Supplier’s COC and serviceable tag for the parts

2	Yehud campus MRB approvals (when applicable)
3	Supplier's final inspection reports complete and signed off by the supplier's QC
4	Required documentation per par 8.3

8.5 Source inspection procedures for Yehud Campus inspectors (Verification inspection)

Inspection shall include:

#	Type of inspection/ test	Sample size	Pass/ fail criteria
1	Review of raw materials certificates	-	Compliance to parts list (PL) requirements
2	Review of of special processes	-	Compliance to parts list (PL) requirements. Review of quality assurance results (per PS). For example: verification that process specimens passed required tests, verification of special process results (coating thickness, conductivity), for painting, results of painting thickness and adhesion testing Compliance When more than one type of coating/ surface treatment is applied – verification of application on correct surfaces of part. When conductive and non conductive coating are applied on different surfaces of the part, measure conductivity to verify correct application. When tests on process specimens are required, verify results
2	Verification of the supplier's inspection report	-	Compliance to engineering requirements, compliance to sample size
3	Visual inspection of painting	100%	Compliance to drawing requirements (shade, paint

#	Type of inspection/ test	Sample size	Pass/ fail criteria
			only on surfaces designated in drawing)
4	Visual inspection for workmanship and burrs	Per ANSI/ASQ Z1.4, table II-A, inspection level II AQL 2.5%,rejection number=1	No burrs allowed No damages allowed
5	Verification of compliance to engineering requirements in drawings/ 3D models according to the following:		
5.1	Inspection of all threads: including true position, and inspection of the thread using a go-no go gage	100% of threads shall be inspected on all parts	Compliance to requirements
5.2	Dimensional inspection covering all dimensions and mechanical properties in drawing for example: flatness, parallelism, roundness, angularity:		Compliance to requirements
5.2.1	Inspection to verify flatness and parallelism	100%	Compliance to requirements
5.2.2	Dimensional inspection for lots under 5 parts or less than 20 dimensions per part	100%	Compliance to requirements
5.2.3	Inspection of dimensions with tolerance less than (more accurate than) 5/100 mm, for all lot sizes	100%	Compliance to requirements
5.2.4	Dimensional inspection for lots over 5 parts	Per ANSI/ASQ Z1.4, table II-A, inspection level II AQL 2.5%,rejection number=1 Compliance to requirements 20 most accurate dimensions shall be	Compliance to requirements

#	Type of inspection/ test	Sample size	Pass/ fail criteria
		measured (except for dimensions with tolerance more accurate than 5/100mm, which will be 100% measured, on all parts)	

8.5.1 Specific inspection requirements for screws:

#	Type of inspection/ test	Sample size	Pass/ fail criteria
1	Dimensional inspection of screws, including inspection of threads	Per ANSI/ASQ Z1.4, table II-A, inspection level II AQL 2.5%,rejection number=1	Compliance to requirements

8.5.2 Specific inspection requirements for springs:

#	Type of inspection/ test	Sample size	Pass/ fail criteria
1	Dimensional inspection of springs, including testing of spring rates	Per ANSI/ASQ Z1.4, table II-A, inspection level II AQL 2.5%,rejection number=1	Compliance to requirements

9. SPECIFIC QUALITY REQUIREMENTS FOR THE PRODUCTION OF RUBBER PARTS FOR DEFENSE APPLICATIONS

9.1 General

This chapter details specific quality requirements for rubber parts for defense applications. The chapter includes:

- Specific requirements for manufacturing and inspection by the supplier – types of inspection and testing that shall be completed by the supplier prior to submitting the product to Yehud Campus source inspection
- Submission to Yehud Campus Source Inspection – details how the supplier should submit the product to source inspection
- Detail of the inspection procedures to be followed by the Yehud Campus source inspector

9.2 Applicable Documents

The following documents, in their latest revision on the issue date of the purchase order, comprise a part of the manufacturing and inspection requirements in this chapter:

#	Document Number	Title
1	ANSI/ASQ Z1.4	Sampling procedures and tables for inspection by attributes

9.3 Specific requirements for production and quality control by the supplier

This paragraph details the requirements for production and inspection to be followed by the supplier before submitting the product to Yehud campus source inspection

9.3.1 Manufacturing of the parts in the purchase order shall comply to the 3D models, drawing and parts lists detailed in the purchase order.

9.3.2 Remaining shelf life – per requirements in PO

9.3.3 Full documentation of the rubber compound, production route cards including curing time/ cycle, date of curing shall be retained by the supplier for the duration of the life of the component. Including, COC, COT and applicable test records.

9.3.4 The supplier shall complete inspection of the lot before submission to source inspection by Yehud campus. This inspection shall cover at least the following:

#	Type of inspection/ test	Sample size	Pass/ fail criteria
1	Review of compound documentation including test record	-	Compliance to parts list requirements
2	Visual inspection for surface quality	100%	Compliance to requirements
3	Inspection/ tests required to verify compliance to requirements in the engineering documents	Per ANSI/ASQ Z1.4, table II-A, inspection level II, AQL 2.5%	Compliance to requirements Every engineering requirement shall be detailed in the inspection report, CMM reports shall be printed. The sample tested shall be identified and separated from the lot

9.3.5 Results of supplier's inspection shall be documented. The inspection report shall include the following information:

9.3.6 Suppliers inspection report shall document results of the inspection and tests required in par 8.3.3, and include results of the dimensional inspection. The report shall include the following details:

- Identification of part: Part number/ drawing number + revision, Purchase order number + line number, Identification of production lot number
- Quantity of parts in lot/ Quantity of parts produced
- Identification of compound unique number
- For dimensional inspection report:
  - Sample size and serial numbers sampled (if applicable)
  - Reference to drawing (balloon, ref designator), required dimension + tolerance, result of measurement (when go-no go gages are used the result may be documented as "pass/fail", otherwise actual results shall be documented. Any deviating dimension shall be clearly identified by an asterisk ("*")
  - type of measuring device used
  - Dimensional results shall preferably be documented for every item, a range of results may also be reported
- The report shall be stamped and signed by the supplier's inspector.
- Date of inspection

9.4 Submissions to Yehud Campus Source Inspection

9.4.1 The parts shall be submitted to source inspection by Yehud campus after successfully passing the suppliers inspection (in-process and final) per the applicable drawings, models and specifications

9.4.2 The supplier's production file shall be made available to the Yehud campus inspector upon request.

9.4.3 After successful completion of the inspection by Yehud campus, the parts shall be packed and the package shall be inspected also.

9.4.4 The data package for the production lot shall include the following documents:

#	Required documents
1	Supplier's COC, COT and serviceable tag for the parts
2	Yehud campus MRB approvals (when applicable)
3	Supplier's final inspection reports complete and signed-off by the supplier's QC
4	Required documentation per par 8.3.3

9.5 Source inspection procedures for Yehud Campus inspectors

Inspection shall include:

#	Type of inspection/ test	Sample size	Pass/ fail criteria
1	Review of the compound documentation and test results	-	Complies to requirements in parts list,
2	Verification of the supplier's inspection report	-	Compliance to engineering requirements
3	Visual inspection for surface quality	Per ANSI/ASQ Z1.4, table II-A, inspection level II, AQL 2.5%	Compliance to requirements
5	Verification of compliance to engineering requirements in drawings/ 3D models	3 parts	Compliance to requirements
6	Verification of remaining shelf life	-	Limited shelf life materials, shall have at least 90% of their shelf life remaining when supplied
7	Verification of packaging and identification of shelf life	-	Every package shall be clearly identified with the following details: part number, production date, expiration date and required storage environment

10. SPECIFIC QUALITY REQUIREMENTS FOR THE PRODUCTION OF COMPOSITE PARTS

10.1 General

This chapter details specific quality requirements for composite parts for defense applications. The chapter includes:

- Specific requirements for manufacturing and inspection by the supplier – types of inspection and testing that shall be completed by the supplier prior to submitting the product to Yehud Campus source inspection
- Submission to Yehud Campus Source Inspection – details how the supplier should submit the product to source inspection
- Detail of the inspection procedures to be followed by the Yehud Campus source inspector

10.2 Applicable Documents

The following documents, in their latest revision on the issue date of the purchase order, comprise a part of the manufacturing and inspection requirements in this chapter:

#	Document Number	Title
1	PS321700E*	FABRICATION OF LAMINATED PARTS AND SANDWICHES, WET EPOXY SYSTEMS, Basic Specification
2	PS322000E*	STRUCTURAL LAMINATES AND SANDWICHES EPOXY BASE PREPREGS
3	PS324200 *	MANUFACTURING OF CO-CURED CARBON/EPOXY & HYBRID PARTS
4	PS249101*	SURFACE PREPARATION OF PLASTIC & COMPOSITE MATERIALS
5	ANSI/ASQ Z1.4	Sampling procedures and tables for inspection by attributes

* Note: The process specifications applicable to the PO shall be IAI process specifications in the engineering documents or alternative specifications approved by Yehud Campus materials engineering department.

10.3 Specific requirements for production and quality control by the supplier

This paragraph details the requirements for production and inspection to be followed by the supplier before submitting the product to Yehud campus source inspection. The requirements specified herein are the minimal set of requirements. Inspection methodology and mandatory inspection points by Yehud Campus shall be agreed during the PRR, or in a designated meeting prior to the beginning of serial production.

10.3.1 Manufacturing of the parts in the purchase order shall comply to the 3D models, drawings and parts lists in the purchase order. The manufacturing process shall comply to the process specifications in these documents.

Clarification: All dimensions in drawings are final dimensions after coating and painting, unless otherwise explicitly stated in the parts list.

10.3.2 The supplier shall provide full documentation of raw materials (original COC, acceptance test results, life extension tests results if applicable). Expiry dates and compliance to working life shall be demonstrated.

10.3.3 The supplier shall use a process log or route card to fully document the production process of every part including:

- Ply orientation/ warp direction (per drawing requirements)
- Process test specimens as required in the process specifications
- Dates and times of start and finish of time limited steps (for example start and finish of lay-up), date and time of curing process
- Humidity and temperature values during lay-up
- Charts of the curing process (temperature/ pressure/ vacuum values).
- For any measurement in the production process, the measured value shall be documented (for example vacuum level when sealing the vacuum bag).

10.3.4 The following record shall be retained for the duration of the life of the product for every part/ batch of parts fabricated:

- Identification of part number, serial number/ batch number
- Identification of process specification
- For every raw material, the following information shall be documented and retained: Material specification number, lot number, roll number, date of production, date of receipt of the material, storage life expiration date, remaining working life (in hours) at the beginning of the cure cycle. Records shall be retained for any life extension.
- Date and time: beginning of layup, completion of layup beginning of curing
- Identification of curing process, type of equipment used for the curing process, Chart of the specific curing process(es) (from Autoclave or oven recorder).
- Test results of process specimens per requirements in PL/PS
- Test results of NDT (where required)
- Yehud campus MRB reports, if applicable
- Records of rework/ repair performed

10.3.5 The supplier shall complete in-process and final inspection of the lot before submission to Yehud campus source inspection. This inspection shall cover at least the following:

#	Type of inspection/ test	Sample size	Pass/ fail criteria
1	Review of process records and raw materials working life and shelf life	-	Compliance to parts list requirements. Material shelf life and working life not expired until beginning of curing
2	Receiving inspection after special processes at subcontractors	-	Compliance to drawing, specifically compliance to masking requirements (treatements applied only to the required surfaces) Verification that required process specimens were successfully tested In painting, verification of painting thickness and adhesion testing compliance to the required process specification (based on processor documentation)
3	Review of completed routing cards/ process logs, and and specifically in-process inspection steps		Compliance to drawing requirements (shade, masked areas)
4	Visual inspection	100%	External plies are full and not damaged (no scratches, dents or other damages), painting shade correct, masking per drawing requirements
5	Verification of curing process (per oven/ autoclave records)	100%	Compliance to process specification requirements
6	Hardness testing of process specimens	100%	Compliance to process specification requirements
7	Nondestructive testing	As required in the process specification	Compliance to process specification requirements. Compliance to test specifications requirements
8	Dimensional inspection	100% for key characteristics ANSI/ASQ Z1.4, table II-A, AQL 2.5% (for other dimensions)	Compliance to requirements Every engineering requirement shall be detailed in the inspection report, CMM reports shall be printed. The sample tested shall be identified and separated from the lot
9	Complete record for every part/ batch as required in paragraph 9.3.4		Record includes all required information

10.3.6 Requirements for FAI:

10.3.6.1 A detailed FAI plan shall be agreed during the PRR or in a designated meeting before start of the serial production

10.3.6.2 If such a plan had not been agreed, the FAI shall follow all steps of production, with the presence of Yehud Campus inspector.

10.3.6.3 The supplier shall provide inspection/ test reports for production tools (molds, jigs) during the FAI.

10.3.6.4 The supplier shall provide notice of at least two weeks prior to FAI planned beginning.

10.4 submissions to Yehud Campus Source Inspection

10.4.1 The parts shall be submitted to source inspection by Yehud campus after successfully passing the suppliers inspection

10.4.2 The supplier's production file shall be made available to the Yehud campus inspector upon request.

10.4.3 The data package for the production lot shall include the following documents:

#	Required documents
1	Supplier's COC
2	Complete route cards
3	Manufacturing record as detailed in par 9.3.4
4	Dimensional inspection reports (for final part and sub parts)
5	Yehud campus MRB approvals (when applicable)
6	COC and records of painting process, including painting specimens

10.5 Source inspection procedures for Yehud Campus inspectors (Verification inspection)

Inspection shall include:

#	Type of inspection/ test	Sample size	Pass/ fail criteria
1	Review of raw material documentation	-	Compliance to PL requirements, storage life/ working life not expired
2	Review of supplier's documentation as detailed in par 9.3.3 and 9.3.4, including orientation of plies/ warp direction	-	Compliance to process specification Compliance to drawing requirements, masking, testing of process specimens. When painted, verify painting thickness, adhesion testing per the applicable process specification (check documentation of painting)

#	Type of inspection/ test	Sample size	Pass/ fail criteria
1	Review of raw material documentation	-	Compliance to PL requirements, storage life/ working life not expired
3	Visual inspection	Per ANSI/ASQ Z1.4, table II-A, inspection level II, AQL 2.5%	No damages, compliance to drawing requirements (shade, masked areas)
4	Visual inspection for workmanship and burrs	Per ANSI/ASQ Z1.4, table inspection II-A level II, AQL 2.5%	No burrs allowed No damages allowed
5	Dimensional inspection	3 parts	Compliance to drawings requirements

11. SPECIFIC QUALITY REQUIREMENTS FOR THE PRODUCTION OF OPTICAL PARTS

11.1 General

This chapter details specific quality requirements for optical parts (lenses, mirrors, optical windows, optical filters).
The chapter includes:

- Specific requirements for manufacturing and inspection by the supplier – types of inspection and testing that shall be completed by the supplier prior to submitting the product to Yehud Campus source inspection
- Submission to Yehud Campus Source Inspection – details how the supplier should submit the product to source inspection
- Detail of the inspection procedures to be followed by the Yehud Campus source inspector

11.2 Applicable Documents

The following documents, in their latest revision on the issue date of the purchase order, comprise a part of the manufacturing and inspection requirements in this chapter:

#	Document Number	Title
1	Q-D001.2510.05.20	Quality assurance requirements for flat optical elements
2	Q-D001.2510.06.20	Quality assurance requirements for lenses
3	ANSI/ASQ Z1.4	Sampling procedures and tables for inspection by attributes

11.3 Specific requirements for production and quality control by the supplier

This paragraph details the requirements for production and inspection to be followed by the supplier before submitting the product to Yehud campus source inspection

11.3.1 Manufacturing of the parts in the purchase order shall comply to the 3D models, drawing and parts lists in the purchase order.

11.3.2 In-process and final inspection by the supplier shall be completed prior to submission of parts to Yehud Campus source inspection, Inspection shall comply to Q-D001.2510.05.20 for flat optical elements, and to Q-D001.2510.06.20 for lenses.

11.3.3 Reports for inspection and test required shall be documented and retained by the supplier.

11.4 Submissions to Yehud Campus Source Inspection

11.4.1 The parts shall be submitted to Yehud campus source inspection after passing the suppliers inspection.

11.4.2 The supplier's production file shall be made available to the Yehud campus inspector upon request.

11.4.3 The data package for the production lot shall include the following documents:

#	Required documents
1	COC documents for raw materials
2	Supplier's inspection and test reports
3	Dimensional inspection reports
4	Test results of process specimens for coating
5	Yehud campus MRB approvals (when applicable)

11.5 Source inspection procedures for Yehud Campus inspectors

Inspection shall include:

#	Type of inspection/ test	Sample size	Pass/ fail criteria
1	Review raw materials documentation	-	Compliance to parts list, valid shelf life (when applicable)
2	Review of data package per par 10.4.3	-	Compliance to engineering requirements
3	Visual inspection for surface quality	Per ANSI/ASQ Z1.4, table II-A, inspection level II, AQL 2.5%	Compliance to requirements
4	Dimensional inspection	3 parts	Compliance to drawings requirements