SUPPLIER MANUAL

SPX-00007672, Version 6.0
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SECTION 1
PURPOSE AND SCOPE

The purpose of this manual is to specify SpaceX requirements for our suppliers. The goal of these requirements is to support the production of quality product – a responsibility that is shared between SpaceX and our Suppliers.

All material shall be processed, controlled, inspected, and tested in accordance with the requirements set forth in this manual and any other relevant SpaceX specification, as applicable to the business. As a Supplier to SpaceX, you are an important contributor to our finished product. Delayed receipts, nonconforming parts, or incorrect documentation can jeopardize our ability to build quality products with on-time delivery.

The requirements of this manual apply to all SpaceX Flight and Non-Flight suppliers (hereinafter referred to as Supplier) providing production parts, materials, special processes and services to SpaceX. All documents referenced in this document can be found on www.spacex.com/legal or are otherwise publically available.
SECTION 2
DEFINITIONS

Acceptable Mills List – A list of metallic raw material sources that must be used in the fabrication of flight hardware procured by or for SpaceX where SpaceX is the design authority. The list also applies to the melters of this raw material. The list does not apply to castings, casting stock, forgings or forging stock; these are handled on an individual part basis. This list can be found at Spacex.com/legal and is updated regularly.

Approved Supplier List (ASL) – A list of special process suppliers that must be used when a SpaceX supplier outsources such work. This list can be found at Spacex.com/legal and is updated regularly. Alternatively referred to as an Approved Vendor List (AVL).

Audit – An official inspection of a Supplier’s capability, capacity, special processes, quality management system, or other critical performance factors. Audit records are completed forms stored in the Supplier Maintenance system and used to justify changes in supplier approval status. Note that Audits are surveys, and that variation between audits, auditors, and suppliers within reason is normal and expected.

Certificate of Compliance (CoC) – A document provided by the Seller and certified by a competent authority that provided goods or services meet all required specifications. Alternatively referred to as a certificate of conformance.

Country of Origin – the country of manufacture, production, or processing where an end product originates. Note that specific Country of Origin requirements may be governed by Federal Acquisition Regulations (FAR clauses) and other contractual requirements.

Commercial Off The Shelf (COTS) - Any item or supply that is;
(i) A commercial item, that is, of a type customarily used by the general public or by non-governmental entities for purposes other than governmental purposes, and (i) Has been sold, leased, or licensed to the general public; or (ii) Has been offered for sale, lease, or license to the general public;
(ii) Sold in substantial quantities in the commercial marketplace; and
(iii) Offered to SpaceX under a contract or subcontract at any tier, without modification, in the same form in which it is sold in the commercial marketplace.

Electro-Static Discharge (ESD) – Sudden, usually unintended flow of electricity between two or more objects.

Foreign Object Debris (FOD) - A substance, debris or article alien to a system, subsystem, assembly, component, or process which would potentially cause damage or otherwise interfere with performance or reliability.

Non-destructive Testing (NDT) – An evaluation technique that assesses material, part, or system properties without causing damage or changes to performance. May also be referred to as non-destructive evaluation (NDE) or non-destructive inspection (NDI).

Onboarding – The process by which a Supplier is added to SpaceX’s Supplier Maintenance system, and is subsequently reviewed and audited, with adjustments made to Supplier Type and Status accordingly.

Original Equipment Manufacturer (OEM) – A Supplier that makes product from purchased components.
**Scope of Approval** – A specific list of processes, specifications, or capabilities that a Supplier is authorized to perform for SpaceX.

**Seller** – The party identified on the face of this Contract with whom SpaceX is contracting. Used interchangeably with “Supplier.”

**SpaceX** - SPACE EXPLORATION TECHNOLOGIES CORP., acting through its companies or business units as identified on the face of this Contract. If a subsidiary or affiliate of SpaceX is identified on the face of this Contract, then "SpaceX" means that subsidiary or affiliate.

**Special Process** - Those processes which cannot be verified by SpaceX prior to installation or delivery. Typically, these processes can only be tested or inspected by destructive testing. Examples include: Welding, brazing, plating, heat treating, non-destructive testing, etc. Note that SpaceX may elect to control certain processes as though they were Special Processes even if they do not meet the definition listed here.

**Subcontractor** – A company performing work on SpaceX product under the oversight of a Supplier/Seller.

**Supplier** – The party identified on the face of this Contract with whom SpaceX is contracting. Used interchangeably with “Seller.”

**Supplier Request for Information (SRI)** – SPX-00002691 is a form used to establish effective communication between SpaceX and Suppliers to assure compliance with required specifications. The SRI form should be used as a means to 1) request information, 2) request approval for changes to product or processes, 3) request documentation and direction related to non-conformances, and 4) submit an NDT technique for approval.

**Supplier Status** – Communicates the approval status of a Supplier. Allowable statuses are: Approved, Conditional, Under Consideration, Probation, and Disqualified.

**Supplier Type** – The following is a list of supplier types at SpaceX. Note that only those suppliers defined as Flight or Non-flight shall comply with the requirements in this document.

- **Flight** - Supplier provides one or both of the following: a) parts or materials that leave the launch pad; b) Services including special processes that modify the properties of parts or materials that leave the launch pad.

- **Non-Flight** - Supplier provides product or services including special processes that control or validate flight product, which includes, but is not limited to tooling, testing, calibration, ground support equipment, and qualification material. SpaceX proprietary information is shared with this category of vendors.

- **General Use** – Supplier provides product or services that do not modify, control or validate product that leaves the launch pad. Any supplier that may have access to SpaceX proprietary information either in discussion or by function of being on SpaceX premises or that exclusively provides research and development product or services to SpaceX should be included in this category.

- **Restricted General Use** – Supplier provides products or services that do not modify, control or validate product that leaves the launch pad, and SpaceX proprietary information is not shared with the supplier and the supplier does not have unescorted access to SpaceX locations.

- **Non-Vendor** – Company or organization whose products or services are generally not managed by the Purchasing department. This includes companies or organizations that: a) are statutory in nature (government
agencies, insurance companies, utilities, etc.); b) serve a social purpose (charity, university, etc.); c) are one-time off-site events (amusement park, sports organization); d) are paid via SpaceX credit card only. General Type Purchase Orders are not issued to the supplier.

**Employee** – SpaceX employee. Employees are entered into Warp solely to facilitate the Expense Reimbursement process. Purchase Orders may not be issued to Employees.
SECTION 3
REQUIREMENTS

3.1 REQUIRED DOCUMENTS

In order to initiate business with SpaceX, the Supplier must have the following documents completed and on file. Additional documents may be required based on engineering, business, or other needs:

3.1.1 Non-Disclosure Agreement (NDA)

Suppliers shall not disclose to third parties or use design data belonging to or purchased by SpaceX for any purpose other than the production and support of products and services to be supplied to SpaceX. This applies to all SpaceX products except where agreements have been reached with SpaceX that allows the Supplier specific rights to the use of the design data.

3.1.2 SpaceX Export Compliance Statement

The documents, drawings, etc. supplied by SpaceX to each of the suppliers may constitute Technical Data within the definition of the U.S. International Traffic in Arms Regulations (ITAR) and are subject to the export control laws of the United States. Transfer of this Technical Data by any means to a foreign person or foreign entity, whether in the United States or abroad, without prior export license or other approval from the U.S. Department of State, is prohibited. The ITAR agreement is only required for suppliers in the United States.

3.1.3 W-9

The W-9 form is only required for suppliers in the United States.

3.1.4 Supplier Pre-Award Survey

SPX-00035002, the Supplier Pre-Award Survey, gives SpaceX the initial information to evaluate the Supplier’s services, location, contacts, capability, capacity, business type, and quality certification. If a quality certification is applicable, please include a copy to send with this form.

Copies of these forms are available at www.spacex.com/suppliers.

3.2 PURCHASE ORDER AGREEMENT

3.2.1 Acknowledgement

An affirmative acknowledgement of a SpaceX Purchase Order incorporating referenced specifications constitutes the Supplier’s acceptance of those specifications. Acknowledgement via email to the buyer or via the SpaceX supplier portal is required.

3.2.2 Purchase Order Requirements

The requirements in this document are applicable for all SpaceX orders to Flight and Non-Flight suppliers. In addition, the Purchase Order may cite specific numbered quality clauses from SPX-00000874 Quality Clause Attachment for Purchase Orders. When referenced, compliance to those clauses is required, and acceptance or performance of the order is a record of the Supplier’s understanding and compliance to those requirements.

3.2.3 SpaceX Drawings

Most SpaceX drawings are minimally dimensioned and models are provided as required. Most SpaceX models exist in NX, which can be sent as an STP file. Should this be an issue, please contact the SpaceX buyer to make other arrangements.
3.2.4 Cost Recovery
Costs associated with product that does not conform to SpaceX requirements may be charged back to the Supplier. Total costs may include both material and non-material charges.

3.3 SHIPMENTS

3.3.1 On-time Delivery
Seller shall meet all scheduled delivery dates as specified on SpaceX Purchase Order. If Seller becomes aware of any circumstances that are likely to give rise to a delay in promised delivery date, the Seller shall immediately notify their SpaceX buyer, in writing, stating the reason for the delay and the new time for delivery. Suppliers may also use the supplier portal for this purpose. For overseas products, this notification should be given no later than 30 days before the promised date. For all other products, notification should be provided no later than 48 hours before the promised date.

The Seller shall seek authorization from SpaceX if they wish to deliver any parts more than five days earlier than the promised delivery date. In case of delay in delivery without proper notification, SpaceX reserves the right to cancel the Purchase Order without liability to SpaceX or any other third party.

Unauthorized over shipments and early shipments may be returned at Seller’s expense. Seller shall be liable for all storage/handling charges incurred as a result of over shipments and early shipments.

3.3.2 Drop Shipments

3.3.2.1 Parts and material are not to be shipped to SpaceX without a final inspection by the Supplier or prior approval by SpaceX.

3.3.2.2 In the rare case where a drop shipment from a Supplier’s subcontractor to SpaceX is required and not indicated on the Purchase Order, a written approval by the relevant Quality Engineer must be provided. The preferred method of written approval is a Supplier Request Form (SPX-00002691).

3.3.2.3 In the case where the Purchase Order requires a drop shipment of SpaceX owned material to the Supplier, the Supplier is responsible for the inspection and handling of material as specified in the SpaceX Quality Clause Attachment for Purchase Orders (SPX-00000874).

3.3.3 Returns
If communicated as a requirement by the Supplier, the buyer will request a Return Merchandise Authorization (RMA) prior to shipping parts.

3.3.4 Packaging
All items must be adequately preserved, packaged, handled, and contained to prevent deterioration and damage during shipment per the SpaceX procedure for Supplier Shipping, Packaging and Preservation (SPX-00008836). Each lot or batch shall, as far as is practicable, consist of units of product of a single type, grade, class, size and composition, manufactured under essentially the same conditions and at essentially the same time.

When shipping multiple Purchase Order line items, Seller shall segregate multiple lots of the same part number. Product submitted against a single purchase order line should consist of units manufactured under essentially the same conditions and at essentially the same time. In cases where this is not achievable, lots shall be segregated and appropriately identified within the shipment.
Damage during transit may be the responsibility of the supplier if inadequate packing is identified as a contributing cause.

3.4 ORDER OF PRECEDENCE FOR TECHNICAL DOCUMENTS

In the event of a conflict in requirements between technical documents, the following order of precedence shall prevail:

1. Purchase Order/Contract (note that this includes requirements flowed on the Purchase Order or contract, including Terms and Conditions, Supplier Manual (SPX-00007672) and SpaceX Quality Clause Attachment for Purchase Orders SPX-00000874.)
2. Drawings
3. Specifications cited on the drawings

Note: Contact the SpaceX authorized buyer regarding any questions or concerns. The configuration requirements specified in the Purchase Order will contain applicable drawing, associated revision levels, supplemental drawing data, quality flow-downs, and customer flow-downs.

3.5 SUPPLIER PORTAL

SpaceX prefers that our suppliers use the Supplier Portal located at [https://supplierexchange.spacex.com](https://supplierexchange.spacex.com) for acknowledgement of Purchase Orders and other transactions. Suppliers not already active on the portal can e-mail their primary SpaceX contact for onboarding.
SECTION 4
SUPPLIER QUALITY REQUIREMENTS

4.1 GENERAL

4.1.1 Conformance
The Supplier shall ensure that material provided to SpaceX conforms to all Purchase Order, specification, and drawing requirements, whether processed by the Supplier or procured from subcontractors. Tests, inspections, and record retention requirements, in addition to those required by SpaceX drawings, may be incorporated in specifications and/or Purchase Orders in specific terms.

Neither surveillance, inspection and/or tests made by SpaceX or their representatives at either the Seller’s or buyer’s facility nor the Seller’s compliance with all applicable product assurance requirements shall relieve the Seller of the responsibility to furnish items which conform to the requirements of the Purchase Order.

For Electrical, Electronic, and Electromechanical (EEE) parts and assemblies the supplier shall ensure compliance to AV2218.

4.1.2 Quality System Requirements
The Supplier must be able to maintain a quality system that meets or exceeds industry standards and ensures adequate product conformance and appropriate objective evidence to meet usual business responsibilities. It is preferable that Sellers are able to maintain a quality system that meets or exceeds ISO 9001(current revision) or AS9100 (current revision). The Seller shall notify the buyer within two working days if any ISO, AS, or NADCAP certifications are revoked or suspended. Failure to notify SpaceX of such revocation shall constitute a breach of contract any may result in termination of any outstanding Purchase Orders and/or disqualification. Notification of certification upgrade is encouraged, but not mandatory

4.1.2.1 The Supplier shall have a suitable, controlled means for determining the acceptability of product.

4.1.2.2 The Supplier shall have a documented procedure for controlling nonconforming material.

4.1.2.3 The Supplier shall have a documented procedure for implementing corrective and preventative action.

4.1.2.4 The Supplier shall flow down these quality system requirements to subcontractors

4.1.2.5 Supplier personnel performing work on contracted products and services should be adequately trained to ensure that their skills and competency levels will result in products that meet all contract requirements. Supplier shall have records to show this training.

4.1.3 Quality Plan
Where applicable to the criticality of the product, a quality plan for the processing and final inspection of the product shall be developed.
4.1.4 Cost of Quality Monitoring
SpaceX subcontractors shall track their internal cost of quality data consisting of a minimum of scrap, rework, and repair costs. This data shall be reviewed by Supplier management as an evaluation of the manufacturing planning and process.

4.1.5 Configuration Management
For Seller-controlled drawings of SpaceX custom alpha revision components, the Seller shall maintain a specific and unique part number with revision control for SpaceX. No significant change affecting the design or manufacturing process or location shall be made without prior written authorization from SpaceX in the form of a Supplier Request Form (SPX-00002691). Significant changes include, but may not be limited to, changes that affect performance, integration, system compatibility, size, function, functional performance, testing requirements, material, material types etc.

4.2 PRODUCTION AND PROCESS CONTROL

4.2.1 Process Validation Plan or SpaceX Part Approval Process
A process validation plan shall be developed for the processing of SpaceX product when required by the Purchase Order requirements. Alternatively, SpaceX may require specific parts be subject to the SpaceX Part Approval Process per SPX-00034901 – a requirement that will be communicated via the Purchase Order. This plan shall account for all contracted drawing characteristics. These plans are subject to approval by SpaceX and are applicable to all SpaceX drawings and those of SpaceX customers. Changes to previously approved processes require SpaceX review and approval through the Supplier Request Form (SPX-00002691).

4.2.2 Product Traceability
The Supplier shall have a documented plan for maintaining traceability of product, constituent parts, special processes, and material. This is usually captured through work orders or travelers.

4.2.3 Statistical Process Control
The Supplier shall ensure that a capable process to meet drawing requirements is in place. The Supplier is encouraged to use Statistical Process Control (SPC) where applicable to the purchased volume.

4.2.4 Equipment Maintenance
The Supplier shall maintain their equipment to ensure process control and product quality.

4.2.5 Calibration
As applicable to the business, the Supplier shall perform all inspections and tests using calibrated equipment. The Supplier shall establish and maintain a system for the calibration of all inspection, measuring, and test equipment (IMTE) and measurement standards used to perform all tests and inspections.

4.2.5.1 The calibration system shall be coordinated with the supplier’s inspection or quality control system and shall be designed to provide adequate accuracy in use of IMTE and measurement standards.

4.2.5.2 The calibration system shall provide ready detection and notification of deficiencies, such as out of tolerance conditions, device repair, overdue devices, and lost devices, and a timely positive action process in place for their correction.

SpaceX Proprietary – Use or disclosure of this information is subject to SpaceX approval.
4.2.5.3 Materials used to meet applicable drawing or procurement requirements shall not be excluded.

4.2.5.4 If any IMTE or measurement standard is found to be out-of-tolerance during the calibration process, the suppliers calibration system shall provide for the notification to the respective user and designated contractor quality element of the out-of-tolerance condition with associated measurement data so that impact analysis and appropriate action can be taken.

4.2.5.5 For calibration service providers, accreditation to ISO 17025 is preferred.

4.2.5.6 Calibration standards shall be traceable to NIST or equivalent standards.

4.2.5.7 The Supplier is responsible for the maintenance and calibration of SpaceX supplied tooling, gages and test equipment. Any repair or rework of SpaceX supplied tooling, gages, and test equipment requires prior approval.

4.2.6 Limited Shelf Life Control Plan
As applicable, the Supplier shall have a documented limited shelf life control plan.

4.2.7 Electrostatic Discharge (ESD) Control Plan
If the items to be delivered under the Purchase Order SpaceX are electrostatic discharge (ESD) sensitive, the Seller shall have an ESD control program which precludes ESD damage during all phases of fabrication, testing, handling, storage, and packaging for delivery based on ANSI/ESD S20.20-2007 (excluding Electrically Initiated Explosive Devices). Nonmanufacturing distributors shall handle, store, package and identify such items under an ESD control program which ensures continuation of the ESD control program. The Seller shall have an ESD control program which identifies contents as ESD sensitive. All ESD control items shall be tested per EPA ESD Control Items of ANSI/ESD S20.20-2007 Table 3. All packaging material used for ESD sensitive items should conform to ANSI/ESD S541-2008 (Packaging Materials for ESD Sensitive Items).

Pink poly bags shall not be used for packaging of any items delivered to SpaceX

4.2.8 Foreign Object Debris/Damage (FOD) Control Plan
The Supplier shall have a documented FOD Control Program in place for the purpose of prevention, detection, and removal of foreign objects. The Supplier is responsible to ensure that SpaceX receives clean, undamaged, and contamination-free product.

FOD prevention must be implemented in all areas as applicable and the Supplier must provide FOD awareness training. The Supplier must protect parts from handling damage in all areas; Supplier must provide material handling awareness training to all employees and handling standards shall be documented.

4.2.9 Design Control
Suppliers with design authority shall have a documented design control procedure. For custom hardware and processes, the Supplier shall notify SpaceX of any design changes through the use of the SRI form (SPX-00002691). Distributors (known as Supplier) of materials specified “Source Controlled”, as noted on the SpaceX engineering drawing, shall only obtain material from the Manufacturer listed as the approved source on the Source Controlled drawing.
4.2.10 Identification and Marking

The Seller 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.

For SpaceX-designed parts, vendor serial numbers, when required per Purchase Order or drawing, shall be in an alphanumeric format composed of two parts in the format XXXXXX-000000. The purchase order or drawing shall be used to define requirements for serialization. The first part of this serial number shall be the SpaceX-provided Supplier ID, which can be found in the header of the Purchase Order, followed by a dash. The second part will be a six-digit alphanumeric unique part identifier (the Seller shall keep a unique sequential numbering system for that particular part).

It is acceptable to include information such as unique serialization, lot codes and/or other pertinent process information on the part when not required per the drawing or Purchase Order as long as the information is legible and complies with all drawing, Purchase Order or specification requirements (i.e. correct location, marking method, font size, etc.). It is also acceptable to mark a part with the Purchase Order number when the supplier does not have access to the work order number.

Unless otherwise specified by drawing or 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.

4.2.11 Manufacturing Readiness Review (MRR)

A SpaceX subcontractor or critical component supplier shall conduct a Manufacturing Readiness Review with SpaceX Supplier Quality prior to commencing manufacturing on an alpha revision of a flight unit.

4.2.11.1 The SpaceX subcontractor or critical component supplier will be notified of the requirement to perform a MRR via the Purchase Order or its attached documents.

4.2.11.2 Representatives from manufacturing, inspection/test, design, and quality shall participate as appropriate. Government representatives shall be allowed to participate in the MRR as appropriate.

4.2.11.3 Topics covered shall include, but not be limited to: drawing availability and acceptability, configuration status, producibility of parts and materials, adequacy of manufacturing processes/certifications, manufacturing planning, current manufacturing trend data, personnel experience and training/certifications, tooling, facilities, inspection points, test equipment availability and calibration status, corrective action status, and manufacturing lessons learned from prior like hardware builds and schedule.

4.2.12 Commercial Off-the-Shelf (COTS) Items

The Supplier shall notify SpaceX of any parts acquired through the use of 3rd party distributors or any other non-OEM sources when such sources are not certified to AS9120. The supplier shall be able to provide full traceability of parts detailing the characteristics, original manufacturer name, original manufacturer part number, serial/lot number, and shelf life (if applicable).

4.2.13 Record Retention

For government contracts, Seller shall maintain and make available to SpaceX or its agents all records for, or related to, SpaceX products in accordance with FAR 4.703 regardless of Purchase Order.

SpaceX Proprietary – Use or disclosure of this information is subject to SpaceX approval.
dollar amount. Records must be retained at least three (3) years following SpaceX’s final payment under its prime contract. Accordingly, Seller shall receive written approval from a SpaceX Authorized Representative prior to destroying any of these records.

For commercial contracts, Seller shall maintain and make available to SpaceX or its agents all records for, or related to, SpaceX products regardless of dollar amount. Records must be retained at least five (5) years following final shipment to SpaceX.

**4.2.14 Material Sourcing**


4.2.14.2 Non-Metallic Materials – When sourcing composites, ceramics, polymers, glasses, and other material, Suppliers may use any source in compliance with sourcing and traceability requirements as specified in the Purchase Order, Terms and Conditions, drawing, and other command media.

4.2.14.3 COTS – COTS parts are not bound by the approved mill requirement.

**4.3 SPECIAL PROCESS VALIDATION**

For all special processes, the Seller shall maintain adequate controls to ensure processes are performed in accordance with applicable specifications and will achieve the planned results.

Controls shall include training of personnel in the applicable procedures and requirements for validation and revalidation of processes. Records of training and validation activities shall be maintained per section 4.3.5.

For all SpaceX-designed parts, special processes – as well as certain additional processes not typically categorized as “special” – are source controlled, and must be performed by a SpaceX approved vendor. All source controlled processes and approved suppliers can be found in the Approved Supplier List. The Seller shall obtain the latest revision from www.spacex.com/legal.

Approval to perform one process does NOT imply approval for any additional processes – a vendor must be approved for each special and/or controlled process it performs.

4.3.1 NADCAP Participation

SpaceX encourages NADCAP Certifications where special processes have such certifications available.

4.3.2 Special Process Approval

Special Processes require SpaceX approval per SPX-00022928. Any changes to special processes (including subcontractor changes) as defined by SpaceX, must have approval prior to implementation through the Supplier Request Form (SPX-00002691).

4.3.3 Nondestructive Testing (NDT)
4.3.3.1 Suppliers who perform NDT for SpaceX at their facility in support of their primary service, e.g. casting, require SpaceX approval for NDT processes even if NADCAP certified.

4.3.3.2 When a subcontractor is used for NDT work, it is the Supplier’s responsibility to flow down and ensure the fulfillment of SpaceX’s requirements including but not limited to personnel qualifications, referenced specifications, revision levels, and Purchase Order Quality Clauses.

4.3.3.3 An internal audit evaluating all NDT Inspection procedures (including but not limited to cleaning, X-Ray, and FPI) and employee adherence to those procedures shall be conducted at least annually. The audit shall cover procedures, processing, interpretation, personnel qualifications, and control checks/calibrations. An individual who is at a minimum certified to Level II in the process being audited shall perform these internal audits.

4.3.3.4 Unless otherwise specified, all parts requiring Fluorescent Penetrant Inspection (FPI), Magnetic Particle Inspection (MPI), or Radiographic Inspection (X-Ray) shall be inspected 100%.

4.3.3.5 Radiographs containing indications, either film artifacts or surface indications meeting the visual requirements, must have all these types of indications marked as such on the film.

4.3.3.6 For each part number requiring a Non-Destructive Test, the Seller shall have the techniques approved by SpaceX prior to shipment. To submit a technique for approval, the Seller shall complete a Supplier Request Form (SPX-00002691) using the “NDT Technique Submission” type and email it to the noted address along with an electronic copy of the techniques signed by the vendor NDT Level III. The SpaceX NDT Level III and SQE (Supplier Quality Engineer) will work with the Seller NDT Level III to resolve any technique issues, and once approved, will return a copy of the technique with a SpaceX NDT Level III signature.

The Seller shall use only SpaceX approved techniques for all NDT for the applicable part number and shall not modify these techniques without approval from the SpaceX NDT Level III. Approval must be given in the form of a signature on the new technique.

4.3.4 Additional Requirements

Additional Special Process requirements are outlined through the Purchase Order, Drawings, relevant specifications, and the SpaceX Quality Clause Attachment for Purchase Orders (SPX-00000874).

4.3.5 Record Retention

All records shall be retained as required by SpaceX specification or contractual requirement. The Supplier shall retain all radiographic film at their facility indefinitely or until authorized in writing to destroy, unless otherwise specified by SpaceX. SpaceX reserves the right to request film at any time.

4.3.6 Subcontracting Special Processes

4.3.6.1 A list of vendors approved to perform special processes on SpaceX hardware can be found in the SpaceX Approved Supplier List on www.spacex.com/legal.

SpaceX Proprietary – Use or disclosure of this information is subject to SpaceX approval.
4.3.6.2 The Seller shall flow down all relevant quality requirements imposed by SpaceX to any sub-tier suppliers processing SpaceX hardware.

4.3.6.3 If a preferred source has not been approved by SpaceX, Seller can request approval prior to beginning work by contacting SpaceX supplier quality.

4.4 INSPECTION

4.4.1 Inspection Responsibility
It is the Supplier’s responsibility to ensure that all material shipped to SpaceX conforms to the Purchase Order and drawing. SpaceX will evaluate incoming material to ensure conformance with all applicable requirements. This may be accomplished by Receiving Inspection verification, periodic audits, in-process performance, random laboratory testing, or in special circumstances, Source Inspection. SpaceX reserves the right to inspect purchased material using any suitable sampling program to determine if total conformance exists.

4.4.2 Source Inspection

4.4.2.1 Source Inspection is required for each lot of material prior to shipment when so stated on the SpaceX Purchase Order or as otherwise notified. This inspection takes place at the Supplier’s facility and is conducted by a representative of the SpaceX Supplier Quality Organization or a designated agent. The source inspector will inspect or witness the inspection of parts from each lot and will review the Supplier’s documentation for accuracy and completeness, as well as, meeting overall SpaceX requirements.

4.4.2.2 The Supplier is to enclose a copy of the Source Inspection Report filled out by the SpaceX Quality Representative with each source inspected shipment and include all shipping documents. The Source Inspection Report shall be signed by the Supplier representative and the source inspector.

4.4.2.3 The decision to require source inspection will be based on design complexity and/or size, component criticality, previous quality issues, and overall quality performance.

4.4.2.4 The Supplier shall bear the cost of source inspections if the need is a result of past poor quality performance.

4.4.2.5 The performance of source inspection does not preclude the rejection of material at a later date.

4.4.3 Certificate of Conformance
A Certificate of Conformance shall be included with shipments certifying that all materials and processes supplied are in accordance with SpaceX requirements. The Certificate shall indicate at a minimum, the following:
• Part number
• Revision (if revision-controlled)
• Lot/date code
• SpaceX serial number (as applicable)
• Vendor serial number (where required by drawing or Purchase Order)
• SpaceX Purchase Order number

SpaceX Proprietary – Use or disclosure of this information is subject to SpaceX approval.
• SpaceX Purchase Order line number
• Quantity
• Relevant specifications. Industry standard or SpaceX specifications noted on the Purchase Order or drawing shall be per the latest revision unless otherwise specified.

This document shall be signed and dated by the Seller’s quality assurance or management representative. Certification packages shall be included with their respective parts.

4.4.4 Documentation
SpaceX may refuse to accept items delivered under the Purchase Order if the Seller fails to submit required documentation, e.g. test data or reports. SpaceX may also return such items at the cost of the supplier. Documentation includes SpaceX Source Inspection Report form (SPX-00002162) when such source inspection is performed.

A hard copy of all required documentation shall be sent with each shipment. Exceptions to the requirement for hard copies may be allowed when such exceptions are communicated through formal, released documents such as the Purchase Order or quality clauses.

4.4.5 First Article Inspection
A First Article Inspection Report (FAIR) shall be included the first time a Seller delivers a part/assembly to a given alpha revision of a SpaceX-designed part number. The FAIR shall list actual inspection results for all drawing dimensions and applicable notes. A FAIR is not required for numeric revision SpaceX part numbers, development, Research & Development (R&D) hardware, standard commercial off the shelf (COTS) parts, standard catalog items or deliverable software. The parts used to perform the first article shall be marked. First article acceptance by SpaceX shall neither constitute final acceptance of the lot nor relieve the Seller of the obligation to furnish parts that meet all drawing, specification and Purchase Order requirements.

The Seller is required to use AS9102 for first article inspections.

If a first article inspection is required on a part for which a similar FAIR has already been delivered to SpaceX, a delta FAIR may be acceptable. Questions regarding the suitability of delta first article inspections should be directed to a SpaceX supplier quality engineer.

4.4.6 Validation of Inspection and Test Equipment
When tooling such as fixtures, gages, or test stands are used for inspection purposes, the Supplier is responsible for validating the equipment before it is put into service. The Supplier shall also maintain the equipment and configuration. The equipment shall be used only to inspect and/or test the functions, dimensions, or features incorporated into it.

4.4.7 Inspection Requirements
The Seller shall implement all necessary protocols to ensure conformance to each drawing specification and contractual requirement for every part submitted. SpaceX reserves the right to reject an entire lot of parts if a nonconformance is found on any part within the lot.

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:

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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√ or less

The Seller shall perform 100% visual inspection for the entire lot, regardless of sample size.

The Seller shall inspect 100% of threaded features. Sampling is not permitted. Go/no-go gages shall be used to verify conformance on all threaded inserts that do not contain a thread-locking feature.

Alternate inspection requirements may be flowed down through a SpaceX-provided inspection plan, as applicable.

4.4.8 Painted Surfaces

Painted surfaces shall be smooth, continuous, adherent, and uniform in appearance. Surfaces shall be free from defects that degrade performance such as pinholes, blisters, orange peel, runs, sags, frosty areas, scratches, breaks, or other imperfections.

4.4.9 Fracture Critical Product

In some cases, SpaceX will designate certain hardware as being fracture critical. Such components will be clearly labeled as such on the drawing. When processing fracture critical hardware, suppliers shall take extra care that such parts are planned, processed, handled, inspected, and shipped to ensure that no features, properties, or characteristics are negatively impacted.

4.4.10 Raw Material Requirements for Fracture Critical Product

Any part designated as fracture critical and fabricated from the following alloys shall be ultrasonically inspected at the raw material level as outlined below unless otherwise specified on the engineering drawing or Purchase Order.

- Ferrous alloys (i.e. 4340, 17-4PH, 13-8Mo) excluding 300 series stainless steels (i.e. 304(L), 316(L)):
  - Bar: Product 0.500 inch (12.70 mm) and above in nominal thickness, diameter or least distance between parallel sides shall meet Class A requirements of AMS-2154 or ASTM-E-2375.
  - Plate: Product 0.500 inch (12.70 mm) and above in nominal thickness shall meet Class A requirements of AMS-2154 or ASTM-E-2375.

- Titanium and titanium alloys:

SpaceX Proprietary – Use or disclosure of this information is subject to SpaceX approval.
4.5 SUPPLIER EVALUATION

4.5.1 Pre-Award Survey

The Pre-Award Survey serves as the first survey of a supplier’s quality certification, capacity, and abilities. Completing this survey with accurate information is of the utmost importance.

4.5.2 Supplier Audit

SpaceX representatives shall have the right to visit Supplier facilities. SpaceX reserves the right to perform on-site failure and/or cause and extent of nonconformance investigations on very short (less than 24 hour) notice at the cost of the Supplier until performance levels increase. These investigations may not be limited to normal business days and hours. Within the scope of these investigations, we may require access to proprietary information. That information will remain confidential and be used only as part of the investigation. In accordance with the Terms and Conditions of the Purchase Order, the Supplier and their sub-tier Suppliers agree to fully support such activities without reservation.

4.5.3 Pre-award Supplier Audit

At the request of the SpaceX Purchasing Department when previous quality data is not available, a product is significantly different from products currently being produced for SpaceX, or the Supplier is new or has been inactive, a pre-award audit may be conducted. The purpose of the pre-award audit is to assess the Supplier’s capabilities to produce the product or service. The audit includes, but is not limited to, topics such as management/organization, inspection and calibration capabilities, core business type, and control of nonconforming product, as applicable to the business.

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4.5.4 **Quality Monitoring**
Suppliers are continuously monitored for quality and performance, through inspection, test, or review of their products or services. Quality monitoring may trigger certain actions to take place based on performance including, but not limited to, audits, issue visits, corrective/preventive action requests, scorecard reviews, probation, or disqualification.

4.5.5 **Continual Improvement Evaluation**
An assessment of the Supplier’s Continual Improvement activities may be part of any other type of audit, as well as performed as a standalone review.

4.5.6 **Supplier Scorecards**

4.5.6.1 SpaceX generates Supplier Scorecards to measure the Supplier’s quality and delivery performance.

4.5.6.2 Supplier performance ratings may not be automatically communicated to the Supplier, but are available upon request. Suppliers with performance ratings deemed unacceptable by Supplier Quality or Purchasing, usually based upon downward trends or sustained below average performance, will be contacted to initiate improvement actions.

4.5.6.3 A below average Scorecard rating (a C rating is average in a lettered rating system) for two consecutive quarters results in the need for formal Corrective Action.

4.5.6.4 A failing Scorecard rating (an F rating is failing in a letter rating system) in any category for two consecutive quarters may result in the Supplier being downgraded to Probation. Corrective action must be initiated at the request of SpaceX. Such notification may be verbal or written. Failure to plan and execute appropriate, effective corrective action may result in disqualification.

4.6 **NONCONFORMING MATERIAL PROCEDURES**

4.6.1 **Supplier Detected Nonconformance**

4.6.1.1 If the Supplier discovers the product does not conform to SpaceX requirements and is not re-workable, the Supplier should submit a Supplier Request Form (SPX-00002691) for disposition and approval prior to shipment of any nonconforming material. Note that requirements may originate from drawings, models, specifications, Purchase Orders, the supplier manual, quality clauses, and other authorized documents and communications.

4.6.1.2 Filing an SRI form does not guarantee the request will be granted, nor does it relinquish the Supplier’s responsibility for the nonconformance.

4.6.1.3 All nonconformance Supplier Request Forms require a statement of the root cause and the corrective actions to prevent recurrence. Corrective actions should include implementation dates, work in progress quantity, and quantity of affected material.
The Seller shall not ship nonconforming material or product until authorization to ship in the form of a written response to the SRI has been obtained from SpaceX. Upon authorization to ship, the non-conforming product must be labeled as non-conforming by the Seller before shipment and all documentation related to the nonconforming product including a copy of the issue ticket shall accompany the product at time of shipment. Failure to comply may result in material rejection, delays, or other corrective action.

4.6.2 SpaceX Detected Nonconformance
If a nonconformance is detected by SpaceX at any stage of review, the material may either be returned to the Supplier or submitted for a disposition to process internally. This is considered an inspection escape and is factored into the Supplier’s quality rating. Costs associated with this nonconformance may be accumulated for recovery.

4.6.3 Source Inspection Detected Nonconformance
Nonconforming material detected by the SpaceX source inspection representative will adversely affect the Supplier’s quality rating the same as material detected at SpaceX. In cases where the source inspector identifies a non-conformance, SpaceX may elect to bill the supplier for source inspection costs. Additionally, poor quality performance resulting in a new requirement for source inspection may also be charged to the supplier.

4.6.4 Returned Material
When material that has been returned from SpaceX to a Supplier is subsequently returned to SpaceX, that material must be identified as “SpaceX Returned Material.” The Supplier must attach a copy of the paperwork on which the material was returned from SpaceX to the shipping documents. In addition, each container must be clearly identified as customer returns and shipped separately from normal material. The Supplier shall also include on the Certification of Conformance a written description of why the material is being returned to SpaceX and the action that was taken. (e.g., Reworked to Drawing, etc.). Failure to properly identify returned material will result in rejection of the material and possible suspension of the Supplier.

In cases where the Supplier disputes the return of furnished material, SpaceX may return said material for analysis and review. In these cases, a supplier quality engineer will review parts, materials, planning, processing, and other details in coordination with the Supplier to determine whether or not material should be classified as a return.

4.7 CORRECTIVE/PREVENTIVE ACTION

4.7.1 Corrective Action Request (CAR)
If supplier quality determines the need for corrective action from a Supplier, SpaceX may request corrective action from the Supplier. Such requests shall be responded to in a timely and expedient fashion and shall include the following minimum information:
• Containment actions taken
• Analysis of the root cause of the problem
• Statement of the corrective and/or preventative actions taken
• Effectiveness of the actions
• Objective evidence that shows completion of the above items

4.7.2 Preventive Action Request (PAR)
Preventive Action Request follow a similar outline to Corrective Action Requests but are meant to prevent a nonconformance from occurring before it happens. Preventive Action Requests may be
generated by observations, audit findings, and Corrective Actions that can be applied elsewhere to prevent a similar nonconformance.

4.7.3 Timely Action
Suppliers who fail to provide adequate corrective action responses by the due date assigned on the Corrective Action Request may receive further disciplinary action up to and including termination and/or disqualification.

4.8 PROHIBITED PRACTICES

4.8.1 Unauthorized Repair
Without prior written approval from SpaceX, Seller shall not repair by any method, parts damaged or found to be faulty during fabrication.

4.8.2 Change in Approved Processes, Materials, or Procedures
Seller shall not change any process, material or procedure without prior written approval by SpaceX if such process, material or procedure was originally subject to approval by SpaceX or Government specified qualification procedures. Original approval is primarily governed through the use of SPX-00034901 SpaceX Part Approval Process, but may also be controlled through other released documents, Warpdrive records, or other communications.

Seller shall not accept any verbal modifications to purchase orders or any related document. Independent of any previous engineering or other authorization, suppliers of production flight hardware shall use the Supplier Request Form (SPX-00002691) to document approval for deviations.

4.8.3 Improper Resubmittal
Articles rejected by SpaceX and subsequently resubmitted to SpaceX shall be clearly and properly identified as resubmitted articles. Seller’s shipping document shall contain a statement that articles are replacement or reworked articles and shall also refer to SpaceX’s rejection document.

4.8.4 Notification of Facility Change
Sellers are prohibited from relocating any production, manufacturing, and/or processing facilities during performance of a SpaceX Purchase Order without prior notification to SpaceX. This is necessary to afford SpaceX an opportunity to examine such facilities for compliance with quality assurance requirements, including any necessary approvals. In addition, if there is a change in senior management the Seller shall notify SpaceX.