Landing Systems	**DOCUMENT 300** **Supplier and Product Quality Requirements for MRO** **LS-MIA-W038-QA [01]**

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1. Overview

1.1. Purpose

The Goodrich Landing Systems (GLS) MRO Supplier and Product Quality Requirements, defines, illustrates, and explains quality requirements for tier-1 (direct GLS purchase holders) and sub-tier suppliers, as well as processors, on product purchased.

1.2. Scope

1.2.1. The MRO Supplier and Product Quality Requirements are invoked by direct reference on the purchase order.

1.2.2. No deviation from these requirements is permitted unless specifically authorized in writing by GLS Quality Assurance management.

1.3. Responsibilities

Suppliers and processors shall flow down all applicable requirements of MRO Supplier and Product Quality Requirements to all sub-tier suppliers and/or processors.

2. Supplier Requirements:

2.1. Quality Management System (QMS):

2.1.1. Suppliers that provide parts or materials to GLS, with the exception of Brokers, should maintain one of the following certificates or maintain a QMS that complies to those requirements:

- Title 14 FAR Part 145 Repair Station Certificate or equivalent
- SAE AS9100
- SAE AS 9110
- ISO EN9100

2.1.2. Suppliers that provide outside processing to GLS should maintain one of the following certificates or maintain a QMS that complies to those requirements:

- Title 14 FAR Part 145 Repair Station Certificate or equivalent
- SAE AS 9110
- ISO 9001
- OE Approval

2.1.3. The supplier shall provide a copy of their QMS manual/document in English upon request.

2.2. Quality Record Retention:

2.2.1. Quality Record Maintenance:

2.2.1.1. Suppliers shall maintain a process to prevent tampering or loss of records.

2.2.1.2. Suppliers, processors and their sub-tiers, with the exception of Brokers, should define their responsibilities to retain the active and inactive records in a record management procedure.

2.2.1.3. Suppliers and processors, with the exception of Brokers, shall maintain their Quality records for a minimum of two (2) years.

2.2.2. Destruction of Records:

2.2.2.1. Supplier Quality Assurance is to be notified in writing at least 2 months prior to planned destruction of records pertaining to product supplied to GLS.

2.2.2.2. At the end of the product lifecycle and with the agreement of the appropriate authorizing personnel within GLS the records may be destroyed. Shredding has been determined as the preferred method of destruction of approved records.

2.2.2.3. Evidence of the disposal of the records shall be kept no less than 2 years from the date of disposal.

2.2.2.4. Records that are potentially the subject of or relevant to, pending litigation or litigation which is reasonably anticipated shall not be disposed until approval is obtained from the Goodrich legal department and from the document owner (if the owner is different from the supplier or processor).

2.2.3. In case of termination of operation (takeover, transfer of ownership and joint venture), suppliers and processors shall define and implement the new responsibilities of record archiving, including the possible transfer to the owner as applicable.

2.2.4. In case of bankruptcy, the supplier shall ensure that archived records are maintained accessible for its customers and the Regulatory authorities, including their possible transfer to them.

2.3. Supplier Document Control

2.3.1. Applicable Engineering Data:

2.3.1.1. Materials or parts shall be manufactured/processed to the latest material or process specification revisions in effect at the time of commencement of the manufacture/processing.

2.3.2. Revision Control:

2.3.2.1. Supplier shall have a defined process to review and incorporate drawing revisions/changes.

2.3.2.2. The supplier and processors shall roll up the revision levels and document these changes in the revision table whenever any type of change is made.

2.4. Right of Access:

The supplier and processor shall provide access for GLS personnel, government and civil aviation authorities, and customers to their facilities, personnel and records when requested as required for quality and management systems reviews, product / process validation evaluations, or investigations.

2.5. Flow down requirements:

The supplier or processor shall flow down all appropriate and relevant requirements and information to their sub-tier suppliers.

2.6. Purchase Order Review:

Suppliers shall have documented evidence of review of the Purchase Order which may include at a minimum:

2.6.1. Review that all technical information has been received and understood (for example, Doc 300, engineering drawings, and process specifications).

2.6.2. Resource assessment

2.6.3. Capability assessment

2.6.4. Capacity analysis

2.7. Material & Part Integrity:

2.7.1. Material & Part Identification:

2.7.1.1. Part marking and serialization shall be identified in the supplier's control plan/manufacturing documentation for all parts.

2.7.1.2. The Supplier should define packaging identification requirements.

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

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

2.7.1.5. 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".

2.7.1.6. Parts requiring serialization shall be identified with unique serial numbers, which shall not be duplicated.

2.7.1.7. Serial numbers shall remain unique and consecutive for each engineering drawing / model part number regardless of revision.

2.7.1.8. Forging, casting, extrusion or swaging serialization:

- Requires serialization per the engineering drawing / model requirements
- The numeric portion only of the forging serial number should apply to the machined detail parts.
- The prefix code of the finished part supplier shall be used in place of the forging, casting, extrusion or swaging supplier prefix code.

2.7.2. Material Substitutions:

Material substitutions are not allowed unless authorized by engineering drawing/ model, material specification.

2.7.3. Counterfeit parts:

2.7.3.1. Suppliers shall ensure that counterfeit parts are not delivered to GLS and/or GLS customers.

2.7.3.2. Suppliers shall ensure that suspect unapproved parts are not delivered to GLS and/or GLS customers.

2.7.4. Standard Components:

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

2.7.4.2. Suppliers shall ensure the standard hardware delivered to GLS conforms to the latest specification or configuration requirements.

2.7.5. Foreign Material Requirements for raw material/forgings/castings:

2.7.5.1. Applies to suppliers who supply raw material / forgings / castings directly to GLS and GLS's suppliers.

2.7.5.2. Special requirements apply to material produced in company(s) located in a country other than the United States or Canada and the country does not have a Bilateral Airworthiness Agreement (BAA) for the product being supplied. Suppliers intending to purchase raw material stock, forgings, castings and standard hardware from sources outside North America shall notify their assigned GLS PQR and obtain concurrence from the appropriate GLS M&PT group prior to commencing the procurement activity.

2.7.5.3. All suppliers providing parts for U.S. Military programs shall conform to the Berry Amendment requirement which requires any specialty metals incorporated into articles to be delivered to the Department of Defense (DOD) shall be melted in the United States, its possessions, or Puerto Rico, or in certain quality countries

NOTE: All steels used for Landing Systems components are considered "specialty metal".

2.8. Use of Sub-Tier Suppliers:

2.8.1. Offload/ Transfer of Work:

2.8.1.1. Tier 1 suppliers shall ensure the capability of all offload sub-tiers and the quality of all product.

2.8.1.2. If a sub-tier processor is used, that special processor should be approved for the process specification being performed.

2.8.2. When a sub-tier supplier is used, the Supplier's purchase order to that sub-tier should reference applicable GLS and GLS customer requirements.

2.9. Supplier Process Controls

2.9.1. 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.

2.9.2. The manufacturing planning shall be retained on file at the supplier's manufacturing facility, and shall be available upon request by GLS and/or its customers.

2.9.3. The planning text shall be in English and may include the following details:

- Name of applicable manufacturer with facility address.
- 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.
- Engineering drawing / model revision level.
- 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.
- Raw material (including forging part number if applicable), raw material specification, raw material heat treat condition.
- All operations shall be noted in their proper manufacturing sequence, including all inspection and test points.

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

2.9.5. Part identification including method and text. All identification shall be applied prior to final inspection.

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

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

2.9.8. Special processes and sources for special processing shall be controlled and approved:

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

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

2.10. Records of Manufacturing:

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 may include the following information:

2.10.1. Part number, revision, and material traceability.

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

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

2.10.4. 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.

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

2.10.6. 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).

2.10.7. 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. The supplier's quality department shall approve split orders.

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

NOTE: Validation 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.

2.11. Inspection and Testing

Part 145 Repair Stations which require Release Authorization Certificates form 8130-3 for product repairs are exempt from GLS source verification and AS 9102A First Article Requirements.

2.12. Material Certification requirements

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

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

2.13. Waiver Process:

Title 14 FAR Part 145 Repair Stations do not require waiver authorization to deliver repair items.

2.14. Product Verification:

Products shall be inspected for dimensional and specification conformance by the supplier's final inspection personnel in accordance with the supplier's quality system.

2.15. Control of Monitoring and Measuring Equipment

2.15.1. Measuring devices 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]).

2.15.2. Shall ensure adequate sensitivity of measurement instrumentation is used to achieve the 10 to 1 rule (instrument accuracy should divide the tolerance into 10 parts or more).

2.15.3. Measuring devices shall be calibrated to assure its accuracy as per ISO 10012-1:1992 – Quality Assurance Requirements for Measuring Equipment.

2.16. Handling, Storage, Preservation, Shipping:

2.16.1. Foreign Object Debris (FOD): Suppliers shall have a written procedure which addresses elimination of Foreign Object Debris (FOD), reference NAS 412. Minimum requirements may include:

- Training
- Material handling and part preservation
- Housekeeping
- Tool and hardware accountability
- Work is accomplished in a manner to prevent FOD
- GLS has the right to perform FOD audits
- Supplier shall perform periodic self-assessments
- Physical entry control into FOD controlled areas
- Flow down requirement to sub-tiers

2.16.2. Protection of sensitive surfaces:

2.16.2.1. Machined parts with finished or semi-finished unprotected (not plated) surfaces will be delivered with these surfaces covered with protective oil (reference SOPM 20-44-02, Temporary Protective Coatings, LSPS 1000, Corrosion Protection of Parts, or other applicable specifications).

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

2.16.3. Packaging Specifications: The packaging of product shipped to GLS shall ensure minimum protection from transit damage. Reference ASTM-D9351-98 for “Standard Practice for Commercial Packaging” or MIL-STD-2073-1D for “Standard Practice for Military Packaging.”

2.17. Drop Shipments

2.17.1 When authorized by the purchase orders (PO), suppliers shall ship directly to customers as directed by the SBU/site.

2.17.2 The supplier shall provide a copy of the shipping documentation sent with product to the Collins SBU/site.

2.18. Control of Material at the Supplier:

2.18.1. 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 GLS and (when required) concurrence of GLS customer.

2.18.2. All Service and Warranty components shall be uniquely identified for traceability in the supplier's system throughout the repair process.

2.19. Nonconforming Product:

2.19.1. Nonconforming product is defined as material that cannot be reworked into a conforming condition prior to any controlled process.

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

2.19.3. For any discrepancy discovered that may be reworked into a conforming condition prior to subsequent processing, the supplier's standard internal rework process shall be followed.

2.19.4. Identification of non-conformances by the Supplier:

2.19.4.1. Supplier shall provide written notification to GLS when a non-conformance is determined to exist, or is suspected to exist, on product already delivered to GLS or a GLS customer.

2.19.4.2. Suppliers should include the following information when documenting the non-conformance:

- A clear description of the actual or suspected non-conformance
- Requirement or specification references
- Identifying information such as serial numbers
- Quantity affected and shipment dates
- Evidence of a root cause investigation and corrective actions taken

2.19.4.3. NDT rejections generated during the overhaul or repair process for a subcontractor would be governed/ dispositioned in line with the Component Maintenance Manual (CMM) or deviation approval to Boeing. This documentation should be provided to GLS as part of the documentation package for the work that was performed.

2.20. Disclosures

Suppliers shall notify GLS in accordance with FAA Advisory Circular 00-58, Voluntary Disclosure Reporting Program, when a disclosure event is identified.

2.21. Customer Returns

2.21.1. All items returned to the supplier by GLS or GLS's customer shall be documented.

2.21.2. Customer returns that result in a Disclosure shall be documented in accordance with FAA Advisory Circular 00-58, Voluntary Disclosure Reporting Program.

2.22. Service and Warranty

Service and Warranty components are defined as items returned by GLS or its customers to the supplier for evaluation, repair, and/or replacement.

2.23. Repairs

All repair and rework requires documented evidence of work performed. Copies of this evidence shall be returned with the repaired item. Copies of all required test reports, shall accompany the rework/repaired item(s). All documentation should also be identified with the GLS service work order and/or purchase order number.

2.24. Final Inspection and Shipment:

The Supplier shall submit an 8130-3 form or equivalent with shipment. Additional items may also accompany the shipment as required:

- Serialized Component list (the supplier is responsible for only the components replaced during the warranty or repair rework).
- Test Report Replaced items shall be accompanied by Certification of Compliance (i.e. cure dates for o-rings, seals).

2.25. Corrective Action Process:

2.25.1. Suppliers will be notified of a rejection or non-conformance in writing.

2.25.2. Product escapes to GLS, including products rejected by GLS at the supplier site, should be responded to within 30 days. Note: Response time may differ if Quality determines that there are circumstances that justify it (such as nature of issue).

2.25.3. The 5 Why process should be used for Supplier Requests for Corrective Action (SCAR). Confirmation of containment, root cause investigation, corrective actions taken, and objective evidence of effectivity should accompany the response.

2.25.4. The supplier shall contain and identify all suspect products including:

- Inventory
- Work in process
- Completed product pending final release
- Product in transit/shipped

2.25.5. Root cause investigations, corrective/ preventive actions and effectivity plans, or verification of effectivity should be returned to GLS within the time noted on the request.

2.25.6. Corrective Action Responsiveness: 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 changing the supplier's status to "HOLD" and may ultimately result in removal as an approved supplier. Part 145 Repair stations shall generate "tear down" reports and provide a Release Authorization Certificate form 8130-3.

2.26. Special Processes:

2.26.1. Special processes are those processes listed in GLS's Document 200 Approved Processors.

2.26.1.1. The GLS Document 200 approved processor listing is located on GLS's Supplier Shared Documents.

2.26.1.2. Special Process sources approved for use on GLS product are controlled by GLS on Document 200 Approved Processors.

2.26.1.3. Special processes performed by GLS facilities are not required to be listed in Doc 200. The sub-tier should coordinate the use of GLS facilities for special processing directly with the specific site.

2.26.2. Approval of Special Processors:

2.26.2.1. Requests for approval must be made in writing to Supply Chain Management using Using form LS-SBU-F001-SQA, Request for Processor Approval (available in the document control software system).

2.26.2.2. Approval is based on one or more of the following:

- NADCAP accreditation
- Existing customer approval (i.e. Boeing, Lockheed, and Airbus)
- GLS on-site audit of the Processor's quality system and/or special process.
- In Canada, NDT processors require Transport Canada Approval.

2.26.2.3. Processors that perform special processes that are NADCAP commodities are required to have NADCAP accreditation. Any exceptions to this requirement will be based on GLS Supplier Quality management review once the processor submits a request for waiver in writing.

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

2.26.2.5. Document 200 is the official GLS listing of approved processors. On occasions when new processors are approved by GLS but not evident pending revision of the public version of Document 200, an e-mail from GLS Supplier Quality Assurance may suffice as evidence of approval until the public version is revised.
In addition to DOC 200, approved processors may also be listed in a site's specific Approved Supplier List (i.e. Document 500).

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

2.27. <u>Supplier's use of Approved Processors:</u>

2.27.1. When GLS 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 GLS 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.

2.27.2. 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.

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

2.27.4. The supplier's purchase order shall flow down to the processor all applicable information required to perform work correctly to engineering and contractual requirements. The purchase order shall clearly specify the full scope of processing to be performed, non-standard 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 GLS as the supplier's direct customer.

2.28. Supplier/Processor Risk Assessment:

GLS approved suppliers/processors will be monitored for risk.

References

Document Number	Document Title
SAE AS9100	Quality Systems – Aerospace – Model for Quality Assurance in Design, Development, Production, Installation and Servicing
SAE AS9102	Aerospace, First Article Inspection Requirements
ISO 9001	Quality Management Systems — Requirements
AS9110	Quality Management Systems – Requirements for Aviation Maintenance Organizations
Document 200	GLS Processor Listing
ISO 10012-1:1992	Quality Assurance Requirements for Measuring Equipment
SOPM 20-44-02	Temporary Protective Coatings
LSPS 1000	Corrosion Protection of Parts
Title 14 FAR Part 145	FAA Repair Station Certificate Regulations
CAR 571 & 572	Transport Canada Regulations
LS-SBU-A001-SQM	Supplier Quality Management
Document 500	Approved Supplier List for Miami

Revision Description

Revision Date	Description of Change
8/24/2022	Transferred from LS-LS-W001-SQA & updates throughout document.
12/28/2023	Added instructions for Drop Shipments. Added Document 500 to list of references.