NOTICE

This document is provided as a guide to the changes made in the referenced documents. These referenced “living” documents are subject to change at any time. Therefore, the provided update is provided for informational purposes only and is overridden by all other documents in any instances of contradiction.
Clarification on Quality Requirements

Space Exploration Technologies is committed to designing, manufacturing, and launching the world’s most advanced rockets and spacecraft.

In order to ensure un-interrupted development, safety, and support of our products, we continually improve our products, services, and processes.

This document was created to help better relay to our supply base the expectations we have for process, documentation, and communication.
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Raw Material Updates - SPX-00035640

• Acceptable Mills List
  – All Metallic Raw Materials must be procured from a SpaceX approved mill or distributor. These mills and distributors can be found on the SpaceX Acceptable Mills List. Two applicable documents are available on www.SpaceX.com/Legal (Password: 123)
    • SpaceX Acceptable Mills List DDMMYY.pdf contains the list of acceptable metallic raw materials sources.
  – This list is not applicable to Castings, Casting Stock, Closed-Die Forgings or Closed-Die Forging Stock. These are handled on an individual part basis
  – SPX-00035640 was released on August 6, 2016 and is applicable to all purchase orders which were placed on or after this date.
Material Updates – SPXQC-10a Clarification

**SPXQC-10a: MATERIAL TRACEABILITY:** The Seller shall furnish a complete set of material certifications traceable to lot, batch, block, or heat number of the mill / original material manufacturer. Certifications generated by the supplier shall be signed by the material supplier’s authorized quality representative, and indicate the representative’s title.

Certification to conflicting forms of material is forbidden.

Seller shall provide material to specification with no exceptions or addendums. Material shall not be provided as “chemistry only,” “capable,” “heat-treatable,” or with other specified exceptions unless explicitly requested on the controlling purchase order, drawing, or specification as appropriate.

*When specified on the purchase order, raw material such as titanium, aluminum, etc. must have the appropriate heat lot identified on each piece for heat lot traceability. All remnant material returns must clearly retain all traceability.*

**COMPLETE** trace must be established and maintained through all documentation to satisfy the requirements of SPXQC-10a. For additional information, please see the “Documentation Examples / Best Practice” section at the end of this presentation. If complete trace from mill is not established the shipment will be rejected.
The Seller shall inspect every Key and Major Characteristic specified on the drawing on 100% of parts. Sampling of Key and Major Characteristics is not permitted.

SpaceX uses the following identifiers for features on drawings:

<table>
<thead>
<tr>
<th>Identifier</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Key Characteristic" /></td>
<td>Key Characteristic</td>
</tr>
<tr>
<td><img src="image" alt="Major Characteristic" /></td>
<td>Major Characteristic</td>
</tr>
<tr>
<td><img src="image" alt="Minor Characteristic" /></td>
<td>Minor Characteristic</td>
</tr>
</tbody>
</table>

If the governing SpaceX drawing does not have Key/Major/Minor Characteristics identified, the following criteria shall be used to determine which characteristics shall be inspected for 100% of the parts in the lot:

- All dimensional tolerances of .004 inches or less
- Position tolerances of .005 inches or less
- Angularity tolerances of 0.5 degrees or less
- Surface finishes of 32\(\mu\) or less
RTV - Return to Vendor Process Updates

SpaceX has implemented a time driven Rapid Return to Vendor (RTV) process that returns material to suppliers within 5 days of inspection (weekends and holidays excluded), where non-conformance(s) identified are deemed vendor caused. This process will drive early notification of defects from incoming inspection and will support SpaceX in minimizing both risk to schedule and flight due to non-conforming product.

- **On Day 1:** SpaceX will send a notice of intent to RTV
  - A team of Quality Specialists will ensure that the non-conformance is truly “vendor caused”
  - The notice is sent to both SpaceX and supplier representatives to ensure awareness on both ends.
  - The notice will advise that an RMA#, if necessary, should be provided within 72 hours

- **On Day 3 (48 hours from initial notice):** SpaceX will send a final notice of intent to RTV
  - If no response or RMA is received by this time, a final notification will be sent
  - This notification will indicate that 24 hours remains for receipt of an RMA#

- **On Day 5:** SpaceX will return the suspect material for evaluation & rework/replacement
  - No further notice will be sent at this point
  - SpaceX will return material utilizing either a vendor (if provided) or internally generated RMA#

For questions regarding the process, please contact: Diondre Montgomery - Diondre.Montgomery@spacex.com Mason Falk – Mason.Falk@spacex.com
eCerts – Electronic Certificate Submissions

Overview
Electronic Certificates (eCerts) provides a process for vendors to submit their certificates and paperwork electronically before parts are shipped to SpaceX with the goal of expediting receipt and ensuring acceptability of SpaceX shipments.

Built on Supplier Feedback
Paperwork lost at SpaceX
Shipments put on hold for minor errors
Invoices not being paid because the receiving process was delayed

Additional Requirements
Increase throughput and efficiency
Reduce physical waste of scanning documents
Improve legibility of records to satisfy customer needs

ECERT SUBMISSION PROCESS

<table>
<thead>
<tr>
<th>SUPPLIER</th>
<th>AUTOMATION</th>
<th>SPACEX RECEIVING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete eCert Validation Report (ECVR)</td>
<td>Submit eCVR via Email</td>
<td>Valid Submission?</td>
</tr>
<tr>
<td>NO</td>
<td>YES</td>
<td>Review eCert Package</td>
</tr>
<tr>
<td>YES</td>
<td>Send Notice Of Rejection</td>
<td>Package Approved?</td>
</tr>
<tr>
<td>NO</td>
<td>Send Notice Of Acceptance</td>
<td>YES</td>
</tr>
<tr>
<td></td>
<td>Ship Parts</td>
<td></td>
</tr>
</tbody>
</table>
eCerts – Electronic Certificate Submissions

Summary
Once on-boarded, suppliers must submit eCerts for all parts
eCerts must be submitted separately for each PO Line
Source Inspection (SPXQC-17 and SPXQC-61) should be completed prior to eCert submission.
Source Inspection Approval should be included in the eCert package.

Points of Contact
Primary: Supplier Quality Engineer
Secondary: Supplier Performance Specialist

References
SPD-00035912 – Electronic Certificate Submission Process
SPX-00035967 – eCert Validation Report
Revisions to Quality Clause Attachment

SPX-00000874

“SpaceX Quality Clause Attachment for Purchase Orders”

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>27.0</td>
<td>Split clause 38 in to 38a and 38b for improved control of frozen and shelf life material. Added clause 60 for custom hardware requirements.</td>
</tr>
<tr>
<td>28.0</td>
<td>Added SPXQC-61: IN-PROCESS SOURCE INSPECTION ON SUBASSEMBLIES and did minor formatting. Approvers changed.</td>
</tr>
<tr>
<td>29.0</td>
<td>Title changes for clarification to SPXQC- 10a, 10b, 13, 14, 17, 21, 26, 29, 50, 54, 56, &amp; 57. Description changes to SPXQC- 13, 17, 48, &amp; 57. Removed individual quality clause callouts. List of deleted quality clauses can be found in revision history for reference. SPXQC-31: Added Identification / Marking Requirements SPXQC-17: Updated Requirements SPXQC-54: Updated Requirements SPXQC-61: Updated Requirements Deleted SPXQC-55: SpaceX Part Approval Process. Changed Procedure Owner to Vibhor Jain. Added “Documentation Required” field with example to SPXQC- 10a, 10b, 13, 14, 15, 23, 24, 34, 35, 37, 38a, 38b, 39, 40, 44, 45, 46, 47, 48, 49, 50, 51, 53, 54, 56, 57, 58, 59, 60, 61.</td>
</tr>
</tbody>
</table>
Revisions to Quality Clause Attachment

For clarification, **Quality Clauses that require documentation** have been identified as shown below.

**SPXQC-10b:**

**RAW MATERIAL TEST RESULTS**

For non-proprietary materials, the Seller shall furnish all chemical and physical test reports & results applicable to the material specification. Such reports shall be traceable to the lot, batch, block, or heat lot number of the original material manufacturer or mill. All test results traceable to the materials supplied must be kept on file for a minimum of seven (7) years unless otherwise specified by the SpaceX purchase order.

- “Documentation Required” has been added to highlight the fact that SpaceX expects some sort of paperwork deliverable (if and only when that specific clause is noted on your purchase order).

- A “Suggested Deliverable” has been added to describe the type of documentation that we expect.
Revisions to Quality Clause Attachment

**SPXQC-31 – USE OF BR-127 PRIMER**

**Original:** required that each package shall be labelled and identified as according to Clause M

**Update:** The Supplier shall identify all items, parts, components, subassemblies and/or assemblies with the appropriate part number and revision level as noted on the part drawing or as otherwise specified by the SpaceX Purchase Order. Parts and/or materials that are not suitable for marking due to size and/or configuration may be identified using the bag and tag methods outlined in SAE AS478 or equivalent.

<table>
<thead>
<tr>
<th>SPXQC-38a – TEMPERATURE AND SHELF-LIFE SENSITIVE MATERIAL REQUIREMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Temperature sensitive material must have certifications of compliance that reflect storage temperature</td>
</tr>
<tr>
<td>• Shelf life sensitive material must be delivered with 80% remaining shelf life</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SPXQC-38b – SHIPPING OF FROZEN MATERIALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Material must be shipped in a manner that maintains its temperature requirements throughout transportation</td>
</tr>
<tr>
<td>• Shipments must include two USB compatible temperature recording devices per pallet</td>
</tr>
</tbody>
</table>
Revisions to Quality Clause Attachment

SPXQC-54: NDT TECHNIQUE APPROVAL FRACTURE CRITICAL

Original:
QC-54 required that supplier use Supplier Request Form (SPX-00002691) for SpaceX approval of supplier’s NDT Technique and email it to the noted address along with an electronic copy of the techniques signed by the vendor NDT Level III.

Update:
QC-54 was updated to remove use of “Supplier Request Form (SPX-00002691)”. Supplier is still required to get a NDT technique approved. Supplier shall submit an electronic copy of techniques signed by the vendor NDT Level III to buyer & SQE

SPXQC-60 – CUSTOM HARDWARE REQUIREMENTS

- Must conform to SPX-00025120 “Hardware Procurement”
Revisions to Quality Clause Attachment

SPXQC-61 – IN-PROCESS SOURCE INSPECTION

Was updated to provide more clear insight on the requirements and how this QC will be applied in conjunction with SPXQC-17

**Update:** In-Process Source Inspection shall be conducted per the following requirements:

- **When the drawing specifies that dimensions apply before Coating/Plating:**
  - Request source inspection immediately before coating/plating operation.

- **Passivation/Cleaning:**
  - Request source inspection immediately before the passivation/cleaning operation.

- **If the Purchase Order contains an assembly composed of multiple piece parts:**
  - Request Source Inspection on all piece parts listed in the BOM before final assembly. This inspection shall be performed within a single source inspection event.
  - The final Certificate of Compliance, submitted to SpaceX for the assembly, shall list and include the revision level of all piece parts that makes up that specific assembly.

- **A SpaceX In-Process Source Inspection does not preclude subsequent inspection nor does it relieve the Seller of the responsibility of providing acceptable product. In-Process Source inspections may include personnel from SpaceX in addition to SpaceX customer representatives and/or regulatory authorities, and shall include access to all records applicable to SpaceX product or orders.**

Note: If part(s) procured on a Purchased Order Line meeting more than one of above mentioned criteria, supplier shall contact SpaceX to determine when the source inspection event shall occur.
Documentation Examples / Best Practice

The following slides provide “best practice” examples of maintaining traceability / tips to ensure a smooth receipt of your order at SpaceX. It is strongly advised that these are reviewed, and any documentation / process is updated to reflect.
The Seller shall provide a Certificate of Conformance that certifies all materials and processes supplied are in accordance with SpaceX Purchase Order requirements for all flight and R&D hardware. The Certificate shall indicate at a minimum, unless specified otherwise on the Purchase Order, the following:

- SpaceX Part Number + Revision
- SpaceX Child Part Number (if assembly / if applicable) + Revision
- Lot/date code
- SpaceX serial number (if applicable per section M. Identification/Marking) < Not shown in example >
- Vendor serial number (where required by drawing or purchase order) < Not shown in example >
- SpaceX Purchase Order number
- SpaceX Purchase Order Line number
- Quantity
- Relevant specifications < Not shown in example >
  - Full traceability to hardware, plating, and raw material (if applicable)
  - Job / Lot Number(s)
  - Supplier Name / Responsible Signature
Above you will see the traceability of the plating used in the example assembly linked to the Certificate of Conformance:

1. Vendor name called out on C of C
2. Lot number linked to C of C
3. Procured Purchase Order linked to C of C
Above you will see the traceability of the hardware used in the example assembly linked to the Certificate of Conformance:

1. Vendor name called out on C of C
2. Lot number linked to C of C
3. Procured Purchase Order linked to C of C
Above you will see the traceability of the raw material used in the example assembly linked to the Certificate of Conformance:

1. Vendor name called out on C of C
2. Lot number linked to C of C
3. Procured Purchase Order linked to C of C
Best Practice (when submitting physical paperwork)

• Write and highlight the specific quality clause satisfied by the document being provided.

• Mark the paperwork in the upper right hand corner (as shown in the example below).
Best Practice (when submitting eCerts)

• Include a table of contents as the first page of the PDF submitted through eCerts

• Example and potential template shown below

### Table of Contents

<table>
<thead>
<tr>
<th>Quality Clause</th>
<th>Page #</th>
</tr>
</thead>
<tbody>
<tr>
<td>QC-10a</td>
<td>2</td>
</tr>
<tr>
<td>QC-10b</td>
<td>2</td>
</tr>
<tr>
<td>QC-13</td>
<td>3</td>
</tr>
</tbody>
</table>
Thank you very much!

- Always request an explanation / clarification when receiving your RFQ/PO from your Buyer in regard to exactly what is needed per line / per PO.

- Any quality concerns can be clarified by contacting your Supplier Development Engineer or Supplier Quality Specialist.