

# Supplier Quality Requirements

Revision A – Dated June 01, 2016

# EXTEX

## Engineered Products

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\*\*\*IMPORTANT\*\*\*

SUPPLIERS MUST COMPLY WITH SUPPLIER REQUIREMENTS MANUAL (SRM) AND SUPPLEMENTAL QUALITY REQUIREMENTS (SQR) (WHERE APPLICABLE) IN ADDITION TO THE PURCHASE ORDER AND DESIGN DATA REQUIREMENTS. IF IN CONFLICT, PRECEDENCE SHALL BE IN THE FOLLOWING ORDER: (1) EXTEX DESIGN DATA (2) EXTEX PURCHASE ORDERS (3) EXTEX SUPPLEMENTAL QUALITY REQUIREMENTS (4) EXTEX TERMS AND CONDITIONS.

## 1. APPLICABILITY

The Supplemental Quality Requirements in this document pertain to EXTEX designed product purchase orders.

## 2. SUPPLIER CONTROL

Only suppliers **APPROVED BY EXTEX Engineer Products, Inc (EXTEX)** are authorized to manufacture and/or process EXTEX designed product (including **SUB-SUPPLIERS** unless otherwise specified).

**Preapproval of sub-supplier(s) is necessary to prevent rejection of completed and/or delivered parts due to unapproved or disapproved sub-supplier(s).**

**Sub-suppliers must be approved by EXTEX before parts can be accepted through the EXTEX quality system, except where the top tier supplier has been approved by EXTEX in writing to manage their own sub tier suppliers.**

EXTEX performs onsite audits of its direct suppliers every three years in accordance with our FAA approved supplier control procedure. EXTEX requires its active direct suppliers and their sub-suppliers to complete mail-in audit surveys annually to retain their approval status on EXTEX's Approved Supplier List (ASL).

EXTEX, government representatives, or regulatory agencies (FAA) reserve the right of entry to survey the facilities and review processes, procedures, parts, and records to ensure that product conforms to specified requirements.

Suppliers may request a list of EXTEX approved suppliers by contacting the EXTEX purchasing department.

Definition	Requires EXTEX approval	Does Not Require EXTEX approval	On-site Audit (every 3 years)	Mail in Survey (every Year)
Direct supplier	X		X	X
Casting or Forging Supplier	X		X	X
Special process supplier that is NADCAP accredited	X			X
Special process supplier that is not NADCAP accredited	X		X	X
Machining sub-suppliers whose work is not (or is unable to be) verified through dimensional inspection	X			X
Machining sub-suppliers whose work is verified through dimensional inspection.		X		
Provides services such as testing, or engineering services.	X			X

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Provides raw material as either a distributor and/or mill source.	X			X
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### 3. SUPPLIER CHANGE IN NAME, LOCATION, QUALITY MANAGEMENT OR OWNERSHIP

EXTEX requires suppliers to notify EXTEX's Quality Department in writing whenever there is a change in the supplier's name, location, Quality Management, or Ownership prior to the shipment of the next purchase order.

Suppliers shall be required to complete a mail-in audit survey whenever there is a change in the supplier's Name, Quality Management, or Ownership prior to the shipment of the next purchase order.

In the event of a location change, suppliers shall be required to complete a mail-in audit survey prior to moving to the new location. EXTEX may follow up with an onsite audit if it is determined to be necessary. EXTEX will notify the supplier of any requalification requirements (e.g. First Article, Metallurgical Testing, etc.).

This is necessary to maintain the supplier's listing in EXTEX's Approved Supplier List (ASL).

### 4. INFORMATION FLOW DOWN TO SUB-TIER SUPPLIERS

**Suppliers shall flow down to their sub-tier suppliers applicable EXTEX purchase order requirements**, EXTEX Supplier Requirements Manual, EXTEX Supplemental Quality Requirements, applicable specification(s), standard(s), design data, and approved supplier listing.

### 5. CONTRACT REVIEW

Contract review must be conducted by the supplier upon receipt of the purchase order\* from EXTEX. Upon completion of the contract review the supplier will sign the purchase order in the designated purchase order acknowledgement section and forward to EXTEX Purchasing. Expected return of acknowledgement to EXTEX is no later than 7-10 working days after receipt of purchase order by supplier. Suppliers may submit their formal sales order acknowledgement form in place of the supplier signed EXTEX purchase order as long as it reflects all required acknowledgment information and is signed.

Supplier response to the purchase order acknowledgement accepts the following: purchase order part, revision, quantity, price and delivery; EXTEX Purchase Order Terms and Conditions; EXTEX Supplier Requirements Manual; EXTEX Supplemental Quality Requirements; Purchase order Quality requirements; and other instructions or requirements specified within the purchase order.

#### **Purchase order acknowledgement is required for:**

- Each purchase order and change order for manufacture of EXTEX designed parts
- Each purchase order for non-EXTEX designed parts
- Each purchase order for testing or inspection
- Once each year for all purchase orders from suppliers of non-product related services, industry standard hardware and supplies for equipment or facility repairs.

Included with the signed purchase order acknowledgement the supplier is required to provide the list of sub-suppliers that will be used in the manufacture of the part number(s) on the purchase order if the part number(s) are **new to the supplier or if there are changes to sub-suppliers since last time manufactured**. The sub-supplier information to be listed is:

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- Sub-supplier name
- Location
- Process to be performed

The sub-supplier list will not be required once a Fixed Process Plan is approved by EXTEX unless if there are changes to sub-suppliers since the approval of the Fixed Process Plan.

*\*Purchase order refers to the document that may be titled "Purchase order", "Repair Order", "OSP Order", or "Change order"*

## 6. **RESTRICTED ELEMENTS**

All products and/or services provided to EXTEX will not come in contact with, or be exposed to, mercury bearing instruments or equipment, or mercury in any other form.

## 7. **BILL OF MATERIALS (BOM)**

The BOM table in EXTEX drawings identifies the necessary details needed to fabricate the assembly. Suppliers may decide to procure or manufacture the necessary details based on the following conditions:

**NOTE: If you received parts that are not listed in the BOM table of the EXTEX drawing, contact EXTEX Quality immediately to verify part applicability.**

7.1. **Procure Option** – Suppliers may procure non-EXTEX, or EXTEX details as listed on the EXTEX assembly drawing. Supporting documents (i.e. packing list, Certificate of Conformity, FAA Form 8130-3) must show traceability to the manufacturer or EXTEX and be submitted to EXTEX. (Note: Supplier is not permitted to procure an alternate part number unless that alternate is listed on the EXTEX BOM)

7.2. **Manufacture Option** – Suppliers can manufacture details using part numbers, design data, and assembly drawings provided to the supplier by EXTEX if the part number is listed on the EXTEX assembly drawing.

## 8. **TRACEABILITY**

### 8.1. **Raw Material Control**

- ***Material must be traced back to the original melt source.***
- ***Material certifications from the melt source are required.***
- ***The original melt source (mill source) must be preapproved by EXTEX, except where supplier has been approved by EXTEX to manage their sub-tier suppliers.***
- Material master heat control required. Master heat numbers must be traceable to a specific manufacturing lot or serial number.
- *Forgings* – In addition to drawing and specification requirements, grain flow results are required with the first article or when requested by purchase order.
- *Castings* – Each master heat must be tested to EXTEX design data and specification requirements.

8.2. **Lot Control** – Suppliers maintain material / product traceability from receipt, through all stages of production including sub-supplier processing, until delivery to EXTEX.

- **Material traceability begins with an individual raw material heat/batch number or equivalent.**
- Metal processes shall be traceable back to the master heat of the material.

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- Certifications must be traceable to the material/product specified on the inspection documents.
- Casting and forging lots cannot contain more than one material heat / batch number.

8.3. **Serialized Parts** – EXTEX identifies serialization requirements on its purchase orders and/or design data.

- If SERIALIZATION is marked YES on the PO, EXTEX provides a BASE S/N: (i.e. TA15-xxx).
- The supplier then generates and maintains a list of serial numbers shipped to EXTEX.
- Begin initial production runs with serial number -051 or higher. Do not use -001 as the first serial number.
- Do not duplicate serial numbers that have been previously shipped.

## 9. **FIXED PROCESS CONTROL**

9.1. Suppliers must submit fixed process planning changes and/or documents for review and approval by EXTEX Engineering and Quality under the following conditions:

- When requested by EXTEX Engineering or Quality representatives
- When identified as a Fixed Process Part (Yes) on a EXTEX Purchase Order
- When noted as 'Flight Safety' or 'Engineering Source Approval Required' on drawings
- When noted as 'Fixed Process Planning Required' for 'xxx' where 'xxx' is the specific process, processes or details that require fixed process on drawings.
- When there is any change to the fixed process (e.g. supplier change, process brought in-house, etc.)

9.2. Each fixed process document shall include:

- Identification that the process is "Fixed" or "Frozen" or otherwise requires EXTEX approval of changes;
- The Supplier name;
- EXTEX part number and drawing revision letter;
- Revision control (supplier to provide revision history summary with fixed process plan)

9.3. In addition to the above, a fixed process from top tier suppliers shall include the following:

- **Sequence of operations**: all necessary operations including raw material release, part fabrication, special processes, in-process inspections, part marking and final inspection;
- **Part Accountability**: Router includes an approval for each operation (via sign off or similar mechanism) prior to releasing parts for the next operation and a method of tracking the quantity of parts through each operation.
- **Inspection Plan**: Identifies in process inspections of finished dimensions that cannot be verified on the finished product due to subsequent operations.
- **Material**: Includes the EXTEX material specification and identifies the raw material supply chain map to the melt source unless material is supplied by EXTEX. Each material supplier must be identified by name.
- **Special processes**: Include the EXTEX specification requirements for all special processes or refers to the appropriate drawing note. Suppliers must be listed by name.
- In cases where a supplier's proprietary process is used, the fixed process must be maintained by the supplier at their facility and available for review at their facility by EXTEX, government representatives, or regulatory agencies (FAA) upon request.

EXTEX approval of an outside supplier's FPP (fixed process plan) does not guarantee acceptance of product and does not relieve the supplier of the responsibility for delivering product that conforms to design data and EXTEX purchase order requirements.

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Fixed or Frozen Processes that are currently approved by EXTEX, will not require a new Fixed Process Plan. The current approved FPP's will be "Grandfathered" in.

## 10. INSPECTION REQUIREMENTS



### 10.1. CRITICAL FEATURES and FIT CHARACTERISTICS

EXTEX identifies critical features in the notes of the design data and uses a critical feature symbol  to denote critical features within the drawing.

EXTEX identifies fit characteristics in the notes of the design data and uses a fit characteristic symbol  to denote fit characteristics within the drawing.

Direct suppliers and sub-suppliers are responsible for ensuring conformance to the drawing through 100% inspection and documentation of critical features and fit characteristics.

Inspection results of critical features and fit characteristics must be submitted to EXTEX as part of the inspection report. Serialized parts must have individual results recorded by serial number.

EXTEX will not disposition 'Accept as is' for any deviation to a Critical  or fit clearance  feature. RMRA's submitted for a critical or fit clearance feature requires a supplier proposed rework or repair process that must be approved by EXTEX.

### 10.2. ALL OTHER FEATURES

Suppliers shall sample inspect all other features in accordance with ANSI/ASQC Z1.4 or equivalent. The **acceptable defect rate is zero** so if any defect is detected the supplier shall inspect 100% of that feature for the affected lot. The inspection results of these features shall be submitted to EXTEX as part of the inspection report.

### 10.3. SURFACE ROUGHNESS INSPECTION METHOD

Bearings:

EXTEX requires suppliers to use a direct method when inspecting surface roughness on machined surfaces with a finish requirement of 20Ra or less such as a profilometer or approved equivalent. Surface roughness requirements cannot be inspected by visual inspection alone or comparison to a known standard unless if the area is inaccessible to direct measurement.

All other Parts:

EXTEX requires suppliers to use a direct method when inspecting surface roughness on machined surfaces with a finish requirement of 32Ra or less such as a profilometer or approved equivalent. Surface roughness requirements cannot be inspected by visual inspection alone or comparison to a known standard unless if the area is inaccessible to direct measurement.

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## 10.4. NOISE TEST (BEARINGS ONLY)

EXTEX requires suppliers to perform and pass noise test on a minimum of five (5) bearings from the **first production lot** unless otherwise specified by EXTEX purchase order. Suppliers must perform the noise test using the EXTEX bearing analyzer model BA-96 (or other EXTEX approved method). Noise acceptance limits will be equal to or better than values provided by EXTEX. Bearing Acceptance Limits are contained in EXTEX QWI-014.

If any of the five (5) bearings from the first production lot fail the noise test, then 100% of the bearings from that lot must be tested. Five (5) bearings from each of the next three (3) subsequent lots must be tested and pass the noise test. Once three (3) successive lots pass noise test, the supplier will have complied with this requirement. Suppliers may rework bearings which fail noise test to bring them within noise acceptance limits.

## 10.5. INSPECTION AND TEST REPORT

Supplier's Inspection Test Reports shall include the following information as a minimum:

- Part number
- Revision letter
- Purchase order number
- Lot number
- Lot quantity
- Inspection sample size
- Characteristics inspected and/or tested
- Method and/or gauge used during inspection
- Method used to measure
- Inspection test data
- Quantity passed and rejected by characteristic
- Date of inspection or test
- Signature or stamp of supplier's inspection or test representative.

## 10.6 GEAR INSPECTION

Supplier shall provide gear charts to EXTEX with each shipment of parts. Each gear chart must properly identify part number and serial number. Sample rate is based on the following criteria:

- AGMA class Q10 or higher requires 100% inspection.
- AGMA class Q9 or lower will require at least 1 gear chart per manufacturing lot unless otherwise specified by EXTEX purchase order.

## 10.7 WORKMANSHIP

Suppliers must only ship product that meets EXTEX drawing requirements, or obtain a written deviation approval (RMRA) prior to shipment for any non-conforming product.

Suppliers shall submit an RMRA to EXTEX for review and disposition prior to shipping product that exhibit workmanship issues similar but not limited to the following:

- Nicks
- Dents
- Scratches

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- Bent Parts
- Burrs
- Cracks
- Pits
- Raised Metal
- Rust or Corrosion

## 11. CERTIFICATIONS

- Suppliers shall provide a Certificate of Conformance (CofC) for each shipment and lot made to the EXTEX purchase order. This includes copies of all sub-supplier certifications.
- Certifications include, but are not limited to: Raw Material, Test Reports, Inspection Reports, Heat Treat, NDT, Plating and Coating, and Manufacturer's Certificate of Conformance.
- The CofC details all pertinent work performed by the supplier and signed by the Supplier's Responsible Quality Representative as evidence that the deliverable product conforms to stated requirements.
- The CofC includes the following information as a minimum:
  - Supplier's name
  - Quantity of shipment
  - Lot numbers/date codes/serial numbers (when applicable)
  - EXTEX part number and drawing revision
  - Country in which the part was manufactured
  - EXTEX purchase order number
  - Statement that all other applicable requirements as called out by the purchase order, drawings, or specifications have been met.

## 12. FIRST ARTICLE REQUIREMENTS

- 12.1. EXTEX requires suppliers to perform a full First Article Inspection (FAI) or a partial FAI for affected characteristics and document results in accordance with AS9102 (latest revision) or equivalent.

First Article Inspections may be performed internally by the supplier or by an independent 3<sup>rd</sup> party under the following conditions:

- As required by marking First Article Required on the purchase order
  - If there are multiple shipments on the same purchase order, only the first shipment of that purchase order will require a first article inspection report.
- First production run (i.e. process qualification, new revision level, first piece inspection, etc.)
- A EXTEX drawing or specification change affecting fit, form, or function of the part (excludes administrative changes to correct typographical errors, company information, change drawing format, etc.) Partial FAI to validate changes of affected characteristics is acceptable.
- A significant change to the manufacturing source(s), process(es), inspection method(s), location of manufacture, tooling or materials that can potentially affect fit, form, or function. Suppliers shall notify EXTEX in writing of any significant changes. EXTEX will then notify the supplier whether a full or partial FAI is required.
- A change in software, numerical control program, or translation to another media that can potentially affect fit, form, or function.
- A natural or man-made event, which may adversely affect the manufacturing process.
- A lapse in production of two (2) years or as specified by EXTEX.

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When a First Article Inspection is required for an assembly, the components of that assembly will also require a First Article Inspection. This should be completed prior to the assembly of the article.

- 12.2. A copy of the AS9102 standard can be found at [www.sae.org](http://www.sae.org). Suppliers who submit equivalent FAI Reports must meet the requirements of AS9102 (latest revision).

## 13. SOURCE INSPECTION

- 13.1. When SOURCE INSPECTION is marked YES on the EXTEX purchase order, contact the Quality Manager at EXTEX within 4 weeks prior to the completion of the product to schedule a EXTEX inspector or an inspector designated by EXTEX to perform a source inspection at the supplier or sub-supplier's facility as required. When noted on the EXTEX purchase order, the supplier or sub-supplier must allow a government source inspector to perform all necessary inspections at their facility.

- 13.2. During the source inspection, the supplier or sub-supplier provides the following information:

- Copy of EXTEX Purchase Order
- Copy of EXTEX drawing
- Copy of EXTEX Supplier Quality Requirements
- Suppliers manufacturing package
- All sub-supplier certifications
- First Article inspection results (if applicable)
- Test Reports (if applicable)
- Final inspection report(s)
- Finished product
- Access to the necessary inspection equipment
- Any additional information needed at the time of source inspection.

Any additional information required by the source inspector will be communicated to the supplier in advance of source inspection.

- 13.3. The designated source inspector completes and stamps the **Source Inspection Sheet (QF-8.2.4-3)** with a EXTEX inspection stamp. The supplier includes a copy of the completed Source Inspection form along with the product for each shipment.

## 14. FAA PART CONFORMITY

Conformity inspections are required to verify that an aircraft component or modification complies with the design data. These inspections physically compare the component or modification to the engineering specifications, drawings, and the airworthiness standards.

When FAA conformity is marked YES on the EXTEX purchase order or when notified at a later date, the supplier and/or sub-supplier must permit a FAA designee (DMIR or DAR) and a EXTEX representative to verify part conformity to the design requirements at the supplier's or sub-supplier's premises.

EXTEX will notify the supplier in writing to schedule the part conformity and determine where it will be performed.

End item conformity will be performed where the product is completed.



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In-process conformity may occur at any phase of the manufacturing process (i.e. heat treat, NDT, machining, etc.). When in-process conformity is required, the supplier or sub-supplier(s) must notify EXTEX prior to starting that process. Product may not move to the next operation while it is waiting for an in-process conformity inspection. The conformity evaluates EXTEX's processes and control. The results as well as corrective actions are sent directly to EXTEX.

## 15. SUPPLIER DEVIATION

**Suppliers do not have MRB authority.** Any deviation or departure from EXTEX design data requires written submittal on a **Request for Material Review Action (RMRA) Form (QF-8.3-5)**. EXTEX's consent to shipping non-conforming product does not relieve supplier of its responsibilities to EXTEX.

Suppliers are responsible for completing the RMRA form, root cause, corrective action and submitting it to EXTEX engineering and quality for review.

Suppliers may only ship accepted deviated product after obtaining approval via an approved / signed RMRA from a EXTEX engineering and quality representative. Suppliers must only ship product that meets specification, or obtain a written deviation prior to shipment for any non-conforming product.

The deviation is limited to the purchase order and quantity specified on the RMRA and does not constitute a blanket acceptance of future deviations unless otherwise specified on the RMRA.

Suppliers must include a copy of the approved RMRA with the dispositioned product and properly segregate accepted deviated product from conforming product in the shipment.

## 16. SUPPLIER QUALITY ESCAPE

EXTEX defines a Supplier Quality Escape as a part fabricated by the supplier that does not comply with EXTEX design data, passed through the supplier's quality system, and was delivered to EXTEX.

EXTEX requires suppliers to report these escapes on delivered parts to EXTEX as soon as discovered on the **Supplier Quality Escape Self Disclosure and Containment Form (QF-8.3-6)** or equivalent document. EXTEX will then issue an External DMR in the QTS database to the supplier.

The supplier will then be responsible for responding with a root cause and corrective action plan to EXTEX.

## 17. PACKAGING AND PRESERVATION

Unless otherwise specified on the EXTEX purchase order, drawing, or specification, suppliers are responsible for using best commercial practices to adequately package and preserve product to prevent damage or deterioration of the product due to contamination, corrosion, environment, Foreign Object Damage/Debris (FOD), mishandling, part-to-part contact, and/or loss.

## 18. RETURN POLICY

EXTEX reserves the right to return product if it does not conform to EXTEX's drawing, specification and/or purchase order requirements (e.g. documentation/paperwork requirements).

For detailed information reference the EXTEX Terms and Conditions  
[http://extengineered.com/files/Extex\\_Purchase\\_Order\\_Terms\\_and\\_Conditions.pdf](http://extengineered.com/files/Extex_Purchase_Order_Terms_and_Conditions.pdf)

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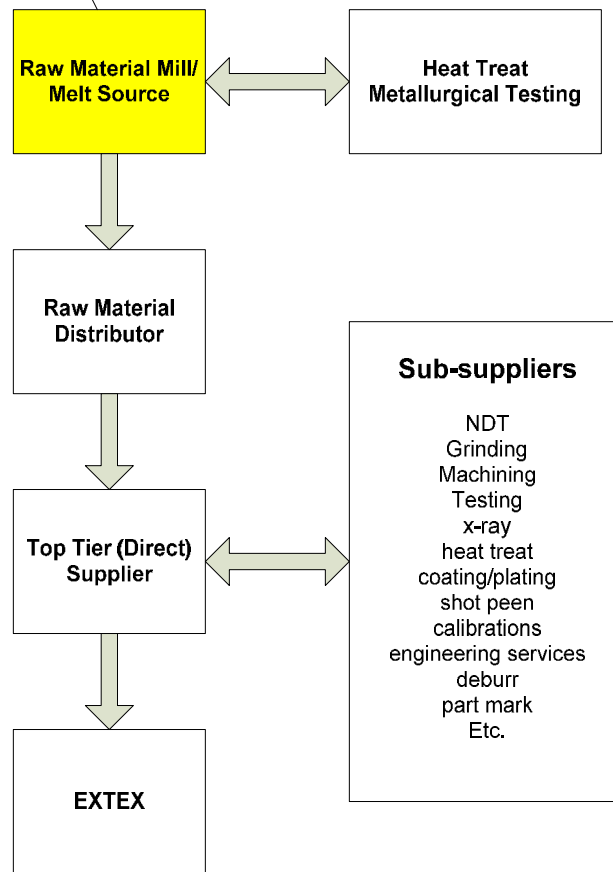
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### 19. RECORD RETENTION

Suppliers and their sub-suppliers are responsible for maintaining manufacturing and quality records for a minimum of ten (10) years.

All articles manufactured to an EXTEX purchase order must be traced back to the Mill/Melt source



### Revision History

Revision	Description	Date	Approved By
IR	Initial release under EXTEX	12/11/2015	J. Goudreau
A	Update to Sub-tier controls	6/1/2016	J. Goudreau

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### ACKNOWLEDGEMENT OF RECEIPT

I acknowledge that I have received, read and understand the requirements stated in the Supplemental Quality Requirements Rev. IR

Company Name: \_\_\_\_\_

Quality Manager: \_\_\_\_\_  
(Name, Signature and Date)

General Manager or Equivalent: \_\_\_\_\_  
(Name, Signature, Title and Date)

Please return this page via Email, Fax, or Postal Mail to

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