UTC Aerospace Systems

Landing Systems

LS-SBU-A001-SQA

LS Supplier and Product Quality Requirements

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1. Overview

1.1. Purpose:

1.1.1. This document is a supplement to UTC Supplier Quality System Requirements, ASQR-01 (current rev.) and UTAS SCM-PRO-0003 “PRO-0003” (current rev.) for UTAS Landing Systems (legacy Landing Gear and legacy Aircraft Wheels and Brakes).

1.1.2. This document replaces any previous revisions of AWB9100 and Document 300

1.1.3. This document defines Landing System quality requirements for tier 1, sub-tier suppliers, and processors and applies to all purchased product by and for all Landing System sites when referenced by purchase order or contract.

1.1.3.1. **Wheels and Brakes specific requirements herein are identified (*WB) and Landing Gear specific requirements herein are identified (*LG).**

1.2. Scope:

1.2.1. Applies to all LS suppliers and processors when ASQR-01, UTAS-SCM-PRO-0003, and LS addendum requirement (current rev.) LS-SBU-A001-SQA, formerly Doc 300 is invoked by direct reference on the purchase order.

1.2.2. Suppliers and processors shall comply to and flow down all applicable requirements of ASQR-01, PRO-0003, this addendum, additional purchasing document requirements to all sub-tier suppliers and/or processors.

1.2.3. No deviation from these requirements is permitted unless specifically authorized in writing by LS Supplier Quality Assurance management.

1.2.3.1. AS/EN/JISQ 9100 or AS/EN/JISQ 9120 (current revision) registration exceptions will be based on a LS Supplier Quality management review.

1.2.3.2. Suppliers shall submit a request for waiver to this requirement in writing to LS SQA management.

1.2.3.3. Nadcap accreditation exceptions will be based on a LS Supplier Quality management review. Suppliers and processors shall submit a request for waiver to this requirement in writing to LS SQA management (Ref. PRO-0003).

1.3. Responsibility:

1.3.1. LS Supplier Quality Assurance in collaboration with Supply Chain Management is responsible for the management and administration of the requirements contained within this document.

1.3.2. Suppliers are responsible for ensuring the use of LS and customer-directed supply/process resources.

1.3.3. Suppliers are responsible for ensuring the capability of all offload sub-tiers and the quality of all product and services provided.

1.3.4. Suppliers and Processors are responsible for contacting your Supply Chain Management or Supplier Quality Representative(s) for questions or clarification

1.3.5. Right of access addendum - Supplier shall notify LS Procurement for coordination of activities if contacted directly by LS customers or regulatory agencies.

1.4. Quality Alerts

1.4.1. Quality Alerts” are the medium that shall be used to communicate pertinent quality related issues or other approved information to suppliers and/or processors.

1.4.2. New requirements are contractually required upon being issued by LS, and when stated, are amendments to LS flow down requirements per the effectivity date listed in the alert. Suppliers and/or processors shall:**:**

1.4.2.1. Review the requirements listed in the alert

1.4.2.2. Determine contractual impact (if any) of the alert
1.4.2.3. Notify the applicable LS buyer of the impact (if any)
1.4.2.4. Take necessary actions to ensure compliance to requirements of the alert
1.4.2.5. If requested to do so, respond as outlined in the alert

1.5. Engineering Data:
1.5.1. Parts shall be manufactured/processed to the latest process specification revisions in effect at the time of commencement of the manufacture/processing.
1.5.2. **(*LG)** An index of specifications and revision level applicable to product being manufactured to meet LS requirements is available on Content Server.
1.5.3. **(*LG)** Suppliers shall review the index and revision log each time a new version is posted to Content Server to ensure compliance to the listed revision levels of the noted specifications.
1.5.4. Should a LS customer controlled specification have a formally released revision later than noted on the index, notification must be provided to the buyer and written authorization obtained prior to any performance of the newer version requirements.
1.5.5. Use of an older revision than on the LS index is not acceptable unless authorized by LS Engineering. Written authorization is required prior to any performance of the older version requirements.

1.6. Engineering Change Proposal Requests (ECPRs)
1.6.1. Suppliers may request an engineering change by completing an Engineering Change Proposal Request (ECPR), form *LS-LG-F-014-ENG (formerly, LG DIV ENG FORM 0838).*
1.6.1.1. Completed forms shall be submitted through Content Server. The LS buyer shall be the focal for status/updates.
1.6.1.2. The ECPR shall be properly completed including the reason or the justification for the ECPR. An incomplete ECPR will be returned to the originator for resubmission.
1.6.1.3. The results of a LS review of the request will be forwarded to the supplier.

1.7. Quality Record Retention: (LS specific requirements)
1.7.1. Where not specified in ASQR-01 and in the absence of other contract specific criteria, quality records are to be maintained for no less than **10** years past the end of the program.
1.7.2. Supplier Quality Assurance is to be notified in writing at least 2 months prior to planned destruction of records pertaining to product supplied to LS.

1.8. Document Links:
1.8.1. LS has provided a document retrieval site within each supplier's **Content Server** account, it is the responsibility of each supplier to ensure they have access and comply to the current revision of these documents and flow down the specific requirements including UTAS, LS, and customer requirements to their respective sub-tiers and processors.

1.8.2. Additional access to the standard flow down documents are as follows:

http://utcaerospacesystems.com/Company/suppliersdocuments/Forms/AllItems.aspx
For UTAS SCM-PRO-0003, LS-SBU-A001-SQA, Doc 200, UTC T&C's Addendum

http://www.utc.com/Suppliers/Pages/Aerospace-Supplier-Quality-Requirement-Documents.aspx
For ASQR-01 referenced documents and related forms

1.9. ITAR and EAR compliance:

1.9.1. Suppliers, Processors and their sub-tiers shall ensure compliance to ITAR and EAR requirements when handling LS parts and documentation. Any US supplier manufacturing or handling ITAR products must be DDTC (Directorate of Defense Trade Controls) registered. Any Canadian Supplier manufacturing or handling ITAR products must be CGD (Controlled Goods Directorate) registered.

1.9.2. If a non-US supplier is using a US sub-tier supplier for ITAR work, that US supplier must be DDTC registered. The US supplier must also have authorization (i.e. ITAR exemption, license to export the ITAR product back to the non-US supplier)."

1.9.3. Technical and/or proprietary information for all programs shall be transferred between LS and outside sources through the 2 following methods only:

1.9.3.1. Content Server for the following technical and/or proprietary information: or as applicable documents

1.9.3.1.1 LS supplied specifications
1.9.3.1.2 Technical data such as Models, Drawings, ECNs, and parts lists
1.9.3.1.3 First Article Inspection Reports for 2D drawing and MBD (3-D Modeling)
1.9.3.1.4 Alteration or repair of LS or LS customer tooling / gages / fixtures
1.9.3.1.5 LS Failure Analysis Report (FAR)
1.9.3.1.6 Supplier Corrective Action Requests (SCARs)
1.9.3.1.7 LS Approved Processor List (Doc 200)
1.9.3.1.8 Engineering Coordination Memo's
1.9.3.1.9 Quality Notification (QN)
1.9.3.1.10 Manufacturing Plans
1.9.3.1.11 Technique Sheets
1.9.3.1.12 Control Plans/ FMEAs
1.9.3.1.13 Engineering Change Proposal Request (ECPR)

1.9.3.2. Encrypted WinZip (current LS authorized version) email for the following information:

1.9.3.2.1 Disclosures
1.9.3.2.2 Service and Warranty Information

1.9.4. File size of submitted information needs to be less than 4 megabyte; Larger files will need to be proportioned accordingly.

1.10. Supplier Controlled Design:

1.10.1. The supplier shall meet LS contractual requirements for design related to performance requirements.

1.10.2. Supplier's Material Review Board dispositions shall be made available for LS or a LS customer review upon request.

1.10.3. If a Quality Notification (QN) requires submittal to LS process, section 8.3 of this document shall be followed.

1.11. Standard Components:

1.11.1. Suppliers of standard hardware shall maintain traceability to actual manufacturer and manufacturing lot.

1.11.2. Suppliers shall ensure the standard hardware delivered to LS conforms to the latest specification or configuration requirements.

1.12. Material Substitutions

1.12.1. Material substitutions are **not allowed** unless authorized by engineering drawing / model, material specification, LS MRB disposition or superseding of a material specification. This applies to (and is not limited to):

1.12.1.1. Material grade (or stock such as bar, rod, tube, extrusion, and flat)

1.12.1.2. Material Condition (i.e. heat treat)

1.13. Supplier/Processor Assessment

1.13.1. All LS approved suppliers/processors will be monitored for risk. The Risk Priority Number (RPN) will be used to manage oversight activities, including audit frequency, corrective action plans and continuous improvement initiatives.

2. Manufacturing Record Control

2.1. First Article

2.1.1. FAIRs shall be prepared per AS/EN9102 and ASQR-01 requirements/specifications.

2.1.2. *Complete FAIRs, including lower level assemblies, shall be made available to the LS SQA representative for approval and or acceptance of completion. Evidence shall include* stamp, date and sign AS9102 form 1and form 3 (first sheet) as evidence of acceptance.

2.1.3. **(*LG)** Completed FAIR packages shall be scanned and submitted to Content Server once approved by LS SQA representative, prior to shipment to LS site.

2.1.4. A copy of the approved FAIR, shall be made available upon request.

2.1.5. For proprietary products only the packing slip, top assembly FAIR and Certificate of Conformance, is required.

2.1.6. For Repair and Overhaul, FAI requirements apply for “build to print” purchasing product.

2.1.7. For Repair and Overhaul, product outside the “build to print” (for example, specialty bushing) boundaries, requires 100% inspection. FAI is not required for these types of product.

2.1.8. Product certifications required with delivered FAI product,

2.1.8.1. Packing slip

2.1.8.2. Certificate of Conformance – C of C

2.1.9. For forgings, castings, and swagings, an LS M&PT Product Qualification Process Approval must be included with the FAI package

2.2. Records of Manufacturing:

2.2.1. The supplier and supplier’s sub-contracted sources shall maintain manufacturing records that provide traceability to all manufacturing and inspection operations. These records shall clearly indicate material status and acceptability and shall include the following information as a minimum:

2.2.1.1. Part number, revision, and material traceability.

2.2.1.2. List of all serial numbers (if serialized) or quantity of parts (if non-serialized).

2.2.1.3. Clear description of operations performed in the proper sequences to produce the completed product to include in process, receiving, and final inspections.

2.2.1.4. Record the number of parts accepted or rejected at each completed operation. Rejected serial numbers, if serialization is a requirement, and rejection documents/reports shall be noted adjacent to the applicable operation.

2.2.1.5. Record date of acceptance or rejection activity at each operation with operator’s stamp or initials.

2.2.1.6. Clearly reflect the identification requirements, applicable specification, content and method. This can be accomplished as part of the Shop Traveler identification operation, reference to a work instruction or an attached picture of a correctly identified completed part (preferred).

2.2.1.7. When manufacturing lot quantities are reduced or "split", activity shall be recorded at applicable operations on both the original and on the new Shop Traveler. If serialization is required, the serial numbers remaining on the original and the serial numbers being transferred to the new traveler shall be clearly noted.

2.2.1.8. For operations performed by an outside source, record information traceable to source used, process purchase order, or certification number.

2.2.1.9. Note: Verification of any special process planning to ensure compliance to the specification parameters shall be accomplished prior to the actual process being performed. Objective evidence of the plan approval shall be retained and available upon request.

2.2.1.9.1 Evidence of any required rework activities

2.2.1.9.2 Evidence of completion of MRB disposition actions.

2.3. Material Certification requirements:

2.3.1. Laboratory certifications shall reflect actual values, including mill data.

2.3.2. The supplier is responsible for approval of material received.

2.3.3. All LS consigned material (i.e. forgings and castings), drop-shipped from a LS forging supplier to a manufacturing supplier shall be accompanied by a packing slip and Certificate of Conformance.

2.3.4. Material that is shipped directly from a LS site to a manufacturing supplier shall include the forging/casting/swaging certification, Certificate of Conformance and LS shipping ticket having a LS quality acceptance stamp(s).

2.4. **(*LG)**Process Certification Requirement:

2.4.1. The tier 1 supplier shall verify product compliance from the certification received from processors.

2.5. **(*LG)**Supplier Certification and Process Record – Top Assembly (or equivalent):

2.5.1. For assemblies and kits, all detail part numbers and standard hardware used in the assembly shall be listed, with standard hardware being traceable to its certificate of conformance, manufacturing lot and manufacturer.

2.5.2. LG DIV SQA FORM 4485 shall be used for Top Assemblies.

2.5.3. All O-rings (elastomeric materials) and seals shall have cure dates listed.

2.5.4. A statement of conformity.

2.5.5. Quality personnel signature, date and title.

2.5.6. Kits are not to be accepted or delivered by the supplier if all items defined as included in the kit are not present. "Ship short" authorization shall be obtained in writing from Purchasing by means of a purchase order amendment.

2.6. Raw material/forgings/castings:

2.6.1. All forgings, castings and swaging's shall be identified with a vendor code or logo, which shall be specific to that particular supplier and/or per drawing requirements.

2.6.2. The supplier shall maintain traceability from the raw material manufacturer's heat or lot numbers to each individual forging, casting, and swaging. Heat or lot numbers shall be noted on supplier's Certification of Conformance.

2.6.3. Raw Material Suppliers shall have a process control methodology in place for identifying tracking and trending for the following key characteristics Ultimate Tensile Strength (UTS), yield strength (YS), Elongation, and Reduction of Area (R of A). Results and actions taken shall be made available upon request.

2.6.4. In addition to the requirements of AMS 6419 and LGMS1000, producers of material supplied and certified to these specifications shall demonstrate on-going process capability and control with respect to the following key characteristics:

2.6.4.1. Transverse ultimate tensile strength,

2.6.4.2. Yield strength,

2.6.4.3. Elongation and percent reduction of area on every VAR heat produced.

2.6.4.4. The material producer shall provide evidence to UTAS-LS M&PT that the key characteristic data is analyzed per a documented procedure and falls within the process control limits as set by that producer and as determined by the available data.

2.6.4.5. The mill shall also provide evidence that adverse trends in the key characteristic data are identified and corrective action is implemented. In particular, trends in the percent reduction of area shall be used to demonstrate control over the steel cleanliness.

2.6.4.6. The data and analysis shall be supplied to UTAS-LS M&PT through Content Server on a quarterly (3 month) basis in a format which includes results for each material heat melted.

2.6.4.6.1 See Content Server for instruction on submittal communication requirements

2.6.4.7. Failure to provide the analysis may be grounds for disqualification.

3. Identification:

3.1. Part Marking and Serialization:

3.1.1. Part marking and serialization shall be clearly identified in the supplier's control plan/manufacturing documentation for all parts. Suppliers shall have a process in place to ensure no duplication of serial numbers.

3.1.2. The supplier shall maintain a serialization record for each serialized component manufactured. Suppliers shall not duplicate serial numbers on any given part number regardless of revision or configuration changes. Identification and traceability is required for all material, where applicable

3.1.3. All product identification (including permanent etching) shall be clearly legible after final surface coatings (including prime and paint) unless specifically allowed otherwise by engineering specifications.

3.1.4. Country of origin must be identified on all products, bag or tags for imported parts in accordance with U.S. Customs regulation 19 CFR Part 134.11 e.g. "Made in China", "Product of Japan", "Assembled in Italy".

3.1.5. All identification shall be applied prior to final inspection.

3.1.6. All products shall be identified with LS's customer's (for example, Boeing, Lockheed, Gulfstream) part number as required by the engineering drawing and specification requirements.

3.1.7. All products shall have supplier's final acceptance stamp on product or on a tag/package if product does not have an adequate space for stamping. Drawings/Specification requirements apply.

3.1.8. Serial numbers shall comply to drawing and/or specification requirements

3.1.8.1. Supplier shall request prefix codes, which will be assigned by LS SQA, as required

3.1.8.2. A minimum of four and a maximum of six digits (shall be numbers only without spaces or dash "-").

3.1.8.3. Serial numbers shall not restart from 0001 when the dash number changes.

3.1.8.4. If products are of opposite configuration, left and right handed product, the same serial number **shall not** be used on both hands, opposite configuration.

3.1.8.5. The prefix code of the finished part supplier shall be used in place of the forging, casting, extrusion or swaging supplier prefix code, Example:

Forging	P1234
Finished	XYZ1234

3.1.8.6. The numeric portion only of the forging serial number should apply to the machined detail parts.

3.1.9. Suppliers of the detail items shall provide cross-reference traceability to the original forging serial numbers if new serial numbers are assigned

3.1.9.1. The supplier shall identify on the appropriate quality and shipping documents the serial number of the forging used for the resultant part.

3.1.9.2. The supplier shall provide this information for both LS consigned and LS sold forgings.

3.1.10. Non serialized parts shall be identified with date of manufacture, batch or lot number. Drawing/Specification Requirements apply.

3.1.11. Contact LS Supplier Quality Assurance if further clarification is required.

3.1.12. Identify product with the appropriate design activity code per the engineering drawing / model requirements

3.1.13. The LS manufacturer's identification codes are as follows:

- Oakville MFR02121
- Burlington MFR02KZ1
- Fort Worth MFR6K4C8
- Troy MFR97153

Note: Supplier manufacturing codes shall not be used unless specifically called out on the engineering drawing part marking specification requirement.

3.1.14. When serial number traceability is required by design requirements, applicable serial numbers shall be identified on all supplier and supplier's sub-tier quality records (i.e. travelers and process certifications).

3.1.15. Application of drawing / model revision letters on product is only allowed when required by purchase order, engineering drawing / model or specification.

3.1.16. "Kits" shall have the following identified in a prominent location:

3.1.16.1. Each detail item shall be identified per applicable requirements of engineering drawing / model, specifications, and this document.

3.1.16.2. Quality acceptance of the kit.

3.1.16.3. Assigned kit part number and revision level.

3.1.16.4. Purchase order number and latest amendment level. A supplier assigned unique non-repeatable number for each kit that provides complete traceability to all products within each kit.

3.1.17. Raw Material:

3.1.17.1. All bar stock material (each piece) shall be identified with the heat or lot number, purchase order number, or color code as appropriate.

3.1.17.2. Material traceability (heat or lot) shall be transferred to the unused bar stock prior to storage.

4. Process Control

4.1. Manufacturing Plans and Techniques

4.1.1. Manufacturing plans (MPS) shall be generated for all individual components and assemblies when the supplier is manufacturing to an engineering drawing / model and does not have design authority.

4.1.2. Manufacturing plans (MPS) requiring LS approval shall be submitted *and approved by LS* prior to start of manufacturing.

4.1.2.1. Coolants used per specification controls must be identified, in compliance and documented on the submitted plan when required. For example, BAC MFG. control DWG 160T1000 high strength steel, Note 3, BAC 5440, BAC5008 (applicable table indicates approved coolants)

4.1.3. The planning shall include the minimum engineering data references (specification, flag note, etc.) necessary to control and produce the parts and include all of the machining, processing, test and inspection operations necessary to complete the parts to the purchase order and engineering requirements. This includes applicable satellite plans and techniques from sub tier suppliers and processors.

4.1.4. **Note: Developmental aids, including a manufacturing plan template and other similar information are available from LS upon request.**

4.1.5. All plans shall be reviewed and approved by the tier 1 holder of the LS purchase order. When plans are required to be submitted to LS, the tier 1 source shall review and approve the plan prior to submission to LS.

4.1.6. The manufacturing plan(s) shall be retained on file at the supplier's manufacturing facility or their sub-tier when applicable, and shall be available upon request by LS and/or its customers.

4.1.7. The plan documentation shall also be in English and include the following details as a minimum:

4.1.7.1. Name of applicable manufacturer with facility address.

4.1.7.2. Full part number including dash number. When purchase orders refer to part numbers other than the design engineering part number, the planning shall clearly reference both part numbers.

4.1.7.3. Engineering drawing / model revision level.

4.1.7.4. Planning revision table including revision dates and descriptions of changes and traceability to the individual making the change. All planning changes shall be documented, including editorial changes to correct typographical errors or minor editorial changes.

4.1.7.5. Raw material (including forging part number if applicable), raw material specification, raw material size and heat treat condition.

4.1.7.6. All operations shall be noted in their proper manufacturing sequence, including all inspection and test points.

4.1.7.7. Optional sequences or operations shall be defined in the planning.

4.1.7.8. Part identification including method and text.

4.1.7.9. Operations that are required to be performed per a particular specification shall list that specification as part of the operation description in the planning.

4.1.7.10. Special process operations shall list the name and location of the processor, applicable specifications and specific parameters (i.e.: type, class, as applicable).

4.1.8. **(*LG)**Special processes shall be controlled and special process sources shall be approved on Document 200.

4.1.9. Maximum section thickness at time of heat treat shall be noted.

4.1.10. All thermal processing shall be listed as a separate operation (i.e., embrittlement relief, stress relief, etc.). Required times, conditional delay requirements and temperatures shall be documented.

4.1.11. Machining techniques which impart significant localized heating (i.e. EDM, ECM, plasma application, and laser use) shall only be used when authorized by engineering requirements, or MRB disposition.

4.1.12. All manufacturing plans and techniques shall be reviewed by the supplier at least every five years to ensure compliance to current engineering and specification requirements.

4.1.13. Supplier shall have a process to control the timing of the reviews.

4.1.14. **All NDT techniques shall be approved by a recognized NDT Level 3 authority.**

4.2. **(*LG)**Manufacturing Plan Review and Approval

4.2.1. When purchase order, engineering or contractual requirements invoke any one of the following, manufacturing planning shall be submitted to LS for review.

4.2.1.1. Minimum ultimate tensile strength (UTS) 180 KSI (HRC 40) and above, except springs and bushings.

4.2.1.2. CPC6400

4.2.1.3. D581-25629-1

4.2.1.4. D6-1276

4.2.1.5. Plans/techniques for D6-1276 designated parts must also comply with LGPS 8002

4.2.1.6. D8-0965

4.2.1.7. DPS 4.804

4.2.1.8. DPS 4.747

4.2.1.9. PS21201 for F18and F15 parts noted as “Maintenance Critical”, “Fracture Critical”, “Safety of Flight”, or “Fracture Critical Traceable”

4.2.1.10. LGPS 1301

4.2.1.11. LGPS 7010

4.2.1.12. LGPS 8000

4.2.1.13. LGPS 8002

4.2.1.14. “Flight safety”, ”Mission/Safety Critical”, “Safety of Flight”, or “Fracture Critical Traceable”, “Fatigue Critical”, “Maintenance Critical”, “Fracture Critical”, etc.

4.2.1.15. Welding

4.2.2. Submit through the Content Server by uploading into the MPS to UTAS folder located in the "Landing Gear Supplier site".

4.2.2.1. See Content Server for proper naming convention on any MPS submissions

4.2.2.2. Only users with active Content Server accounts will have access to post. Approved MPS will be posted into the Supplier Part folder (Commercial or Military) as applicable.

4.2.3. When any of the following special processes are used in planning that is required to be submitted to LS for review, techniques shall be submitted as a portion of the manufacturing planning submittal:

4.2.3.1. Chrome grind

4.2.3.2. Heat treat, including straightening (if applicable)

4.2.3.3. HVOF

4.2.3.4. HVOF grind

4.2.3.5. Belt grind (Chrome/HVOF)

4.2.3.6. Shot peen

4.2.3.7. Welding

4.2.3.8. NDT techniques requiring approval per DPS 4.747

4.2.3.9. NDT techniques performed in accordance with PS21201 or PS21202 for F18 and F15 parts noted as "Maintenance Critical", "Fracture Critical", "Safety of Flight", or "Fracture Critical Traceable

4.2.4. Material certificates shall be provided for DPS4.804 plans.

4.2.5. Planning shall only be submitted to LS from the tier 1 holder of the LS purchase order. Techniques from sub-tiers shall not be submitted directly to LS.

4.2.6. Manufacturing plans submitted for LS review and approval shall be complete and officially 'released' by the supplier. Any subsequent changes (including, but not limited to: adding or removing notes, adding or removing operations, changes to processing parameters, etc.) require the supplier to roll up the revision level and document these changes in the revision table. This requirement is applicable to process technique sheets as well, and irrespective of, and independent of part production

4.2.7. A memo documenting the results of the manufacturing plan review shall be communicated back to the source(s) submitting the planning.

4.2.8. The supplier shall retain evidence of planning approval status.

4.2.9. Planning shall be revised as applicable and revisions documented until fully approved by LS.

4.2.10. Once planning is approved by LS it shall be considered frozen. Any changes to approved planning shall be resubmitted for review and approval.

4.2.11. When controlled by specification (i.e. DPS4.804, D6-1276, LGPS 8000, etc...) All changes to planning, including editorial changes, shall be documented in a revision table.

4.2.12. ALLOWED CHANGES: The following are allowed changes to an approved manufacturing plan and do not require Landing Systems M&PT and QA approval.

4.2.12.1. Editorial changes:

4.2.12.2. Clarification of existing instructions

4.2.12.3. Documentation of changes to drawing revision level for parts

4.2.12.4. Typographical errors

4.2.12.5. Unplanned rework which meets all of the following:

4.2.12.5.1 Rework not in violation of any specific provisions of the manufacturing plan, and

4.2.12.5.2 Is in accordance with the applicable process specification, and

4.2.12.5.3 Which does not result in any change to sequence of special processes, and

4.2.12.5.4 Which does not adversely affect the final product quality and integrity

4.2.12.6. Rerouting (offloading, sub-contracting) activity that does not involve the following:

4.2.12.6.1 Heat treatment/Stress relieving

4.2.12.6.2 Shot or glass bead peening

4.2.12.6.3 NDI, including magnetic particle inspection, ultrasonic inspection, and x-ray inspection

4.2.12.6.4 Proof load testing

4.2.12.6.5 Plating processes

4.2.12.6.6 Thermal spray coatings

4.2.12.6.7 Welding

4.2.12.6.8 Grinding chromium plating

4.2.12.6.9 Grinding and superfinishing HVOF coatings

4.3. Straightening of Parts:

4.3.1. Unless specifically permitted by the engineering drawing and/or its applicable supporting specifications, authorization by LS Material Review Board and/or Materials & Process Technology is required before performing straightening on steel parts heat treated to tensile strengths greater than 150 KSI.

4.3.2. The supplier shall maintain all necessary documentation and data records for each part straightened, and will be made available to customer upon request.

4.3.3. Straightening of steel parts, regardless of temperature, by means of plastic deformation which results in a modified dimensional condition is prohibited.

5. Inspection and Testing

5.1. **(*WB)** Inspection requirements

5.1.1. Inspection and testing requirements shall be defined by your procuring LS site

5.2. **(*LG)** Inspection Requirements

5.2.1. Quality verification for all product and/or service purchased by LS shall be performed at the supplier's facility by an assigned PQR or an authorized agent except when:

5.2.1.1. A waiver is authorized

5.2.1.2. The supplier has an approved LS DSQAR with stamp.

5.2.1.3. The product is an Industry/Customer standard

5.2.2. Source inspection does not relieve the supplier of any responsibility and/or liability for full compliance with all contract requirements.

5.2.3. The Supplier shall request LS product verification at the Supplier's facility. Supplier shall contact their assigned PQR, Verify Representative, or internal DSQAR as applicable.

5.2.4. The LG DIV SQA FORM 3962 SEAD checklist, completed by the supplier, section 1, shall be used during final product review.

5.2.5. All products received by LS shall have supplier's final acceptance stamp on product or on a tag/package if product does not have an adequate feature for stamping.

5.2.6. All products presented for LS source inspection shall be accompanied by:

5.2.6.1. LS purchase order

5.2.6.2. Supplier's packing slip

5.2.6.3. Certification of Conformance

5.2.6.4. The appropriate Supplier Certification and Process Record (LG DIV FORM 3188 or LG DIV SQA FORM 4485, formerly CP 1174 or equivalent) form which details the material and special processes used for all details and sub-detail components of the ready-made part / assembly.

5.2.6.4.1 For Cadmium Plating utilizing low hydrogen embrittlement method on steel material with UTS higher than 180ksi, specific results will be required per page 2 on Form 3188.

5.2.6.5. All material and process certifications.

5.2.6.6. LG DIV SQA FORM 3962 SEAD checklist, all sections 1 – 2 – 3, as applicable.

5.2.6.7. All LS dispositioned QN's and all sheets, with clear evidence as to completion of all repair steps, supplier stamp and date adjacent to each element of the disposition and additional information if requested in the body of the MRB disposition.

5.2.6.8. Objective evidence current FAI has been completed.

5.2.6.9. Supplier's inspection records that reflect product review and acceptance.

5.2.6.10. Approved manufacturing plans

5.2.6.11. Configuration sheet(s) shall be provided with all assemblies of two or more components that list all details provided in the assembly, serial numbers if applicable, manufacturing date of cure dated materials, standard hardware and or any grease or lubricants used.

5.2.6.12. Copies of all required tests records (ATP's) shall be provided with assemblies.

5.2.6.13. Documentation shall be in English.

5.2.6.14. Documentation required with shipment:

5.2.6.15. Packing slip

5.2.6.16. Supplier Certification and Process record or equivalent

5.2.6.16.1 LG DIV SQA FORM 3188 shall be used if only a detail product

5.2.6.16.2 LG DIV SQA FORM 4485 shall be used for assemblies

5.2.6.17. Certification of Conformance

5.2.6.17.1 Serial numbers to be included, if applicable

5.2.6.18. All QN's with all required buy offs – supplier stamp and date

5.2.6.18.1 PQR, Verify or DSQAR shall stamp and date the QN(s) as evidence of review and acceptance and completion achieved for all dispositioned elements.

5.2.6.19. All required ATP and configuration sheets

5.2.6.20. Proprietary suppliers require, packing slip, Certificate of Conformance, and LS dispositioned QNs.

5.2.7. Suppliers shall provide a completed LG DIV SQA FORM 3962 SEAD audit checklist as part of the FAI package for review and approval by LS.

5.2.7.1. Suppliers shall flow down LG DIV SQA FORM 3962 SEAD requirements to their sub-tiers/processors as appropriate.

5.2.8. Test Landing Systems (strength, endurance, drop, and fatigue), flight test as designated by LS purchase order and or engineering drawing require documented evidence of FAI verification/validation.

5.3. **(*LG)**Waiver Process:

5.3.1. Waivers for change of source location shall be documented using LG DIV SQA FORM 3825.

5.3.1.1. The suppliers SQA PQR focal shall be advised of the request for waiver.

5.3.2. The approved LS SQA waiver shall accompany the shipping documents.

5.3.3. Verbal waivers may be granted by LS Supplier Quality Assurance personnel only. The shipper or packing slip shall contain a statement of when the verbal waiver was granted and by whom.

5.4. **(*LG)**Drop Shipments:

5.4.1. When authorized by PO, suppliers can ship directly to LS customers or other LS Divisions using the supplier shipping documentation:

5.4.1.1. The shipper shall be provided by the LS buyer that identifies drop shipment instructions/requirements.

5.4.1.2. The PO number shall be referenced.

5.4.1.3. If serialized, the serial numbers being shipped shall be recorded on the shipper and submitted to LS SQA PQR or designee through Content Server for final clearance. LS buyer shall provide the stamped and dated shipper back to the supplier upon successful completion of serial number clearance.

5.4.1.4. The supplier shall provide a completed LS shipper, packing slip and Certification of Compliance to the LS SQA PQR, DSQAR or Verify Project Specialist.

5.5. Source Inspection (Certified Suppliers)

5.5.1. Lots shall be inspected for dimensional and specification conformance by the supplier's final inspection personnel in accordance with the supplier's quality system and applicable LS quality flow down requirements.

5.5.2. DSQARs shall perform an audit product verification of all lots presented for shipment.

5.5.3. The DSQAR verification shall be separate and independent from the supplier's final inspection process.

5.5.4. The supplier shall use the LG DIV SQA FORM 3962 (SEAD) for all product shipments and provide to the DSQAR for verification.

5.5.5. The DSQAR source inspection verification shall include:

5.5.5.1. A visual review for correct, legible part identification – all parts.

5.5.5.2. A review of the LS purchase order to ensure products presented are in compliance to the part number, revision and any special requirements.

5.5.5.3. Verification that manufacturing plan approvals have been obtained for all product 180 KSI and above or as required by specification (ref. D61276, DPS 4.804, LGPS 8000, etc.) and are to the latest revision, if applicable.

5.5.5.4. Confirm that the manufacturing traveler / router used meets the approved plan revision

5.5.5.5. Verification that a first article has been completed to the latest revision and is available

5.5.5.6. Review the supplier's manufacturing traveler / router to ensure material traceability, all quantities / serial numbers are accounted for, all operations have been completed as evidence of operator / inspectors stamp (initials), outside process name, purchase order number, and date.

5.5.5.7. Review the supplier's inspection records to ensure 100% product verification has been accomplished through their quality system.

5.5.5.8. Review of all material, heat treat, NDT, and process certifications for compliance to the engineering drawing / model and latest specification requirements. This review includes the accurate recording of the process, specification number, revisions, source, certification number and date performed on the Supplier Certification & Process Record or equivalent. (Note: Actual material source shall be referenced on the Supplier Certification and Process record (or equivalent). Distributors (if used) may be referenced as additional information.)

5.5.5.9. Verification that only Customer and LS approved material and processors were used.

5.5.5.10. Random selection and physical verification of close tolerance, fit/form/functional characteristics, and finish requirements.

5.5.5.11. Certified calibrated functional gages shall be available and used to verify conformance for products, including threads or splines.

5.5.5.12. Review of acceptance testing of product and all test results (ATPs) to ensure compliance to engineering drawing / model and specification requirements. The DSQAR shall then affix his / her stamp, with date of inspection, on the test documentation.

5.5.5.13. Review of configuration sheets to ensure that all components used and assembled to the units are in compliance to the engineering drawing / model bill of material (BOM), where applicable. Cure dates of elastomeric, rubbers material are listed.

5.5.5.14. Verification that assembly procedures and work instructions are in compliance to the engineering drawing / model and specification requirements.

5.5.5.15. Verification that actual test and measurement values are recorded (i.e. torque values, flow rates, Rockwell hardness, and conductivity)

5.5.5.16. Identified key characteristics have been captured and recorded and if required by specification, SPC control of the characteristic.

5.5.6. The DSQAR shall stamp and date the LG DIV SQA FORM 3962 SEAD checklist, each certification, and the final inspection form as evidence of review and acceptance.

5.5.7. The DSQAR shall note acceptance of each shipment by stamping and dating the "Certification of Compliance" and the supplier's packing list/shipper by using the LS supplied DSQAR acceptance stamp.

5.5.8. Suppliers shall maintain an electronic record of all product inspected by DSQARs by part number, quantity, date, P.O number, and DSQAR used. This record shall be made available upon request.

5.5.9. Use of the DSQAR stamps by any other person than the assigned DSQAR will be cause for loss of certification.

5.5.10. Each shipment shall contain a documentation package meeting the requirements of the applicable purchase order and applicable LS quality flow down requirements.

5.6. Source Inspection (De-Certified suppliers)

5.6.1. De-certified suppliers are responsible for all costs associated with having their product verified prior to being received by LS, except for First Article Inspection verification.

5.6.1.1. The product will be verified by an LS SQA or the authorized agent of LS SQA.

5.6.1.2. Suppliers are responsible to initiate requests for source inspection support when the product is complete, accepted through their quality systems, and ready for source inspection.

5.6.2. After the first article lot has been presented and accepted by LS Supplier Quality Assurance, subsequent shipments may be inspected by an authorized third party.

5.6.3. The supplier shall make initial contact and establish a purchase order with the LS authorized agent:

5.6.3.1. The agent authorized by LS to inspect product is “Verify, Inc.” of Irvine, CA.

5.6.3.2. A primary Verify Project Specialist shall be assigned to each participating supplier

5.6.3.3. After initial contact with Verify and assignment of authorized primary Verify Source Inspector, suppliers may contact the source inspector directly or contact Verify Dispatch Department.

5.6.3.4. If a Verify representative is not available for any specific reason, LS personnel will perform the required product verification at the expense of the supplier.

5.6.3.5. The supplier shall provide inspection support as judged reasonable for the Verify Project Specialist to perform an adequate product verification/inspection.

5.6.3.6. Suppliers shall maintain a record of all product presented for contract source verification by part number, quantity, date and Verify representative used. This record shall be made available upon request.

5.7. Product Qualification Process Requirements for Forgings, Castings and Swagings

5.7.1. Product Qualification process shall be performed pre-production (reference DMS 1677, 1935)

5.7.1.1. A detailed product qualification report and a manufacturing plan/traveler router/technique sheet representing all process steps used to manufacture the forging casting or swaging shall be submitted to the LS M&PT of the procuring facility for review and acceptance

5.7.2. Required elements as part of the product qualification process are as follows:

5.7.2.1. Description of each process and operation applicable to the parts including heat treat racking or loading information (sketch or photograph preferred)

5.7.2.2. Thermal treatments, including “set” temperatures and times

5.7.2.3. The results of all metallurgical and quality evaluations as required by design, drawing / model, applicable specifications and purchase order. Evaluation results are to include the following as a minimum:

5.7.2.3.1 Two sets (one for LS and one for supplier) of original photographs of macrosections (at least 1X magnification that is not photocopies). Grain flow shall follow the general part contour with no re-entrant grain flow lines.

5.7.2.3.2 Microstructural verification including decarburization/carburization test results

5.7.2.3.3 Chemical analysis report

5.7.2.3.4 Mechanical properties test report

5.7.2.3.5 Hardness test results

5.7.2.3.6 Nondestructive test results

5.7.2.3.7 Dimensional layout report

5.7.2.3.8 The raw material certifications from which the first article part was manufactured

5.7.2.3.9 All certifications for any outside special processing and testing

5.7.2.3.10 Copies of each LS closed rejection reports (QNs) covering non-conformances that exist on the first article part, as applicable.

5.7.2.4. Any magnetic particle, x-ray, or ultrasonic inspection techniques used to inspect the parts. Nondestructive testing (NDT) procedures and techniques shall be approved by a certified Level III of the applicable NDT process. Approval signature is required on applicable procedures and techniques. Level III certification shall be from a recognized, independent approving body.

5.7.2.5. When the engineering drawing / model requires first article submittal to the LS customer, two copies of the first article report with original grain flow photographs (when required) shall be submitted.

5.7.2.6. Unless otherwise specified on the engineering drawing / model or purchase order, the metallurgical qualification for left and right-hand parts is required for one, but not both, provided processes are identical for either product.

5.8. Control of Monitoring and Measuring Equipment

5.8.1. The measuring device shall be appropriate to the feature being measured, including the proper unit of measure (i.e., International System of Units [metric system] or Imperial [English]).

5.8.2. Shall ensure adequate sensitivity of measurement instrumentation is used to achieve the 10 to 1 rule.

5.8.3. Measuring devices shall be calibrated to assure its accuracy as per AS9100 section 7.6

5.9. **(*LG)**Special Inspection Requirements / Techniques:

5.9.1. Suppliers shall verify threaded product using the thread inspection method defined as System 22 in ANSI/ASME B1.3(current revision) with the following modifications (unless more stringent requirements are specified by contract or drawing):

5.9.2. Visual Inspection per ANSI/ASME B1.3, paragraph 6(c).

5.9.2.1. Maximum Material functional acceptance to a GO thread gage per ANSI/ASME B1.3, Column A1, Row 1.1, of Table 1 or Table 2 as applicable. Use a thread plug gage per ANSI/ASME B1.2 section 4.1 for internal threads. Use a thread ring gage per section 5.1 for external threads. Suppliers shall procure and maintain calibrated gages for functional product verification before and after any plating. After plate gauges shall be used for final product acceptance.

5.9.2.2. In the event of a thread attribute gauge dispute between facilities (i.e. suppliers and LS site gauges that accept and reject the same parts); the NIST calibration certification provided by the supplier from an ISO 17025 accredited lab shall be the refereeing source. If the dispute still cannot be resolved, the supplier or LS may choose a third party as a refereeing source which is an ISO 17025 accredited facility or higher on the NIST hierarchy.

5.9.2.3. Major diameter size measurement per ANSI/ASME B1.3, Column J2, of Table 1, external threads only.

5.9.2.4. Pitch diameter size measurement per ANSI/ASME B1.3, Column C2, of Table 1 or Table 2 as applicable.

5.9.2.4.1 Note: It is recommended that those suppliers that manufacture class #3 series internal and external threads shift their process means toward minimum material condition.

5.9.2.5. Minor diameter size measurement per ANSI/ASME B1.3, Column K2, of Table 1 or Table 2 as applicable.

5.9.2.6. Root radius size measurement per ANSI/ASME B1.3, Column L, of Table 1, external threads only.

5.9.2.6.1 Exception: For tapped holes with internal threads of nominal size less than 0.190", only the functional acceptance and the minor diameter inspections need to be performed.

5.9.2.7. Suppliers shall verify splined product using the spline inspection method defined in ANSI B92.1 section 16.4 (which includes, but is not limited to, the use of GO composite and NOGO sector gages) unless more stringent requirements are specified by contract or drawing.

5.9.2.8. Suppliers using sampling plans for acceptance of product shall submit plans to Supplier Quality Assurance for approval prior to use. Submittal should indicate approvals by other customers to facilitate review process.

6. LS supplied tooling, gages, and fixtures:

6.1. Supplier shall maintain an Accountable Property List to monitor activity and location of all LS and LS customer or government owned tooling/gages/fixtures in their custody.

6.1.1. This list will include both the tooling/gages/fixtures supplied by a LS facility and the tooling/gages/fixtures fabricated by the supplier to manufacture contracted components but owned by LS or its customer(s).

6.2. A supplier receiving LS or LS customer owned tooling/gages/fixtures shall return these after purchase order requirements are completed unless written authorization is received from LS buyer.

6.3. A supplier shall submit a written request and receive a formal LS approval before any alteration or repair is performed on LS or LS customer tooling/gages/fixtures.

6.4. Supplier is responsible for the repair of all loaned tooling/gages/fixtures damaged after receipt by the supplier, and for the preservation of tooling/gages/fixtures which are not in use.

6.5. The supplier is responsible for the replacement or replacement costs of any tooling/gages/fixtures that are lost, damaged beyond repair, or not returned.

6.6. All furnished tooling/gages/fixtures in the custody of a supplier are subject to periodic LS inventory audits and calibration.

6.7. Supplier shall return all LS or LS customer loaned gages on or before calibration due dates.

6.8. See Customer Requirements section for additional requirements.

7. Handling, Storage, Preservation and Shipping:

7.1. Electro Static Discharge sensitive material:

7.1.1. Suppliers delivering Electro Static Discharge sensitive product shall ensure its protection during the manufacturing process and identification per MIL-STD-1686 and ESD packaging for delivery (connector caps, bags, and bubble sheets) per MIL-STD-2073 and MIL-HDBK-263.

7.2. **(*LG)**Protection of sensitive surfaces

7.2.1. Machined parts with finished or semi-finished unprotected (not plated) surfaces will be delivered with these surfaces covered with protective oil (reference LGPS 1000 Corrosion Protection of Parts or applicable specifications).

7.2.2. All threaded items shall have thread protection. Caps or equivalent protection will cover external threads.

7.3. Packaging Specifications:

7.3.1. The packaging of product shipped to LS shall ensure protection from transit damage and shall at a minimum comply to:

7.3.1.1. Reference ASTM-D3951-(current revision) for “Standard Practice for Commercial Packaging”

7.3.1.2. Reference MIL-STD-2073-(current revision) for “Standard Practice for Military Packaging

8. Nonconforming Product:

8.1. General Requirements

8.1.1. Suppliers shall not make their own MRB disposition on nonconforming material (suppliers with design control see section 2)

8.1.2. Suppliers shall not perform unauthorized rework on nonconforming product.

8.1.3. Suppliers shall submit a request for MRB

8.1.4. Suppliers shall not ship nonconforming material without receipt and completion per LS MRB disposition or unless authorized in writing by MRB disposition or receipt of an approved “Request for Custody” form.

8.2. **(*WB)** MRB submission

8.2.1. Supplier shall submit a completed Supplier Material Review Record (Form 815) to the LS Buyer/or Supplier Quality focal.

8.2.2. A unique MRB number will be determined by LS.

8.2.3. Items which have been accepted by the MRB are identified per instructions provided with the form.

8.2.4. Shipment for material with MRB shall be identified per MRB instructions. All material certifications for MRB approved material shall reference appropriate MRB number.

8.2.5. Approval must be granted by LS prior to product shipment.

8.2.6. Approval for shipment does not establish any precedent for future material.

8.2.7. The supplier must maintain a copy of the dispositioned Supplier Material Review Record (Form 815) with their quality records for the affected material

8.3. **(*LG)**MRB submission

8.3.1. For a discrepancy discovered that may be reworked into a conforming condition prior to subsequent processing, the supplier’s standard internal rework process shall be followed. Rework records shall be maintained as per the Records of Manufacturing

8.3.2. For a discrepancy discovered within a special process or during, the guiding specification for that specific special process may provide rework guidelines. Rework records shall be maintained as per the Records of Manufacturing

8.3.3. Any NDT rejections must be submitted to LS MRB for review and disposition.

8.3.4. The supplier shall document the discrepancy on a LS Quality notification(QN) form (LG DIV SQA FORM 2963):

8.3.4.1. See naming convention requirements for QN submission in Content server

8.3.4.2. Shall contain a clear description of actual or suspect nonconformance.

8.3.5. When completing the Vendor Initiated Quality Notification Entry Sheet the requestor must include all appropriate email addresses at bottom of form (i.e buyers, quality, and associated required communication points between supplier and customer), the UTAS QN number will submitted back to suppliers through Content server.

8.3.6. Once disposition is obtained from LS MRB each element of the disposition shall be stamped off and dated as evidence of completion.

8.3.7. If any special processes are used for the repair, the supplier shall list the processor used, the certificate number, and date.

8.3.8. Dispositioned QN's shall be treated as a repair router and follow the part(s) through the entire repair process, stamped and dated as the operations are in fact completed.

8.3.9. Except when specifically authorized by the engineering drawing / specifications or LS Material Review Board (MRB) disposition, welding on any LS assemblies or machined/formed detail components for the purpose of repair is prohibited.

8.4. **(*LG)** "SCRAP" disposition:

8.4.1. The supplier shall provide a copy of the LS dispositioned inspection QN.

8.4.2. The QN shall be signed and dated by the PQR or DSQAR as evidence that the product was physically rendered worthless for its intended use.

8.4.3. When required by LS, evidence of formal mutilation of scrap item shall be demonstrated by the supplier

8.5. Disclosures (Notice of Escapement, NOE):

8.5.1. Suppliers shall provide written notification to LS within 24 hours when a nonconformance is determined to exist, or is suspected to exist, on product already delivered to LS or LS customers using the AS9131 template.

8.5.2. In the case of proprietary suppliers, an impact statement correlated with the supplier engineering organization shall be provided. The impact statement shall contain a proposed disposition for the LS stock and instructions regarding the parts/assemblies installed on operating aircraft.

8.5.3. Delta FAI shall be identified and completed on next production run.

8.6. MRB Administrative Costs

8.6.1. Suppliers are responsible for administrative costs incurred by LS and associated with the Material Review and disposition of supplier manufactured nonconforming product.

8.6.2. Any costs associated with rework of discrepant material may be charged to the supplier.

8.6.3. Any requests for "CHANGE OF CHARGE" shall be submitted to the appropriate LS supplier quality focal.

9. Service and Warranty

9.1. General Requirements

9.1.1. Service and warranty repair components shall not be mixed with new production components during manufacturing or storage. They shall not be assembled into new production without the written authorization of LS and (when required) concurrence of LS customer.

9.1.2. All Service and Warranty components shall be uniquely identified by LS or through supplier non-conformance control methods for traceability in the supplier's system throughout the repair process.

9.1.3. Repairs shall not begin without a repair purchase order and LS authorization.

9.1.4. Parts and assemblies received from LS or a LS customer which are not accompanied by a service routing, inspection requirements/definitions, or having a specific disposition shall be inspected and tested (if appropriate) to confirm the rejection. Items are to be subsequently disassembled for component inspection when applicable. When parts and assemblies are accompanied by a service routing or inspection QN, the instructions contained therein are to be followed.

9.1.5. The inspection results and analysis, Failure Analysis Report (FAR) showing the date of original manufacture and date returned items were received, shall be maintained, controlled, and submitted to LS for review and approval, upon request. The results shall include:

9.1.6. All inspection/rejection MRB generated on components found discrepant (all MRB shall be marked "Service")

9.1.7. Corrective actions for discrepant items that are the supplier's responsibility, and a repair quotation (when applicable) with a listing of all LS consigned inventory required to complete a specific repair.

9.1.8. Serialized Component list (the supplier is responsible for only the components replaced during the warranty or repair rework).

9.1.9. ATP/Test Report

9.1.10. MRB clearance list of all new/consigned parts used in the repair (list all other open issues or QNs with the serviced item).

9.1.11. Any MRB QNs generated with approved MRB clearance during the repair process.

9.1.12. Replaced items shall be accompanied by Certification of Compliance, which shall include applicable data such as cure dates for o-rings, seals, etc. FARs shall be completed within 30 days upon receipt

9.1.13. All documentation should also be identified with the LS service work order and/or purchase order number.

9.1.14. FAR reports shall be submitted through Content Server when required.

10. Corrective Action Process

10.1. General Requirements

10.1.1. Suppliers/processors shall provide written acknowledgement as to the receipt of a corrective action from LS with confirmation of containment and CA team members identified within the timeline specified by the SQA focal.

10.1.2. Containment shall include a review of the following:

10.1.2.1. Inventory

10.1.2.2. Work in process

10.1.2.3. Completed product pending final release

10.1.2.4. Product in transit/shipped

10.1.3. Root Cause, Corrective Action, and Preventive Plans shall be received within the time defined by LS SQA.

10.1.4. Delinquent responses, repeat response rejection due to improperly addressing the issue to identify true direct and root case and or continued failure to provide corrective action responses in a timely manner may result in the removal as an approved supplier/processor.

11. Preventive Action/Continuous Improvement

11.1. UTC Production Part Approval Process (UPPAP)

11.1.1. UPPAP when invoked by drawing, specifications, purchase order or contractual requirements shall be followed, ref. ASQR-09.2.

11.2. Control of Key Characteristics

11.2.1. Suppliers shall have a process for control and analysis of key characteristics as defined within the engineering drawing, model, purchase order and when the part(s)/process is specifically designated for SPC/process capability by LS.

11.2.2. All data pertaining to key characteristics shall be made available upon request and will require approval by LS Supplier Quality Assurance.

11.2.3. When required, data will be provided in the format prescribed per AS9103, Variation Management of Key Characteristics (VMKC)

11.2.4. All processes that effect key characteristics shall be evaluated for statistical process capability (Cpk).

11.2.4.1. Cpk values less than 1.33 shall be addressed by the supplier with an improvement plan.

11.2.4.2. Cpk values less than 1.00 shall be addressed by the supplier with a CA (supplier's format)

12. (*LG)Special Processes

12.1. Approval of Special Processors:

12.1.1. The request shall be made in writing to Supply Chain Management using form LS-SBU-F001-SQA - Request for Processor Approval (Content Server), stating the processor's company information and listing the processes and specifications the supplier is requesting the processor to support.

12.1.2. Processors that perform special processes that are Nadcap commodities are required to have Nadcap accreditation. Any exceptions to this requirement will be based on LS Supplier Quality management approval of a request for waiver.

12.1.3. Approvals are granted for each individual processor / process / specification combination, and are site location specific. Physical relocation of processing requires LS re-approval of the re-located processing prior to any use of that re-located processing on LS product.

12.1.4. Document 200 is the official LS listing of approved processors. On occasions when new processors are approved by LS but not evident pending revision of the public version of Document 200, an e-mail from LS Supplier Quality Assurance may suffice as evidence of approval until the public version is revised.

12.1.5. Special process sources approved by LS for a LS, Military or Industrial specification that has been superseded by another LS, Military or Industrial specification shall be considered approved for the superseding specification.

12.2. Supplier's use of Approved Processors:

12.2.1. Only LS approved sources shall be used to perform special processes on aircraft production parts manufactured for LS engineering drawings/design.

12.2.2. When LS customer controlled processes are required, (i.e. Boeing “BAC’s”, DPS, “PS’s”, and Lockheed “5PTP’s”), selected process sources shall be listed in both the LS Doc 200 listing as approved for quality system and in the applicable customer’s listing (i.e. Boeing D1-4426, and Lockheed QCS-001) for the controlled process.

12.2.3. The supplier shall maintain and use an approved processor list, and are responsible for ensuring that approved sources meet the requirements of the applicable specifications.

12.2.4. Suppliers are responsible for ensuring that processing meets the requirements of the applicable specifications defined in the engineering and contractual requirements.

12.2.5. The supplier’s purchase order shall flow down to the processor all applicable information required to perform work correctly to engineering and contractual requirements and as required by individual process specification and end customer requirements. The purchase order shall clearly specify the full scope of processing to be performed, MRB actions required, applicable specification number(s), revisions and addendums or modifications, part numbers, quantity, serial numbers (if applicable), applicable program and prime customer and identify LS as the supplier’s direct customer.

12.3. Processor Requirements:

12.3.1. Work shall be planned, approved and executed in accordance to the scope of work being performed.

12.3.2. A packing slip, Certificate of Compliance, and inspection records shall be included with all shipments.

12.3.3. Unless allowed by LS specification requirements, for serialized parts, heat treat sources shall record actual hardness values for each serial number.

12.3.4. Objective evidence of compliance to specifications and drawings shall be made available upon request.

12.3.5. Ensure a performance metric that will measure internal rework for each approved process and will be made available upon request.

13. Specific LS Customer Requirements:

13.1. Airbus:

13.1.1. Suppliers shall implement a Risk Management and mitigation process for all processes including sub-tiers.

13.1.2. All Airbus Quality requirements must be in accordance with GRESS (current revision), Airbus’s Quality Requirement document.

13.1.3. Product designated with key characteristics shall include an approved ICY (interchangability) document completed per requirements with each shipment

13.2. Lockheed Martin (LM):

13.2.1. Suppliers shall comply to applicable Appendix QX (current revision) LM Aero Supplier Quality Requirements.

13.2.2. LM Counterfeit Parts Prevention (for the following verbiage Seller is defined as LS suppliers, Buyer is LS:

13.2.2.1. Seller shall establish and maintain a Counterfeit Parts / Material Prevention and Control Plan using AS-5553 (Ref. elements of Section 4) and/or AS6174 (Ref. elements of

Section 3) to ensure that Counterfeit Work is not delivered to Buyer. The purpose of Seller's Plan shall be to develop a robust process to prevent the delivery of counterfeit commodities and control commodities identified as counterfeit

13.2.2.2. a) For purposes of this clause, Work consists of those commodities delivered under this Contract that are the lowest level of separately identifiable items (e.g., articles, components, standard hardware, goods, raw materials and assemblies). "Counterfeit Work" means Work that is, or contains, items misrepresented as having been designed and/or produced under an approved system or other acceptable method. The term also includes approved Work that has reached a design life limit or has been damaged beyond possible repair, but is altered and misrepresented as acceptable.

13.2.2.3. b Seller shall only purchase products to be delivered or incorporated as Work to Buyer directly from the Original Component Manufacturer (OCM)/Original Equipment Manufacturer (OEM),OCM/OEM authorized distributor chain, Aftermarket Manufacturer, or Authorized Reseller. These products shall have verification that Work is traceable to OCM/OEM; OCM/OEM authorized distributor chain, Aftermarket Manufacturer, or Authorized Reseller that identifies the name and location of all the supply chain intermediaries from the part manufacturer to

13.2.2.4. the direct source of the product for the Seller. Work can only be acquired from independent distributors or brokers in cases of diminishing material supply (DMS) or obsolescence and shall be subjected to a screening process appropriate to the commodity in accordance with the Counterfeit Parts / Material Prevention and Control Plan. If traceability is not obtainable, written notice shall be provided to the Supplier Quality Engineer and Buyer prior to delivery with records of evidentiary tests and inspections performed and conformance of the product to specified acceptance criteria that ensures verification activities taken to assure authenticity. Written notice is not required for raw material and standard hardware purchased from independent distributors or brokers, but products must be able to provide commodity level traceability to the Original Manufacturer.

13.2.2.5. c) Seller shall notify Supplier Quality Engineer and Buyer in accordance with 2.2 with the pertinent facts if Seller becomes aware or suspects that it has furnished Counterfeit Work. Seller shall provide to Supplier Quality Engineer and Buyer, upon request, the supply chain traceability to an Original Manufacturer or authorized distributor chain that identifies the name and location of all the supply chain intermediaries from the part manufacturer to the direct source of the product for the Seller.

13.2.2.6. d) Seller shall include this clause or equivalent provisions in lower tier subcontracts for the delivery of items that will be included in or furnished as Work to Buyer. Sellers eligible for utilization of the Government-Industry Data Exchange Program ("GIDEP") shall utilize the GIDEP process to alert the industry of encountered counterfeit parts.

13.2.3. If additional information is required, the supplier shall contact the LS buyer. The LS buyer will then contact the appropriate PQE or Program Management for clarification.

13.2.4. For suppliers providing LM product suppliers shall comply with LM's PM-5010 (current revision)

13.3. Transport Canada

13.3.1. To assure continued compliance to our customers as well as regulatory bodies, in this case Transport Canada, reference 561.13 (3) No supplier who performs work for a holder of a manufacturer certificate under this Subpart shall subcontract the work to another supplier without having first obtained the written consent of the holder of a manufacturer certificate. as a supplier to LS providing product to LS as a manufacturing certificate holder per Transport Canada and you

plan to subcontract any work that does not constitute an approval within the current construct of This document, i.e. MPS approvals, Doc 200, you will need to contact your buyer or SQA representative (PQR) requesting written consent prior to subcontracting.

13.3.2. The request will be in the form of the supplier choice and will include the subcontractor company name, address of manufacturing (service) and a short description of the sub-contracted service to be provided.

13.3.3. LS shall communicate the written consent back to the author of the request.

13.3.4. Copies of the request and written consent shall be maintained by the supplier and shall be subject to the requirements of record management as outlined in section 1.7 of this document.

13.4. Boeing

13.4.1. For U.S Government owned special tooling (ST) accountable to Boeing or Boeing owned special tooling (ST) the requirements of D950-11059-1, BDS Seller Special Tooling Requirements is applicable.

13.4.2. The supplier shall ensure that all standard hardware with Boeing design authority is procured from approved manufacturers and distributors in compliance with Boeing's D-590 Parts Standards specification requirements.

13.4.3. The supplier shall ensure that First Article Inspection records for all standard hardware with Boeing design authority are available upon request

13.4.4. Reference Boeing D1-4426: User Instructions & Requirements:

13.4.4.1. "5.1.2.1 Purchasers are required to adequately define and document the statement of work, where appropriate: specification, specification revision, specification departures, Type, Class, Grade, program number, design authority, pre/post processing steps, as applicable. The organization shall ensure the adequacy of specified purchase requirements prior to their communication to the processor. Note: This applies to tier one suppliers or UTAS Landing System sites offloading special process work to an approved Boeing source."

13.4.4.2. "7.2.1 Processors shall perform contract review prior to accepting an order to ensure the purchaser has adequately defined and documented the statement of work which includes, where appropriate: specification, specification revision, specification departures, Type, Class, Grade, program number, design authority, pre/post processing steps, as applicable"

13.4.4.3. "Note: The specific purchase order processing information required to be flowed down on the purchase order to the special processor is identified in the Boeing Appendix D. Some information is always required and other information is required when applicable."

13.4.4.4. This appendix is available on the Boeing Approved Process Sources D1-4426 web site (link provided). http://active.boeing.com/doingbiz/d14426/Appendix-D.pdf

*13.4.5. Where Boeing build to print Digital Product Definition is the design authority, suppliers are responsible for compliance to the applicable sections of **Boeing's D6-51991 - Quality Assurance Standard for DPD at Boeing Suppliers**; link http://www.boeingsuppliers.com/. Supplier's compliance to D6-51991 will be assessed. Reference LS-LG-W-426-ENG, in Content Server for more information and LS requirements associated with D6-51991.*

*13.4.6. For Boeing Commercial product, Boeing quality clauses, **Q09, S68, U40**, found in Content Server, are required to be flowed down from LS to our suppliers and Boeing requires that the provisions/requirements set forth above be included in LS direct supply contracts as well as the*

obligation that they be flowed to the sub-tier supply chain. This paragraph invokes the requirement as our flow down to suppliers.

13.5. Sumitomo Precision Products (MRJ program)

13.5.1. AQ1-11108 Visual Inspection Procedure of Parts for MRJ program

13.5.1.1. Compliance of AQ1-11108 is invoked to LS and its suppliers that provide product supporting the Mitsubishi Regional Jet program per SPP Quality Control Document AQI-726. Both are available on LS Content Server.

14. References (Outside of LS):

14.1. SAE AS9100 (current revision) Quality Systems – Aerospace – Model for Quality Assurance in Design, Development, Production, Installation and Servicing

14.2. SAE AS9102 - Aerospace, First Article Inspection Requirements

14.3. SAE AS9103 - Variation Management of Key Characteristics

14.4. SAE AS9120 - Quality Management Systems – Requirements for Aviation, Space and Defense Distributors

14.5. SAE AS9131- Quality Management Systems – Non Conformance Documentation

14.6. ISO 9001 (current revision) – Quality Management System - Requirements

14.7. Airbus – GRESS – General Requirements for Equipment and System Suppliers

14.8. ISO 10012 (current rev.) - Measurement Management Systems

14.9. Lockheed Martin Appendix QX (current revision)

14.10. Transport Canada CAR 561 (current revision)

14.11. National Defense Authorization Act, Section 818, Detection and Avoidance of Counterfeit Electronic Parts

14.12. Boeing D1-4426 - User Instructions and Requirements

15. Change Log:

Revision Date	Reference	Comments
April 30, 2015	New	Previous Document 300 LG DIV SQA MAN 001, AWB9100; Complete rewrite with inclusion of new ASQR01, UTAS PRO 0003, into this addendum
June 25, 2015	01	Section 1.5 updated to clarify process specification usage requirements and approval requirements Section 4.1.2 . MPS submittals for approval into LS added *and approved by LS* Section 5.2.6.4.1 Cadmium Plating (LHE) additional requirements
Sept. 9, 2016	02	Updated Table of Contents page numbering, Minor grammatical changes (6/17/2016) Added Section 1.8 – UTC,UTAS, LS Web Document links (6/17/2016) Added Section 1.9.5 – file submission size limits to 4 megabyte (6/17/2016) Added Section 13.5 Sumitomo Precision Products Quality requirements- (MRJ program) (6/17/2016) Added Section 13.4.4.5 – Boeing D6-51991 (DPD) (6/17/2016) Added Section 13.4.4.6 – Boeing clauses Q09, S68, U40 (6/17/2016) Updated section 3.1.9 to clarify part marking application related to ink and clear coat (8/17/2016) Updated Section 2.1 First Article (8/17/2016) Updated Section 3.1, Part Identification (9/9/2016) Various changes in grammar and clarification throughout (9/9/2016)

16. Appendix 1

16.1. Applicability Matrix

16.1.1. Unless specified via sub clause, applicability within sections marked with X are where not marked is inclusive to all LS site suppliers; N/A means not applicable.

Unless specified via sub clause, applicability within sections marked with X are inclusive; N/A means not applicable

Applicability (WB)	Applicability (LG)			
		Ref #	ASQR01	ASQR01
X	X	N/A	Introduction (AS9100, right of access)	ASQR01
X	X	1	Scope	ASQR01
X	X	1.	Scope	ASQR01
X	X	2.	Normative reference	ASQR01
X	X	3.	Terms and Definitions	ASQR01
X	X	4.2.3	Control of Documents	ASQR01
X	X	4.2.4	Control of Records	ASQR01
X	X	4.2.4. 1	Record retention	ASQR01
See BU specific (1.6)	See BU specific (1.6)	4.2.4. 2	Record retention	ASQR01
See BU specific (1.6)	See BU specific (1.6)	4.2.4. 3	Record retention	ASQR01
X	X	5.	Management responsibility	ASQR01
X	X	6.	Resource Management	ASQR01
X	X	7-7.1.3	Product Realization	ASQR01
X	X	7.1.4	Control of Work transfers	ASQR01
X	X	7.2.2	Contract review	ASQR01
X	X	7.2.3	Customer Communication	ASQR01
X	X	7.2.3.c	Document Language	ASQR01
X	X	7.3	Design and Development	ASQR01
X	X	7.4	Purchasing	ASQR01
X	X	7.5	Production and Service Provision	ASQR01
See BU specific (4.0)	See BU specific (4.0)	7.5.1.a-1,2,3	Control of Production and Service Provision	ASQR01
X	X	7.5.1.b-k	Control of Production and Service Provision	ASQR01
X	X	7.5.1.1-4	Production Process Verification	ASQR01
X	X	7.5.2-6	Control of Production and Service Provision (Continued)	ASQR01
X	X	8.-8.2.3	Measurement, Analysis, and Improvement	ASQR01
X	X	8.2.4-a-d	Monitoring and Measuring of Product	ASQR01
See BU specific (11.2)	See BU specific (11.2)	8.2.4.1-2	Statistical Techniques ASQR-20.1	ASQR01
X	X	8.2.4.3-4	Monitoring and Measuring of Product (Continued)	ASQR01
X	X	8.3-4	Non-conforming product/Analysis of Data	ASQR01
See BU specific (10.0)	See BU specific (10.0)	8.5.2	Corrective action	ASQR01
X	X	8.5.3	Preventive Action	ASQR01

Unless specified via sub clause, applicability within sections marked with X are inclusive; N/A means not applicable

Applicability (WB)	Applicability (LG)	ref#	UTAS SCM PRO 0003	UTAS SCM PRO 0003
X	X	1.0	Purpose/Scope	UTAS SCM PRO 0003
X	X	2.0	Responsibility	UTAS SCM PRO 0003
X	X	3.0	References	UTAS SCM PRO 0003
X	X	4.0	Acronyms	UTAS SCM PRO 0003
X	X	5.1-6	General QMS requirements	UTAS SCM PRO 0003
X	X	5.7	Change Management	UTAS SCM PRO 0003
X	X	5.8-10	Supplier Source Control, First Article, Product Inspection Certification	UTAS SCM PRO 0003
See BU specific (5.8)	See BU specific (5.8)	5.11	Monitoring and measuring of product	UTAS SCM PRO 0003
X	X	5.12-13	Use of UTAS Approved Suppliers/ Special Processes	UTAS SCM PRO 0003
X	X	5.14	Distributor requirements	UTAS SCM PRO 0003
N/A	N/A	5.14.6.4	Distributor transfer of Work	UTAS SCM PRO 0003
See BU specific (4.0)	See BU specific (4.0)	5.14.7	Distributor flight safety/…	UTAS SCM PRO 0003
X	X	5.15	Obsolescence	UTAS SCM PRO 0003
X	X	5.16	Non conforming product	UTAS SCM PRO 0003
See BU specific (8.5)	See BU specific (8.5)	5.17.1	Disclosure process	UTAS SCM PRO 0003
X	X	5.17.2-5	Disclosure process (Continued)	UTAS SCM PRO 0003
X	X	5.18	Preservation of product	UTAS SCM PRO 0003
N/A	N/A	5.18.1	Duplicate copies of the Supplier's packing list…	UTAS SCM PRO 0003
See BU specific (6.0)	See BU specific (6.0)	5.19	Tooling, Fixtures, templates, jigs	UTAS SCM PRO 0003
X	X	5.20	Supplier performance	UTAS SCM PRO 0003

Unless specified via sub clause, applicability within sections marked with X are inclusive; N/A means not applicable

Applicability (WB)	Applicability (LG)			
		ref#	LS-SBU-A001-SQA	LS-SBU-A001-SQA
X	X	1.	Overview	LS-SBU-A001-SQA
X	X	1.1-2	Purpose/Scope	LS-SBU-A001-SQA
X	X	1.3	Responsibility	LS-SBU-A001-SQA
X	X	1.4	Quality Alerts	LS-SBU-A001-SQA
X	X	1.5	Engineering Data	LS-SBU-A001-SQA
N/A	X	1.5.2-3	Index Specifications	LS-SBU-A001-SQA
X	X	1.6	Engineering Change requests	LS-SBU-A001-SQA
X	X	1.7	Quality Record Retention	
X	X	1.8	Document Links	LS-SBU-A001-SQA
X	X	1.9	ITAR and EAR Compliance	LS-SBU-A001-SQA
X	X	1.10	Supplier Controlled Design	LS-SBU-A001-SQA
X	X	1.11	Standard Components	LS-SBU-A001-SQA
X	X	1.12	Material Substitutions	LS-SBU-A001-SQA
X	X	1.13	Supplier/Processor Assessment	LS-SBU-A001-SQA
X	X	2.	Manufacturing Record Control	LS-SBU-A001-SQA
X	X	2.1	First Article Requirements	LS-SBU-A001-SQA
N/A	X	2.1.3	FAI reporting	LS-SBU-A001-SQA
X	X	2.2	Records of Manufacturing	LS-SBU-A001-SQA
X	X	2.3	Material Certification Requirements	LS-SBU-A001-SQA
N/A	X	2.4	Process Certification Requirement	LS-SBU-A001-SQA
N/A	X	2.5	Supplier Certification and Process record	LS-SBU-A001-SQA
X	X	2.6	Raw Material, Forgings, Castings	LS-SBU-A001-SQA
X	X	3.	Identification	LS-SBU-A001-SQA
X	X	3.1	Part Marking and Serialization	LS-SBU-A001-SQA
X	X	4.	Process Control	LS-SBU-A001-SQA
X	X	4.1	Manufacturing Plans and Techniques	LS-SBU-A001-SQA
N/A	X	4.1.8	Controlled Special Processes per Doc 200	LS-SBU-A001-SQA
N/A	X	4.2	Manufacturing Plan Review and Approval	LS-SBU-A001-SQA
X	X	4.3	Straightening of Parts	LS-SBU-A001-SQA
X	X	5.	Inspection and Testing	LS-SBU-A001-SQA
X	N/A	5.1	Inspection Requirements (Legacy WB)	LS-SBU-A001-SQA
N/A	X	5.2	Inspection Requirements (Legacy LG)	LS-SBU-A001-SQA
N/A	X	5.3	Waiver Process	LS-SBU-A001-SQA
N/A	X	5.4	Drop Shipments	LS-SBU-A001-SQA
X	X	5.5	Source Inspection (Certified Suppliers)	LS-SBU-A001-SQA
X	X	5.6	Source Inspection (De-Certified Suppliers)	LS-SBU-A001-SQA
X	X	5.7	Product Qualification Process Requirements	LS-SBU-A001-SQA
X	X	5.8	Control of Monitor/Measurement Equipment	LS-SBU-A001-SQA
X	X	5.9	Special Inspection Requirements/Techniques	LS-SBU-A001-SQA
X	X	6.	LS Supplied, Tooling, Gages &Fixtures	LS-SBU-A001-SQA
X	X	7.	Handling, Storage, Preservation & Shipping	LS-SBU-A001-SQA
X	X	7.1	F.O.D	LS-SBU-A001-SQA
X	X	7.2	E.S.D Material	LS-SBU-A001-SQA
X	X	7.3	Protection of Sensitive Services	LS-SBU-A001-SQA
X	X	7.4	Packaging Specifications	LS-SBU-A001-SQA
X	X	8.	Non- Conforming Product	LS-SBU-A001-SQA
X	X	8.1	General Requirements	LS-SBU-A001-SQA
X	N/A	8.2	MRB Requirements (Legacy WB)	LS-SBU-A001-SQA
X	X	8.3	MRB Requirements (Legacy LG)	LS-SBU-A001-SQA

Applicability (WB)	Applicability (LG)			
		ref#	LS-SBU-A001-SQA	LS-SBU-A001-SQA
X	X	8.4	Scrap Process	LS-SBU-A001-SQA
X	X	8.5	Disclosures, Notice of Escapement (NoE)	LS-SBU-A001-SQA
X	X	8.6	MRB Administrative Costs	LS-SBU-A001-SQA
X	X	9.	Service and Warranty	LS-SBU-A001-SQA
X	X	9.1	General Requirements	LS-SBU-A001-SQA
X	X	10.	Corrective Action	LS-SBU-A001-SQA
X	X	10.1	General Requirements	LS-SBU-A001-SQA
X	X	11.	Preventive Action/Continuous Improvement	LS-SBU-A001-SQA
X	X	11.1	UTC Production Part Approval Process (UPPAP)	LS-SBU-A001-SQA
X	X	11.2	Control of Key Characteristics	LS-SBU-A001-SQA
X	X	12.	Special Processes	LS-SBU-A001-SQA
X	X	12.1	Approval of Special Process Sources	LS-SBU-A001-SQA
X	X	12.2	Supplier Use of Approved Processors	LS-SBU-A001-SQA
X	X	12.3	Processor Requirements	LS-SBU-A001-SQA
X	X	13.	Customer Requirements	LS-SBU-A001-SQA
X	X	13.1	Airbus	LS-SBU-A001-SQA
X	X	13.2	Lockheed Martin	LS-SBU-A001-SQA
X	X	13.3	Transport Canada	LS-SBU-A001-SQA
X	X	13.4	Boeing	LS-SBU-A001-SQA
X	X	13.5	Sumitomo Precision Products	LS-SBU-A001-SQA
X	X	14.	References	LS-SBU-A001-SQA
X	X	15.	Change Log	LS-SBU-A001-SQA
X	X	16.	Appendix 1- Applicability Matrix	LS-SBU-A001-SQA