

# Ferco Aerospace Work Instruction

**Title:** Supplier Quality Assurance Manual

**Procedure Number:** FTQ-02-Q-0550

**Revision:** New

**Date:** 8/5/2020

Page 1 of 14

## ACKNOWLEDGEMENT

This document defines supplier quality requirements as created by Ferco Aerospace.

Ferco Aerospace consists of two affiliated companies:

Ferco Tech, LLC located at 291 Conover Drive, Franklin Ohio 45005 USA

L&E Engineering, LLC located at 254 N. Graham Rd. Greenwood, IN 46143 USA

When a supplier falls within the scope of this Supplier Quality Assurance Manual, the requirements contained herein are to be applied.

I have reviewed and understand the requirements of the Ferco Aerospace Supplier Quality Assurance Manual.

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Signature of Authorized Supplier Representative

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Title

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Date

Print this page and sign the document then return to Ferco Aerospace

Forward signed copy to SQE to file in Supplier folder.

<b>TABLE OF CONTENTS</b>	<b>2</b>
<b>1. SCOPE</b>	<b>3</b>
<b>2. REFERENCES</b>	<b>3</b>
<b>3. TERMS AND DEFINITIONS</b>	<b>3</b>
3.1 FERCO AEROSPACE	3
3.2 SPECIAL PROCESSES	3
3.3 TRACEABILITY	3
3.4 SUPPLIER TYPES	3
<b>4. General Requirements</b>	<b>4</b>
4.1 GENERAL REQUIREMENTS	4
4.2 COMMUNICATION WITH FERCO AEROSPACE	5
<b>5. QUALITY MANAGEMENT SYSTEMS (QMS)</b>	<b>7</b>
5.1 COMPLIANCE AND REQUIREMENTS FLOWDOWN	7
5.2 DOCUMENTED INFORMATION (MAINTAINED AND RETAINED)	7
5.3 CONTROL OF NON-CONFORMING PRODUCT AND CORRECTIVE ACTIONS	8
<b>6. PRODUCTION PLANNING AND CONTROL</b>	<b>8</b>
6.1 IDENTIFICATION AND TRACEABILITY	8
6.2 COMPETENCY	8
6.3 MANAGEMENT OF SUPPLY CHAIN	9
6.4 PRODUCTION PROCESS VALIDATION	9
6.5 MONITORING AND MEASUREMENT OF EQUIPMENT	9
6.6 MONITORING AND MEASUREMENT OF PRODUCT	10
6.7 SPECIAL PROCESSES	10
6.8 INTERNAL AUDITS	11

## 1. SCOPE

The requirements of this document apply to all suppliers that furnish product, material, processes, or product related services to anyone in Ferco Aerospace as a contractual requirement regardless of Supplier's industry, regulatory accreditation, or certification status, and each Supplier shall be responsible for ensuring that all members of its supply chain comply with the requirements set forth herein.

Suppliers who only provide product that does not directly affect the form, fit or function of Ferco Aerospace customer's parts (excluding calibration, inspection and testing suppliers) are exempt from the requirements of this document and therefore do not need to sign the acknowledgment.

## 2. REFERENCES

## 3. TERMS AND DEFINITIONS

**3.1. Ferco Aerospace** consists of two affiliated companies:

- Ferco Tech, LLC located at 291 Conover Drive, Franklin Ohio 45005 USA
- L&E Engineering, LLC located at 254 N. Graham Rd. Greenwood, IN 46143 USA

**3.2. Special Processes** – A special process is any production or service process which generates products or services which cannot be measured, monitored or verified prior to delivery and use.

**3.3. Traceability** – Traceability is the ability to trace all processes from procurement of raw materials to production, consumption and disposal to clarify when and where the product was produced and by whom.

### 3.4. Supplier Types

The Supplier Types used in this document are as follows:

Design Part Manufacturer	Supplier of products and/or assemblies with Ferco Aerospace-designated part numbers as defined on proprietary drawings or other technical definitions (also known as Build To Print (BTP) parts)
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Calibration Service Provider	Organization qualified to perform calibration and verification services on Measuring and Test Equipment (monitoring and measuring equipment) used in the production of products.
Design Responsible Supplier	Supplier of products defined by a design/drawing proprietary to that supplier and linked to a Customer part number through the use of a Customer-referenced drawing and/or other purchase order requirements (Source Control, Source Design, Engineered Item).
Distributor	Organization carrying out the purchase, storage, splitting, and sale of products and not transforming, assembling, or otherwise modifying purchased product. Distributors are limited to raw material, industry standard, and Commercial-Off-The-Shelf (COTS) parts.
Industry Raw Material Manufacturer	Manufacturer of raw material that conforms to an established industry or national authority-published specification (e.g., Aerospace Material Specification (AMS))
Industry Standard Part Manufacturer	Manufacturer of parts for which the design, manufacturing, inspection data, and marking requirements necessary to demonstrate conformity of the part are in the public domain and published or established as part of officially recognized standards (e.g., AN (Air Force-Navy Aeronautical Standard), AS (Aerospace Standard), MS (Military Standard), NAS (National Aerospace Standard)).
Laboratory Service Provider	Organization performing testing (e.g., chemical, metallurgical, electrical).
Special Process Supplier	Supplier that only provides special processes on Ferco Aerospace products (i.e., not a part manufacturing supplier).

#### 4. GENERAL REQUIREMENTS

##### 4.1. General Requirements

- 4.1.1. It is the responsibility of the Supplier to obtain the latest revisions of all documents specified by the Purchase Order, Drawings and Ferco Aerospace Terms and Conditions of Purchase. Requests can be made through the Buyer listed on  
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the Purchase Order.

- 4.1.2. All Certificates of Conformance (“CofC”) shall include the following information on the CofC to Ferco Aerospace and include full traceability:
  - 4.1.2.1. Supplier Name and Address
  - 4.1.2.2. Unique CofC Number
  - 4.1.2.3. Customer Name and Address
  - 4.1.2.4. Ferco Aerospace Job or Lot Number as shown on Ferco purchase order
  - 4.1.2.5. Certificate Date
  - 4.1.2.6. Ferco Purchase Order Number and Line Number
  - 4.1.2.7. Part Number
  - 4.1.2.8. Part Description
  - 4.1.2.9. Quantity
  - 4.1.2.10. Specification Numbers and Revisions (All that apply)
  - 4.1.2.11. Data or Results (if required)
  - 4.1.2.12. End User (if required)
  - 4.1.2.13. Statement of Compliance to all requirements
  - 4.1.2.14. Signature of Person with authority to sign that all is correct and compliant
  - 4.1.2.15. Title of Person signing
  - 4.1.2.16. Date signed
- 4.1.3. CofC for product involving the use of raw material shall have full traceability back to the original raw material mill and shall include the above information and the following additional information on the CofC to Ferco Aerospace:
  - 4.1.3.1. Material Specification Number and Revision
  - 4.1.3.2. Heat number of raw material
  - 4.1.3.3. Additional certifications as required by Ferco purchase order.
- 4.1.4. Order of Precedence
  - 4.1.4.1. In cases where there is a difference between documents provided to the supplier, the order of precedence shall be:
    - a) Applicable Ferco Aerospace Drawing
    - b) Procurement Documentation (excluding this document)
    - c) This document
    - d) Specifications and certifications referenced by this document
- 4.1.5. Suppliers receiving a purchase order from Ferco Aerospace shall maintain a Quality Management System that is in compliance with [AS9100](#), [ISO 9001](#), [ISO 17025](#), [NADCAP](#), or [IATF16949:2016](#).
- 4.1.6. All Distributors in the supply chain shall be certified by  
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an industry accredited body to [AS9100](#), [AS9120](#), [ISO 9001](#), or [IATF16949:2016](#).

4.1.7. Supplier providing Calibration and Testing Services shall comply with one of the following requirements: ISO 10012, ISO 17025, Nadcap, ANSI/NCSL Z540.3 or Manufacturer's specifications. If using ANSI/NCSL Z540.3, Supplier shall implement the requirements using the Handbook for the Interpretation of ANSI/NCSL Z540.3.

4.1.8. If Pratt & Whitney (or any variant of their name such as PW) is listed on the PO, all suppliers of metallic raw material shall be Pratt & Whitney LCS certified.

4.1.8.1. If the supplier is not LCS certified, they shall notify the buyer immediately before accepting the order and get written approval that this is acceptable from the Ferco buyer before proceeding. This written acceptance is only valid for the purchase order it is requested and shall not be considered an ongoing approval.

4.1.9. If General Electric (or any variant of their name such as GE) is listed on the PO, any metallic raw material that is used in the final product shall be purchased from a GE S400/S1000 compliant mill.

## **4.2. Communication with Ferco Aerospace**

### **4.2.1. General Communication Requirements**

4.2.1.1 Supplier shall only accept agreements and instructions in writing (e.g., purchase orders, purchase order supplements/amendments). Verbal agreements and instructions shall not be construed as Ferco Aerospace approval or authorization.

- Any changes to the product, terms, or PO requirements require both Ferco quality and Ferco engineering to sign off otherwise it is not considered an approved change and the supplier will be responsible for all related costs and needs for corrective action.

4.2.1.2 For communication with the Ferco Aerospace, Supplier shall have the capability to communicate in English including the following documents unless otherwise approved by the Ferco Aerospace:

- Quality Manual

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- First level Quality procedures
  - Process documentation requiring Ferco Aerospace approval
  - Records related to items provided to Ferco Aerospace
  - All formal communication (Ferco Aerospace-specific Forms, FAI, PPAP documents)
- 4.2.1.3 The supplier shall notify Ferco Aerospace in writing within 24 hours of becoming aware of any non-conformance that affects items that have already been supplied to or in transit to Ferco Aerospace.
- This includes any loss in status of an accreditation, even if that accreditation does not apply to items supplied to Ferco Aerospace.
- 4.2.1.4 The supplier shall notify Ferco Aerospace in writing within 2 business days when it becomes aware of an upcoming closing to the business or a change in business ownership.
- If the supplier will be permanently closed, they shall provide sufficient opportunity to Ferco Aerospace to obtain all retained documentation information related to items supplied to Ferco Aerospace. Sufficient time shall be no less than 2 months.

#### 4.2.2 Methods of Communication

- 4.2.2.1 Supplier shall submit [FRM-Q-0550-01](#) for all formal communications and requests with respect to Ferco Aerospace requirements.

[FRM-Q-0550-01](#) is used for items such as:

- Clarification, interpretation, or identified error with a drawing, specification, or requirement
- A request for an approval to use an alternate method to comply with a Ferco Aerospace quality system requirement (use of an alternate method is not permitted without prior Ferco Aerospace approval)
- Supplier shall notify Ferco Aerospace in writing prior to any planned work transfers (e.g., from one supplier facility to another, from the supplier to a member of its supply chain, from one member of its supply chain to another). Prior approval shall be obtained using [FRM-Q-0550-01](#) when required by Ferco Aerospace.

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- 4.2.2.2 Any and **all US EAR or US ITAR** documents shall be transmitted using <https://fercoaerospace.govftp.com/> - to request an account contact Ferco Aerospace buyer. You will have one access per company. Please supply buyer with Name and email address of person that will be responsible. Note: In the event of an identified escape, the supplier is to notify Ferco Aerospace immediately via email or phone.
- 4.2.2.3 Supplier shall notify Ferco Aerospace in writing, prior to implementation of any change that may affect quality and/or product fit, form, or function using form [FRM-Q-0550-01](#). (e.g., a change in: design characteristic, manufacturing or assembly process, inspection method, tooling, materials, numerical control program or translation to another media).
- 4.2.2.4 Supplier shall permit Ferco Aerospace access to all data in OASIS and Nadcap databases (e.g., registration documentation, certification, audit reports and findings, corrective actions).

## **5 QUALITY MANAGEMENT SYSTEMS (QMS)**

### **5.1 Compliance and Requirements Flow down**

- 5.1.1 Supplier shall comply with the latest revisions of Ferco Aerospace specific requirements, and other documents referenced herein.
- 5.1.2 Supplier shall have a process for Contract Review utilizing a cross functional team for the review.
- Any discrepancies between the Ferco Aerospace purchase order requirements and the suppliers offer shall be resolved prior to proceeding.
- 5.1.3 Supplier shall prevent and mitigate the use of counterfeit parts. Suppliers shall comply with the requirements of AS5553 for electronic components and AS6174 for non-electronic products.
- 5.1.4 Supplier shall have basic processes in place for general housekeeping to prevent product contamination by Foreign Object Debris (FOD). The supplier may refer to AS9146 for general guidance for FOD Prevention Programs.
- 5.1.5 Ferco Aerospace, its representatives, its customers and its customer's governmental agencies and regulatory agencies shall have the right of entry into a supplier's facility or that of their subcontractors, suppliers and/or business partners. Access will be

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provided to quality system documentation and quality records as well as the ability to conduct audits and verify product and processes.

## **5.2 Documented Information (maintained and retained)**

- 5.2.1 Permanent marking methods shall only be used on documented information. The use of pencils is strictly prohibited.
- 5.2.2 Changes to documented information (e.g., work instructions, travelers, routers, test reports, shipping documents) shall be recorded, dated, and traceable to a qualified person making the change (e.g., name, signature, stamp, electronic signature) with a permanent marking method and the original information being legible and retrievable after the change.
- 5.2.3 Records required to provide evidence of conformance shall be retained for a minimum of 10 years.
- 5.2.4 Before destroying any retained records, the supplier shall contact Ferco Aerospace in writing and allow them a period of 1 month to obtain the records that are to be destroyed.
- 5.2.5 Retained records shall remain legible and be sent to Ferco Aerospace within 2 business days from the date that it is requested.
- 5.2.6 Electronic documented information shall be protected from loss and any changes (whether intentional or not). At the minimum, it shall be backed up on a separate device once per week.
- 5.2.7 When the organization becomes aware of the loss or destruction of documented information, it shall notify Ferco Aerospace within 2 business days.

## **5.3 Control of Non-Conforming Product and Corrective Actions**

- 5.3.1 Supplier shall have a process for control of non-conforming product. The process shall provide for segregation and positive identification of non-conforming product.
- 5.3.2 Supplier shall have a root cause and corrective action process to address and correct deficiencies in its system that has or could lead to non-conforming product.
- 5.3.4 If Ferco Aerospace issues a corrective action request, the supplier has 2 days to acknowledge the nonconformance, 15

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days to complete and submit the root cause analysis and 30 days to implement and submit Corrective Action plan.

- 5.3.5 Supplier shall inform Ferco Aerospace within 24 hours of discovery of suspect non-conforming product having been shipped regardless of destination using [FRM-Q-0550-01](#).
- 5.3.6 All product rework shall have documented work instructions. Supplier shall request and obtain approval for rework of product subject to frozen process control.

**Note:** *Non-conforming product not subject to frozen process control, that can be reworked to meet all product requirements within the existing manufacturing process does not require Ferco Aerospace notification or request for approval/disposition.*

## **6. PRODUCTION PLANNING AND CONTROL**

### **6.1. Identification and Traceability**

- 6.1.1. The supplier shall maintain full traceability from procurement through production and shipping.
- 6.1.2. Records documenting traceability shall be maintained and supplied upon request.
- 6.1.3. All product shall be identified throughout the production process and include product status.

### **6.2. Competency**

- 6.2.1. The Supplier shall determine the necessary competence required of person(s) doing work under its control.
- 6.2.2. Supplier shall ensure that these persons are competent on the basis of appropriate education, training, or experience.
- 6.2.3. Where applicable, take actions to acquire the necessary competence, and evaluate the effectiveness of the actions taken.
- 6.2.4. Retain appropriate documented information as evidence of competence.

### **6.3. Management of Supply Chain**

- 6.3.1. Supplier shall ensure that the members of its supply chain are compliant to the applicable requirements contained herein.

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6.3.2. To prevent and mitigate the use of counterfeit parts, suppliers to Ferco Aerospace and all members of their supply chain, including Distributors, shall comply with the requirements of AS5553 for electronic components and AS6174 for non-electronic product.

6.3.3. The use of material and hardware with broken traceability or sourced from a non-authorized supplier is prohibited unless approved by Ferco Aerospace. Supplier shall request and obtain approval using [FRM-Q-0550-01](#) prior to shipment.

## 6.4 Production Process Validation

### 6.4.1 First Article Inspection (FAI)

6.4.1.1 Where required by Ferco Aerospace Purchase Order, a FAI shall be documented and performed in accordance with [AS9102](#). The FAI bundle shall be submitted to Ferco Aerospace and include the following:

- A replication of product part marking (e.g., photograph or sample) that represents production marking shall be included with the FAI report.
- A photograph(s) of the part.
- For an assembly level FAI, all lower level and detail FAIs shall be included in the FAI Report.

6.4.1.2 Additional requirements for [AS9102 FAI Form 1](#):

- Field 11, Supplier Code: Record Ferco Aerospace-assigned supplier code
- Field 12, Purchase Order Number: Record Ferco Aerospace purchase order number

6.4.1.3 Additional requirements for [AS9102 FAI Form 3](#):

- Field 8, record the unit of measure for each characteristic as applicable.
- Field 14, for each characteristic: Record type of inspection measuring equipment used (e.g., gage name, type, description) and inspector identification (e.g., signature, stamp, electronic authorization) of the person that accomplished the inspection

## 6.5 Monitoring and Measurement of Equipment

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- 6.5.1 Monitoring and measurement equipment shall be calibrated or verified, or both, at specified intervals, or prior to use, against measurement standards traceable to international or national measurement standards; when no such standards exist, the basis used for calibration or verification shall be recorded and retained.
- 6.5.2 Monitoring and measurement equipment shall be identified in order to determine their status.
- 6.5.3 The supplier shall establish, implement, and maintain a process for the recall of monitoring and measuring equipment requiring calibration or verification.
- 6.5.4 Supplier shall document an impact review whenever monitoring and measuring equipment is identified with an Out-Of-Tolerance condition and notify Ferco Aerospace within 24 hours of discovery if impacted product has been shipped.

## **6.6 Monitoring and Measurement/Calibration of Product**

- 6.6.1 Supplier shall select monitoring and measuring equipment with a minimum accuracy ratio of 4 to 1 unless otherwise specified (i.e. the item measuring/calibrating shall have an accuracy that is 4 times better than the accuracy that it is measuring/calibrating).
- 6.6.2 Supplier shall perform MSA on all measurement systems used to measure Key Characteristics (KCs) or calibrate/test Ferco supplied products.
- 6.6.3 When performing MSA, supplier shall comply with the MSA minimum requirements according to AS13003 with the following exception:
  - The acceptable precision to tolerance ratio (Gage R&R) is  $\leq 20\%$
- 6.6.4 Supplier shall have a process for on-going verification of visual acuity and color vision for individuals performing product inspection.
- 6.6.5 Inspection Sampling
  - 6.6.5.1 Product acceptance sampling inspection shall be a minimum of 2.5 AQL for COTS type parts. Identification of any non-conformances in the sample shall require 100% inspection of the lot for the affected characteristic(s).

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- 6.6.5.1 All other product types shall be 100% inspected unless a sampling plan has been customer approved.

## **6.7 Special Processes**

- 6.7.1 QMS certification: Special Process Suppliers shall be certified to [AS9100](#) or Nadcap [AC7004](#).
- 6.7.2 For each of the following special processes, any supplier in the supply chain shall be Nadcap accredited:
- Chemical Processing
  - Coatings
  - Heat Treating
  - Materials Testing Laboratories
  - Nonconventional Machining and Surface Enhancement
  - Nondestructive Testing
  - Welding

**Note:** *Special process categories are defined by Performance Review Institute (PRI).*

## **6.8 Internal Audits**

- 6.8.1 Supplier shall perform annual internal audits to evaluate the effectiveness of their Quality Management System.
- 6.8.2 Internal audits shall be objective in nature.
- 6.8.3 Supplier shall assure that persons performing internal audits are competent based on appropriate training, education and/or experience.
- 6.8.4 Records of the internal audits shall be maintained.

### Revision History

Rev	Description	Prepared By	Date Issued
New	Operating Procedure	D. Holder	8/5/2020

### Approvals

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