



AST-10042 SUPPLIER QUALITY MANUAL



DOCUMENT NAME: Supplier Quality Manual

INITIAL CREATION DATE: August 5, 2021

DOCUMENT CLASS: Manual

DEPARTMENT: Quality

1.0 PURPOSE

To outline quality requirements that Astra levies on suppliers of externally procured products and processes.

2.0 SCOPE

This document applies to all purchase orders for development and flight hardware and purchase orders for services provided on development and flight hardware. If the purchase order references AST-10042, then this document applies.

3.0 RESPONSIBILITY

Suppliers to Astra are responsible for compliance to the Supplier Quality Requirements included in this document as flowed down through purchase orders. Astra's Head of Supply Chain and Head of Mission Assurance are jointly responsible to ensure the enforcement of requirements outlined within this document.

4.0 SUPPLIER QUALITY APPROVAL

An assessment of the supplier's manufacturing capabilities and quality management system must be conducted prior to issuing any Purchase Orders. This assessment can be conducted by one or more of the below options:

1. On-site assessment conducted at supplier's facility
2. Supplier self-assessment
3. Desktop/Virtual Audit

All assessments shall be completed by an Astra Supplier Quality Engineer (SQE) or authorized delegate.

5.0 QUALITY REQUIREMENTS

The following quality requirements apply to all Astra suppliers and are applicable to all Astra POs:

5.1 - QUALITY MANAGEMENT SYSTEM

Suppliers shall maintain a quality system in compliance with AS9100, ISO 9001, or equivalent. Compliance to the standard shall be evidenced by a current third-party certification. Copies of certification shall be furnished whenever renewed or changed. In the absence of a certified Quality Management System, an Astra Supplier Quality Engineer (SQE) can perform an onsite assessment to determine supplier approval.

5.2 - FLOW DOWN OF REQUIREMENTS

Suppliers shall flow down to sub-tier suppliers the applicable requirements outlined in this Supplier Quality Manual, drawings, specifications, and the purchase order.

5.3 – RIGHT OF ENTRY

Astra reserves the right to assign representatives, including Astra’s customer, on an itinerant or resident basis at the supplier’s facility or any sub-tier suppliers for any purpose including verifying all tests and/or inspections.

5.4 – CONTROL OF CRITICAL CHARACTERISTICS

All critical characteristics shall be verified (via inspection/measurement) on 100% of parts. Critical characteristics are denoted by an oval on the drawing and governed by [AST-10055 identification and Control of Critical Characteristics](#).

Supplier shall maintain records of critical characteristics inspections/measurements with appropriate levels of part/PO traceability.

5.5 – DESIGN CHANGES

Suppliers are not authorized to change the design, or Bill of Materials (BOM) of a product. If the supplier deems a change to the design or BOM necessary, they must request a design change via a Supplier Deviation Request per Section 5.10.

5.6 – PRODUCT OBSOLESCENCE

The supplier shall notify Astra of any planned material or component obsolescence prior to the acceptance of any Purchase Order. In addition, the supplier shall notify Astra of any plans to obsolete material on any and all existing orders with sufficient notice to facilitate, where applicable, an option for last time buy.

5.7 – RECORD RETENTION

The supplier shall retain quality records for seven (7) years after their last shipment was received, unless otherwise specified on the Astra PO. Quality records are defined as those records used in the processing, test, and inspection or product, and/or services provide to Astra by suppliers and their sub-tiers.

5.8 – SHELF LIFE

All shelf-life limited materials or products delivered to Astra shall have a minimum remaining shelf life of six months or 75% of the total shelf life, whichever is longer, from the Date of Shipment.

5.9 – COUNTERFEIT PART PREVENTION

Suppliers shall have a counterfeit prevention/detection program in accordance with the requirements listed below:

1. The supplier shall represent that they are either an Original Equipment/Component Manufacturer (OEM/OCM) or and OEM/OCM authorized distributor.
2. The supplier shall ensure that only new and authentic materials are used in products delivered to Astra. The supplier may only purchase parts from original equipment manufacturers (OEM), authorized distributors, or approved aftermarket manufacturers.

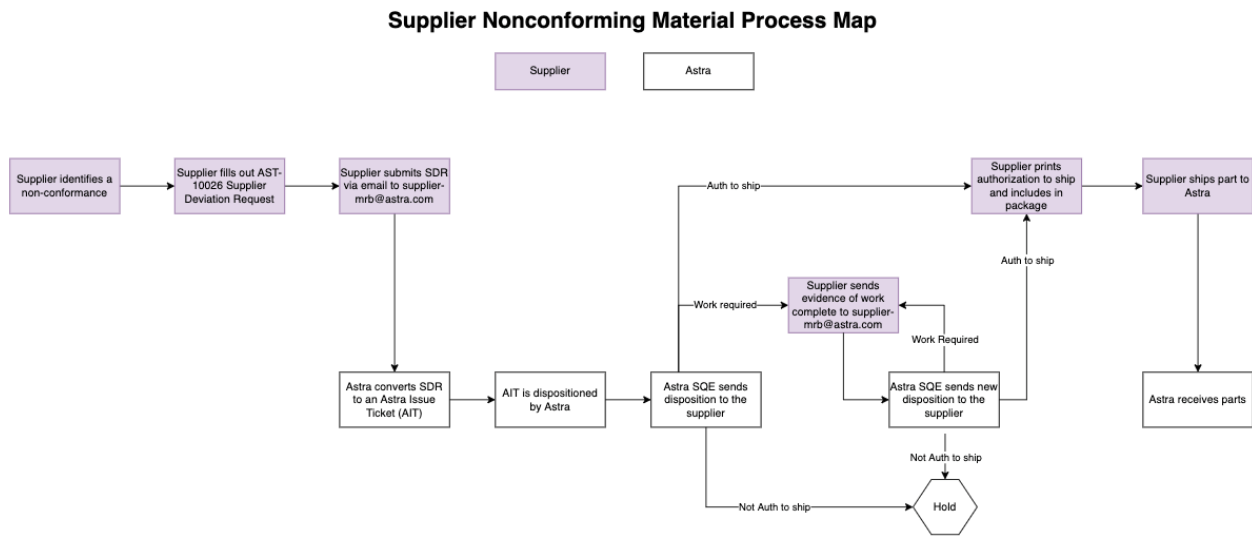
Any product that is not provided by these sources will not be accepted by Astra, unless prior approval is obtained in writing.

Supplier shall agree and ensure that counterfeit materials are not delivered to Astra. The supplier shall notify Astra immediately if they become aware or suspect that it has shipped counterfeit product to Astra. In the event the counterfeit product has been supplied to Astra, the supplier shall, at its own expense, replace the product with genuine approved parts or materials conforming to the requirements. The supplier shall maintain a counterfeit parts prevention and control plan to prevent the delivery of counterfeit parts to Astra.

Electronics manufacturers shall reference SAE AS5553 and distributors of electronic parts shall reference SAE AS6081 for guidance.

5.10 – NONCONFORMING MATERIAL

Supplier shall not ship any non-conforming product or perform any unauthorized repairs without Astra's written approval. Approval is provided via the Supplier Nonconforming Material process outlined below. Astra reserves the right to reject or return any non-conforming product that is not approved via this process.



The supplier shall report to Astra the failure of any Astra required test, including acceptance test (e.g., functional test, leak test, vibration test, burst test, etc.). Hardware experiencing a test failure shall be maintained in its same condition pending authorization from Astra for any investigation activity (i.e., do not disassemble, do not retest). The following notification schedule applies:

- Within 24 hours: an email summary of the test failure and status of affected hardware
- Within 5 days: a preliminary written report
- Within 30 days (goal): A final written failure analysis report identifying failure cause and action(s) taken to prevent recurrence

If supplier detects a non-conformance following shipment, they shall immediately notify Astra of the non-conformance via submission of a Supplier Deviation Request (SDR).

[Supplier Deviation Requests AST-10026](#) (SDR) shall be submitted to supplier-mrb@astra.com along with Astra's Astra. If Astra's disposition is for work (e.g. rework, repair) to be completed at the supplier prior to shipment, evidence of completion of that work must also be submitted to supplier-mrb@astra.com in order to receive an authorization to ship.

The written authorization to ship, provided via page 2 of the [Supplier Deviation Requests AST-10026](#) (SDR), must be printed and included in the package prior to shipment. Astra reserves the right to reject non-conforming product that is shipped to Astra without this written authorization. The subject material must be clearly identified in the shipment.

5.11 – SUPPLIER CORRECTIVE ACTION REQUEST (SCAR)

Suppliers shall perform root cause analysis and implement corrective actions when a Supplier Corrective Action Request (SCAR) is issued by Astra quality. Suppliers shall use form [Supplier Corrective Action Request AST-10024](#) (or equivalent root cause analysis form) to communicate root cause analysis and corrective actions back to the Astra Supplier Quality Engineer (SQE). Suppliers are expected to confirm receipt of the SCAR within 24 hours.

For minor issues, Astra will communicate relevant information via email. The supplier is expected to acknowledge receipt, perform root cause analysis, and implement corresponding corrective actions. A report back to the Astra SQE is not mandatory in this case.

5.12 – PACKAGING REQUIREMENTS

Packaging shall conform to the requirements specified on the applicable drawings, specifications, or purchase order. Hardware shall be packaged in a manner that will prevent damage and preclude moisture, foreign matter or contamination damage, and be properly maintained during handling, storage, and transportation. Packaging/containers shall be appropriately identified to show electrostatic protection. Humidity indicator cards shall be used for components shipped in ESD packaging, anything greater than 10% will result in rejection of the shipment.

5.13 – FOREIGN OBJECT DAMAGE PREVENTION PROGRAM

Suppliers shall maintain a FOD Prevention Program in accordance with Aerospace Standard AS9146, Foreign Object Damage (FOD) Prevention Program – Requirements for Aviation, Space, and Defense Organizations.

5.14 – CALIBRATION

Suppliers shall maintain a calibration system that complies with ISO/IEC 17025. All test equipment and gages used for calibration must be traceable to a national or international standard.

5.15 – PRINTED CIRCUIT BOARDS ASSEMBLIES AND ELECTRONIC DEVICES

All printed circuit boards and assemblies shall meet the requirements specified in IPC-6011, Class 3.

5.16 – WIRE HARNESSSES

All wire harnesses shall meet the requirements specified in IPC/WHMA-A-620, Class 2.

6.0 – QUALITY PO CLAUSES

Quality PO Clauses are invoked by the inclusion of one or more of the designators below (e.g. "Q01", "Q02") onto the Purchase Order line.

When any of these clauses are cited on the purchase order, physical copies of each form must be provided with the shipment. Forms shall also be sent via email to quality-docs@astra.com prior to shipment. The email subject line shall reference the purchase order number and line.

Failure to include the required Quality PO Clause documentation in the physical package and/or via email is grounds for Astra to reject the shipment.

Q01 – CERTIFICATE OF CONFORMANCE

A Certificate of Conformance shall be provided for each shipment and Purchase Order line. The certificate shall include, at a minimum:

- Part number and revision
- Supplier Name and address
- Part Description/Name
- Supplier Part Number (if applicable)
- Material Condition and Specification number (Raw Material Only)
- Astra Purchase Order number and line number
- Lot/Batch number
- Serial number(s)(if applicable)
- Quantity
- Manufacturing date
- Shelf Life and Expiration date (if applicable)
- Statement of conformance to Astra drawing and/or specification signed by quality representative or delegate

Q02 – DIMENSIONAL DATA

When this requirement is cited, supplier shall provide dimensional data per **AS9102 Form 3** (or equivalent) for each shipment and Purchase Order line. The dimensional data must be for 100% of characteristics or notes designated as critical on the drawing, and for every part in the shipment.

Q03 – FIRST ARTICLE INSPECTION REPORT (FAIR)

When this requirement is cited, supplier shall perform a First Article Inspection per AS9102B (or equivalent) and furnish the First Article Inspection Report (FAIR) to Astra. The part used to perform the First Article Inspection shall be identified using a temporary method (i.e. label, removable ink, bag and tag). If a FAIR has already been provided to Astra for the same part number and revision on a previous shipment, then this requirement is waived. A delta FAIR will be required for all subsequent revisions.

Q04 – TEST DATA

When this requirement is cited, supplier shall provide a record of test results demonstrating compliance to drawing notes/specifications.

Q05 – SOURCE INSPECTION

Source Inspection by an Astra Supplier Quality Engineer (SQE) is required at the supplier's facility. The supplier shall provide all test reports, inspection records, facilities, and equipment necessary to perform the appropriate inspection of product. The Astra Supplier Quality Engineer (SQE) and Global Supply Manager (GSM) shall be notified at least 5 business days in advance of performing acceptance test or intent to ship.

Q06 – CALIBRATION CERTIFICATION

A calibration report shall be furnished to Astra for each calibration performed and at a minimum include:

- Identification of the unit being calibrated
- Identification of the calibration source traceable to NIST
- Date of calibration
- Notification of out-of-tolerance conditions
- Certification that calibrations were performed in accordance with either ISO 10012, or ISO/IEC 17025 (latest revisions)

Q07 – CERTIFICATION OF SPECIAL PROCESSES

A certification is required with a statement certifying conformance to each special process (i.e. welding, plating, painting soldering, heat treating, chemical films, anodizing, etc.) performed on the materials to the specification(s) listed on the Astra PO and/or drawing.

The signature of an authorized agent of the company performing each special process including the agent's title must appear on the certification. It also must include the Astra PO number, part number and revision level, serial numbers (if applicable), lot number (if applicable), and quantity shipped.

Q08 – NON-DESTRUCTIVE INSPECTION/EVALUATION (NDI/NDE)

NDI/NDE reports, images (if applicable), and scan data (if applicable), shall be provided for 100% of the parts specified on the PO.

Q09 – MATERIAL TEST REPORT

The supplier shall furnish a Material Test Report (MTR) from the material manufacturer attesting that the material(s) meet all of Astra's requirements.

MTR Requirements:

1. The MTR shall include the name of the manufacturer, material specification, and size.
2. Chemical composition analysis and mechanical properties test results shall be included.
3. Material heat lot number shall be included.

Q10 – FIRST ARTICLE VERIFICATION

For first article runs (new design or revision), a QTY (1) must go through Astra's First Article Verification process and be approved by Astra, prior to manufacturing any additional units.

Q11 – ADVANCED PRODUCT QUALITY PLANNING (APQP) AND PRODUCTION PART APPROVAL PROCESS (PPAP)

Compliance with Aerospace Standard AS9145 (Aerospace Series - Requirements for Advanced Product Quality Planning and Production Part Approval Process), is required.

ARTIFACTS

PRODUCTION PART APPROVAL PROCESS (PPAP ELEMENT)		APQP PHASE	SECTION REFERENCES
1	Design Records	2	3.9
2	Design Risk Analysis* (e.g., DFMEA)	2	3.10; 4.4.2; 4.4.4
3	Process Flow Diagram	3	4.5.2; 4.5.3
4	Process Failure Mode and Effects Analysis (PFMEA)	3	3.1; 4.5.2; 4.5.4
5	Control Plan	3/4	3.3; 4.5.2; 4.5.6; 4.5.7; 4.6.2; Appendix C
6	Measurement System Analysis** (MSA)	4	3.14; 4.6.2; 4.6.3
7	Initial Process Capability Studies	4	3.20; 4.6.2; 4.6.5
8	Packaging, Preservation, and Labeling Approvals	3	4.5.2; 4.5.8
9	First Article Inspection Report (FAIR)	4	4.6.3; 4.6.4
10	Customer PPAP Requirements	4	4.6.7
11	PPAP Approval Form (or equivalent)	4	5.3.2; Appendix D



*Design Risk Analysis is not a required element for “build to print” product. If the product is “build to specification”, Supplier is responsible to provide a DFMEA per element 2.

**MSA to be performed for all Critical Characteristics identified in the Control Plan

Supplier is encouraged to use the templates in the International Aerospace Quality Group (IAQG) - Supply Chain Management Handbook (SCMH).

<https://scmh.iaqg.org/plan-manage/#1612365454613-62320ec6-52d7>

APPROVAL

Supplier shall make all required PPAP artifacts available to Astra's SQE or GSM upon request.

Astra reserves the right to make final determination of Supplier's compliance to AS9145 aerospace standard including PPAP artifacts.

Astra reserves the right to conduct surveillance on Supplier's AS9145 compliance and PPAP artifacts.

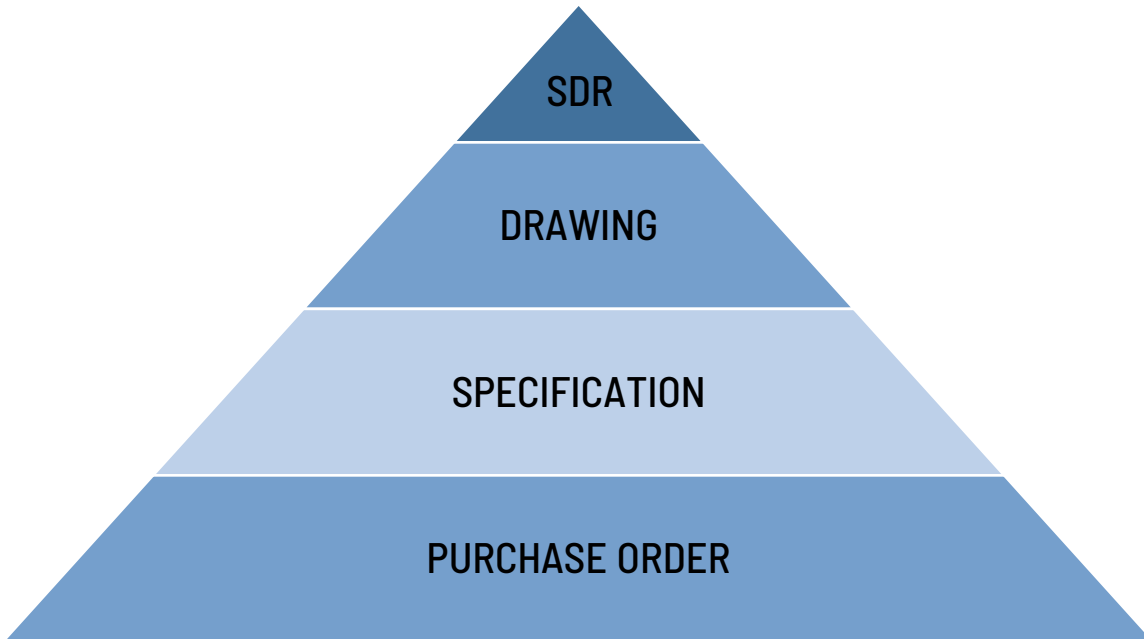
Astra also reserves the right to require PPAP artifact submittal and approval. When Astra engagement is required, Supplier will be notified in writing by Astra's SQE or GSM. Supplier shall coordinate and schedule APQP activity with the Astra's Supplier Quality Engineer (SQE) prior to the start of related procurement, manufacturing and/or processing. In these instances, Supplier shall have written approval of PPAP artifacts from Astra's GSM for all required contract line items prior to first part shipment, unless otherwise directed by Astra's GSM.

Supplier can obtain a copy of AS9145 Aerospace Standard for APQP/PPAP from the following source: SAE International (formally known as Society of Automotive Engineers), AS9145 Aerospace Series - Requirements for Advanced Product Quality Planning and Production Part Approval Process.

Supplier can obtain a copy of APQP/PPAP Checklists and Templates from the following source: International Aerospace Quality Group (IAQG), Supply Chain Management Handbook (SCMH)

7.0 – HIERARCHY OF INFORMATION

Where inconsistencies exist, the information higher in the Hierarchy of Information **always** takes precedence. Waivers are only issued via the SDR process (Section 5.10).



APPENDIX

DATE	REVISION	DESCRIPTION OF CHANGE	CHANGES MADE BY
21 Dec 2021	A	Initial Release	Andrew Griggs
23 Mar 2022	B	1) Various language edits, 2) Modified Q02 to provide data on all critical characteristics, 3) Added critical characteristics requirements, 4) Added SCAR requirements	Angelo Menotti
31 Mar 2022	C	Added word document to create pdf version for distribution	Angelo Menotti
26 Oct 2022	D	1) Restructured document, 2) Added Supplier Approval process, 3) Added quality requirements and additional Quality Clauses	Ryan Perkins

