Supplier Quality Requirements for Prototype and Low Volume Production Parts

Revision 1
April 05, 2013
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1.0 Introduction

1.1 Purpose

The purpose of this document is to communicate Meritor's expectation for prototype submission requirements and low volume production requirements.

1.2 Scope

These requirements are for dedicated prototype suppliers and or regular production suppliers that will provide prototype parts and or low volume production parts for Meritor.

2.0 Requirements

2.1 A Part Submission Warrant shall be completed in full (no blank fields) and signed by an authorized official of the supplier who is responsible for the preparation of this submission package. There shall be a separate warrant form for each part number and each part shipment.

2.2 A Control Plan and Complete Process Flow Chart shall be created and submitted that captures the process and/or processes of record for the manufacturing of these parts. This document shall also capture the dimensional features being checked (highlighting the QCC’s), sample size and frequency of inspection. The frequency of dimensional checks and or verification are typically higher than that of production. Additionally, alternate process flows or rework must be clearly identified in the control plan. If there are sub-tiered suppliers, (ie: plater, heat treat, paint) these processes need to be included in this document.

2.2.1 For low volume production parts, an FMEA is required.

2.3 Dimensional Characteristic Inspection:

For prototype parts being shipped to Troy for testing: A 100% fully ballooned drawing (including the notes), along with a corresponding 100% dimensional layout inspection report shall be conducted on a minimum of one part unless otherwise specified per the direction of Meritor personnel.

If the supplier is able to or has access to a laser scanner, this data would also be required in the submission package.
2.3 (con’t)

For prototype parts being shipped to a Meritor facility for assembly: A 100% fully ballooned drawing (including the notes) along with a corresponding 100% dimensional layout inspection report shall be conducted on a minimum of one part, unless otherwise specified per the direction of Meritor personnel from the receiving plant.

For prototype parts being shipped from Meritor plant to Meritor plant: A 100% fully ballooned drawing (including the notes) along with a corresponding 100% dimensional layout inspection report shall be conducted on a minimum of one part. Additional required inspections are at the receiving Meritor facilities discretion.

For low volume production parts being shipped to a Meritor facility: A 100% fully ballooned drawing (including the notes) along with a corresponding 100% dimensional layout inspection report shall be conducted on a minimum of one to three pieces or as directed by the receiving Meritor facility.

Suppliers are responsible for performing, or having performed legible, signed inspections and/or tests required to substantiate conformance to design record. Suppliers shall use the AIAG Dimensional Results form, CFG 1003 or equivalent.

Castings, forgings, plastics or rubber parts being made from multiple molds or cavities, require one part from each mold or cavity to be 100% dimensionally layed out.

‘Blackbox’ suppliers are to provide dimensional data on part interface dimensions as a minimum per the frequency suggested by the receiving Meritor facility.

2.4 Safety Related Characteristics and Quality Control Characteristics:

For prototype parts being shipped to Troy for testing: all QCC dimensions are to be 100% measured on every part, unless otherwise specified. Additional features deemed critical by Product Engineering and or plant Quality may also be required.

For prototype parts being shipped to a Meritor facility for assembly: all QCC dimensions are to be 100% measured, on every part, unless otherwise specified by the receiving Meritor facility. Additional features deemed critical by Product Engineering and or plant Quality may also be required.
2.4 (con’t)

For prototype parts being shipped from Meritor plant to Meritor plant: all QCC dimensions are to be 100% measured, on every part, unless otherwise specified by the receiving Meritor facility. Additional features deemed critical by Product Engineering and or plant Quality may also be required.

For low volume production parts being shipped to a Meritor facility: all QCC dimensions are to be 100% measured on every part, unless otherwise specified by the receiving Meritor facility. When capability has been demonstrated the supplier will be required to track via SPC charting maintaining the data and providing when requested.

‘Blackbox’ suppliers are to provide dimensional data on QCC’s as directed by the receiving Meritor facility direction as required.

If the characteristic to be inspected is a destructive inspection, the supplier is to coordinate with the appropriate Meritor Materials Engineer for direction. Supplier must provide inspection records including dimensional data (for variable measurements) and/or pass/fail results (for attribute characteristics) for each shipment as per the control plan.

2.5 Material Certifications: The material certification is a required document from the material producer and or heat treatment source that states manufacturing location, lot number, product identification number, product name, dates of test, MTOR specification and actual test data compliance to the product specifications. Material certification shall be deemed part of the submission. Material certification(s) should and dated on the supplier letterhead (ie: XYZ Plating, Inc.) Traceability must be maintained at supplier location. AIAG form CFG 1004 or equivalent shall be used. This is required per heat.

2.5.1: Metals/plastics/rubber certifications: (ie: chemical and mechanical properties)
2.5.2: Heat treat certifications: (ie: temperature, temper, core/surface hardness, case depth, microstructure)
2.5.3: Paint/Plate/Primer/Rust Preventative certifications: (ie: thickness, grade, viscosity)

Heat Treated parts:
For Safety Related Components(SRC) parts: the first and last piece of the run are required for sample testing, by the supplier. (ie: print requirements such as, but not limited to: surface/core hardness, case depth).

For Non-SRC parts: Only one part is required for sample testing, by the supplier. (ie: surface/core hardness, case depth)
2.6 **Simulations:** Per the direction of Product Engineering and or Materials Engineering, simulations may be required to be performed on prototype and or low volume production parts.

2.7 **Tooling(castings):** Prototype part suppliers are required to report out what type of tooling is to be used. ie: red-board tooling or brown-board tooling.

2.8 **X-Ray Requirements:** (Film Radiography and or Digital Radiography, that include Image Quality Indicators)

Existing Production Casting foundries providing prototype parts are not required to 100% X-Ray parts, unless otherwise specified. If the material has been identified as an SRC (safety related component), only one part is to be X-Rayed and the first and last piece will require destructive testing. For non-SRC parts, only the first piece requires destructive testing. All Reader Sheets and or films shall be submitted with the package.

Dedicated Prototype Casting foundries providing prototype parts shall be 100% X-Rayed (including SRC and Non-SRC material). Per the casting specification, All Reader Sheets, x-ray mapping and/or films shall be submitted with the Prototype submission package.

2.9 **Magnetic Particle Inspection Requirements:**
For all Safety Related Component(SRC) forgings and/or castings, 100% MPI is required.

For non-SRC forgings, it will be to the discretion of the MTOR Product Engineer as to what is required.

2.10 **IMDS Requirements:** There are no IMDS requirements for prototype submissions. For low volume production, this is required.

2.11 **MSDS Requirements:** MSDS sheets are required in the submission.

2.12 **Serialization Information/Part Identification:** Each part must be identified with the part number and the serial number. Parts shall be numerically serialized and referenced to test/inspection results. Serial numbers shall begin with P-001 and continue in sequence through the last part shipped. Placement of the serial number on each part shall not affect the appearance, fit or function of the part. Design records, test results, and supplementary inspection result sheets must have the part serial numbers(s) clearly indicated.
2.12 (con't)

Part serialization is required. Common methods of marking include: laser etch, hand etch, pin stamp or punch stamp. When supplying multiple lots for the same part number, the serialization shall be consecutive to avoid duplicate numbering of parts from different lots, unless the serialization starts with the unique lot number or Julian date.

2.12.1: For smaller parts such as nuts, bolts or on parts where there is no reasonable area to be marked, Meritor Plant Quality may waive this requirement.

2.13 Inspection and or Testing Devices: When an inspection and/or testing device such as a gage, fixture, check-aid, or template is used to inspect and/or test a part, the supplier is responsible for inspecting and verifying that the device has been constructed to the same engineering release and change number as the part being inspected and/or tested. Supplier must have completed appropriate measurement system analysis (e.g. GR&R or similar study) for the gage and the gage must be calibrated with full traceability to standards. Results of these activities must be available for review and sent to Meritor quality personnel upon request.

2.14 Deviations: If parts do not meet design record requirements, ie: dimension(s) out of specification or if parts do not meet metallurgical requirements, the supplier is responsible for filling out the Deviation Request form (RA-4901-G090) and submitting it to the responsible Meritor Plant Quality Associate for circulation of signatures from a cross discipline team as applicable. The Deviation Request form must include a Corrective Action from the supplier in order for the form to begin circulation for signatures. This form needs to be approved before the supplier is allowed to ship parts. Please note that submitting this form does not guarantee Meritor approval.

2.15 Reason for Submission and Submission Type: It is the responsibility of the supplier to check the appropriate box(s) as applicable on the submission warrant.

2.16 Parts/Submissions being shipped to Meritor for DV testing, PV testing or as part of a set(for a customer build): an electronic copy of the submission is to be sent, unless hardcopies are specified, to the Meritor Corporate Prototype SQE and Product Engineer for each to review and disposition. In the event that the Corporate Prototype SQE is unavailable, the submission(s) are to be sent to the MTOR Supplier Development Engineer for review and disposition.
2.16 (con’t)

The supplier will also be responsible for sending an electronic copy of the Submission to Meritor user Plant SQA, unless hardcopies are specified.

2.17 Parts/Submissions being sent to Meritor Materials Engineering for verification, an electronic copy of the supporting documentation, unless otherwise specified, is to be submitted to Meritor Materials Engineering in Troy, MI. Suppliers that provide castings or forgings, must provide at least one sample (from each cavity if applicable) to Meritor Materials Engineering for review, unless otherwise specified. If parts are being heat treated, at the request of Materials Engineering, samples may be requested for before and after processing. All parts submitted to Troy must include the appropriate work request number (ESR), obtained through the plant SQA.

2.18 Parts/Submissions being shipped to Meritor Plant location, an electronic copy of the submission is to be sent, unless hardcopies are specified, to the Meritor Plant SQE for review and disposition.

3.0 Part Disposition:

Depending on the location to where the parts are being shipped, the responsible Meritor personnel will disposition the Warrant and will communicate status back to the supplier, Corporate Buyer, Materials Engineering, Product Engineering and Program Manager. Plant Quality and or the prototype SQE are responsible for loading the submission into the designated storage system.

A. APPROVED - This status indicates that the supplier has manufactured material that conforms to all specifications. This is NOT considered a production approval when the part number is in prototype status (ie: 1234A5678X)

B. USEABLE - This status permits the usage of the nonconforming part(s). The Deviation Request form AND a corrective action plan is required and must be signed off by Meritor cross functional team members as applicable: Product Engineering, Materials Engineering and Plant Quality before shipping parts.

C. REJECTED - This status indicates that parts failed to meet requirements. Corrected parts and revised submission shall be re-evaluated prior to shipment.
4.0 **Shipping Methods:**

Suppliers are to ship parts using the approved shipping method specified by the receiving Meritor location. All suppliers shipping material to a Meritor location shall indicate the following on the shipper:

- Part number, Engineering Level, Program, Supplier Identification, and serial numbers.
- Prototype Purchase Order number
- Shipment weight
- Quantity of parts
- Fixture number of any fixtures accompanying shipment
- Date shipped

Shippers which do not contain the proper information may result in rejection at the shipping/receiving dock. A DMN (Defect Material Notification) will be issued as appropriate.

4.1 **Shipping Container Labeling:**

All containers must be identified with the part number, Engineering Revision Level, Supplier Identification, addressee, and serial numbers. A Prototype Parts Tag must also be affixed to the container.

4.2 **Packaging:**

Suppliers are responsible to package parts accordingly to prevent any damage so as to maintain part integrity.

5.0 **Record Retention:**

Suppliers are required to maintain Prototype Part submission packages for a minimum of three years after final shipment.

6.0 **Supporting Documents**

6.1 Meritor Supporting Documents

- Part Submission Warrant for Prototypes
- Dimensional Lay Out Form
- Material Test Results Form
- Prototype Label
# Deviation Request Form (RA-4901-G090)

## Part Submission Warrant

<table>
<thead>
<tr>
<th>Part Name</th>
<th>Meritor Part Number</th>
<th>Rev.</th>
<th>Engineering Drawing Change Level</th>
<th>Dated</th>
<th>Shown on Drawing Number</th>
<th>Purchase Order No.</th>
<th>Weight (kg)</th>
</tr>
</thead>
</table>

### ORGANIZATION MANUFACTURING INFORMATION

- **Supervisor Name:**
- **Meritor Program:**
- **Street Address:**
- **City**
- **State**
- **Zip**

### REASON FOR SUBMISSION (Check at least one)

- [ ] Initial Submission
- [ ] Optional construction or Material
- [ ] Sub-supplier or Material Source Change
- [ ] Other - Please specify below

### SUBMISSION TYPE (Check one)

- [ ] Parts being shipped directly to Meritor for DV/PV testing or as part of a set (for customer build)
- [ ] Parts being shipped directly to Meritor to Materials Engineering for verification
- [ ] Parts being shipped to Meritor Plant for assembly
- [ ] Parts being shipped without complete documentation (must have Meritor approved Deviation Request form attached)

### SUBMISSION INFORMATION: Supplier Engineering Deviation Request Form needed if answer 'No' to any questions 1-10.

<table>
<thead>
<tr>
<th>Question</th>
<th>YES</th>
<th>NO</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Does part meet dimensional requirements on the design record?</td>
<td></td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>2. Is the drawing 100% ballooned?</td>
<td>YES</td>
<td>NO</td>
<td>N/A</td>
</tr>
<tr>
<td>3. Have all QCC's been 100% inspected on all parts to be shipped?</td>
<td>YES</td>
<td>NO</td>
<td>N/A</td>
</tr>
<tr>
<td>4. Are inspection results included, including all QCC's for all parts?</td>
<td>YES</td>
<td>NO</td>
<td>N/A</td>
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<tr>
<td>5. Is the control plan included?</td>
<td>YES</td>
<td>NO</td>
<td>N/A</td>
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<td>6. Was part produced with the specified materials?</td>
<td>YES</td>
<td>NO</td>
<td>N/A</td>
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<tr>
<td>7. Does part meet metallurgical requirements on the design record?</td>
<td>YES</td>
<td>NO</td>
<td>N/A</td>
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<tr>
<td>8. Are Reader Sheets and or X-Ray films included?</td>
<td>YES</td>
<td>NO</td>
<td>N/A</td>
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<tr>
<td>9. Are Magnetic Particle Inspection and or Ultrasonic Testing reports included?</td>
<td>YES</td>
<td>NO</td>
<td>N/A</td>
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<tr>
<td>10. Are material certifications included (including heat treat, paint, etc.)</td>
<td>YES</td>
<td>NO</td>
<td>N/A</td>
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### EXPLANATION / COMMENTS

- **List Molds / Cavities / Heat Codes (if applicable):**
- **Organization Authorized Signature:**
- **Date:**
- **Print Name:**
- **Phone No.:**
- **Fax:**
- **Title:**
- **E-mail:**

### Warrant Disposition:

- Meritor Prototype SGE: Date
- Meritor Plant SGE: Date
- Meritor Product Engineer: Date
- Meritor Corporate SGE: Date

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**Usable designation requires approved Deviation Request form and corrective action.**
## Dimensional Test Results

<table>
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<tr>
<th>ITEM</th>
<th>DIMENSION / SPECIFICATION</th>
<th>SUPPLIER MEASUREMENT RESULTS</th>
<th>OK</th>
<th>NOT OK</th>
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*Blanket statements of conformance are unacceptable for any test results.*

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Material Test Results

| ORGANIZATION: | MATERIAL SUPPLIER: |
| SUPPLIER/VENDOR CODE: | CUSTOMER SPECIFIED SUPPLIER/VENDOR CODE: |

*If source approval is req'd, include the Supplier (Source) & Customer assigned code.

| NAME OF LABORATORY: | SUPPLIER TEST RESULTS (DATA) | OK | NOT OK |
| DESIGN RECORD CHANGE LEVEL: | TEST DATE | QTY. TESTED |
| SPECIFICATION/ LIMITS | TESTED |
| MATERIAL SPEC. NO / REV / DATE | TESTED |

| PART NUMBER: | PART NAME: |
| SPECIFICATION/ LIMITS | TESTED |

*Blanket statement of conformance are unacceptable for any test results.*

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<th>SIGNATURE</th>
<th>TITLE</th>
<th>DATE</th>
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</thead>
</table>

Supplier Quality Requirements for Prototype and Low Volume Production, Rev. 1, April 5th, 2013
**ATTENTION:**

**PART NUMBER:**

**SUPPLIER NAME:**

**REV. LEVEL:**

**DATE SHIPPED:**

**PROGRAM:**

**QUANTITY TOTAL:**

**CERTIFIED BY:**

**SUPPLIER WARRANT APPROVAL RECEIVED?**

Yes  No

**SPECIAL INSTRUCTIONS / NOTES:**

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Notes: This label to be printed on bright colored paper. Each container is to be identified with a properly completed label on all four sides of the shipping container. If parts are not shipped in a container due to part size, then each part is to be identified with this label attached.
7.0 Revision Record and Approvals

<table>
<thead>
<tr>
<th>Rev. #</th>
<th>Date</th>
<th>Revision Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>04/05/2013</td>
<td>Initial Release</td>
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Chuck Smith 4/5/2013
Director of Quality, North America Date Approved