

## Q16 - Engineering Directed Standard Tool/Perishable Tool Inspection Requirements

---

"IMPORTANT NOTICE: A hard copy of this document may not be the document currently in effect. The current version is always the version on the Lockheed Martin network."

---

\* REVISED

\*\* ADDED

### I. APPLICATION

Except as otherwise directed by Buyer, the governing revision of this document shall be the revision in effect on the date of this Purchase Order (PO). Subject to limitation by Buyer, if any, if subsequent revisions of this Buyer document are issued, Seller is authorized to use the latest revision of this document. If Seller opts for use of the latest revision, Seller shall utilize the applicable portions of the latest revision in their entirety.

NOTE: As used herein, the term "Buyer" is synonymous with the term "LOCKHEED MARTIN", the terms "Purchase Order" and "PO" are synonymous with the term "Contract", the terms "Item" and "Items" are synonymous with the term "Work", and the term "Seller" is synonymous with the term "SELLER", all as may be used elsewhere in the PO of which this document "Q16 – Engineering Directed Standard Tool/Perishable Tool Inspection Requirements" is a part.

### II. REQUIREMENTS

- A. Seller shall perform an inspection after all normal manufacturing operations have been completed. Seller shall perform this inspection of any Item prior to delivery to Buyer.
- B. Seller shall furnish the results of this inspection and any previous inspections to Buyer or Buyer's Representative upon request.
- \* C. Seller shall be permitted to perform sample inspection, on the Items (reference Paragraph II. A.) as long as one (1) of the following statistically valid sampling plans is used, or unless otherwise specified by Buyer in writing.

1. MIL-Std-105E
2. ISO 2859-1
3. ANSI/ASQ Z1.4-2003

D. If Seller is other than an original equipment manufacturer of the Items, Seller shall furnish to Buyer or Buyer's Representative an electronic, non-proprietary monthly report that contains, but is not limited to, the following data elements from the final inspection:

4. Distributor (Source provider) if applicable
5. Original Manufacturer
6. LM Aero Part Number
7. Total Lot Quantity
8. Sample Quantity Inspected
9. Number of Items Accepted
10. Number of Items Rejected
11. Feature Rejected
12. Equipment Utilized to Perform Inspection

### III. ENGINEERING INSPECTION CRITERIA

- A. Equipment to inspect and/or validate the required characteristics varies based upon the tool type. Seller shall ensure that each piece of inspection equipment is capable of measuring to the tolerance specified in Industry Standard and/or Buyer specifications. Seller shall provide a listing of measuring equipment, gages, holding devices, and method employed for validating each characteristic identified in Paragraph III. C (at the Seller's facility) to Buyer or Buyer's Representative upon request.
- B. Prior to Buyer receipt, Seller shall ensure that all Items delivered shall have the following inspected for conformance to the applicable Buyer's Standard Tool Specification, "P" Sheet, "C" Number Drawing, TMS (Tool Manufacturing Standard), and/or NAS (National Aerospace Standard):
1. Tool number and Dash Number Identification
  2. Verification that the tool is obtained from an approved manufacturer (if applicable)
  3. Manufacturer's Certification, as required
- C. In addition to the baseline requirements specified in Paragraph III. B, Seller shall inspect each tool category identified below against the respective requirements for each of the Buyer's sites identified in Table 1.

**Table 1 Buyer Site Inspection Requirements by Tool Category**

|  | MARIETTA, MERIDIAN, &<br>CLARKSBURG  | FORT WORTH   |
|--|--|--|
| <b>Common Characteristics<br/>for Each Tool Category</b> | Body Diameter<br>Damage Check<br>Flute Length<br>Identification<br>Material Type<br>Over-All-Length<br>Surface Treatment<br>Thread Size<br>Key Characterisitcs | Back Taper<br>Cutting Diameter<br>Damage Check<br>Flute Length<br>Hardness<br>Helix Angle<br>Identification<br>Material Type<br>Over-All-Length<br>Relief/Clearance Angles<br>Run-Out (Concentricity)<br>Surface Finish<br>Key Characteristics |
| <b>Straight<br/>Shank Drills</b>                         | Shank Diameter<br>Point Type<br>Drill Diameter<br>Pilot Diameter and Length  | Lip Height Variance<br>Chisel Edge Centrality<br>Web Thickness (W2)<br>Point Type<br>Shank Diameter<br>Margin Width<br>Surface Treatment<br>Alignment of Secondary Cutting Edges   |
| <b>Threaded<br/>Shank Drills</b>                         | Point Type<br>Seat Angle<br>Hex Diameter and Length<br>Pilot Diameter and Length   | Lip Height Variance<br>Chisel Edge Centrality<br>Web Thickness (W2)<br>Point Type<br>Seat Angle<br>Shank Hardness<br>Margin Width<br>Surface Treatment<br>Thread 2A Fit<br>Alignment of Secondary Cutting Edges                                |
| <b>Chucking<br/>Reamers</b>                              | Flute Configuration<br>Shank Diameter<br>Pilot Diameter and Length<br>Reamer Diameter  | Chamfer Lip Height<br>Pilot Diameter<br>Margin Width<br>Shank Diameter<br>Core Diameter<br>Concentricity of Pilot/Cutter/Shank Diameters<br>(between centers)  |

|  | MARIETTA, MERIDIAN, & CLARKSBURG  | FORT WORTH  |
|--|---|---|
| Threaded Reamers   | Reamer Diameter<br>Hex Diameter and Length<br>Seat Angle<br>Pilot Diameter and Length | Chamfer Lip Height<br>Pilot Diameter<br>Pilot Length<br>Margin Width<br>Seat Angle<br>Thread 2A Fit<br>Core Diameter<br>Concentricity of Pilot/Cutter/Shank Diameters   |
| End Mills  | Flute Configuration<br>Shank Configuration<br>End Configuration<br>Corner Radius      | Radial Rake Angle<br>Shank Diameter<br>Corner Radius<br>Radius Mismatch<br>Preset Flats Length/Depth<br>Core Diameter<br>End Concavity<br>Radial/Axial Clearance  |
| Countersinks   | Pilot Diameter/Pilot Hole<br>Countersink Angle<br>Pilot Length<br>Seat Angle          | Countersink Angle<br>Relief/Clearance Angles<br>Pilot Diameter<br>Pilot Length<br>Axial Rake Angle<br>Seat Angle<br>Thread 2A Fit<br>Countersink/Pilot Radius   |
| Counterbores   | Corner Radius<br>Diameter<br>Pilot Hole   | Radial/Axial Rake<br>Corner Radius<br>Pilot Diameter<br>Margin Width<br>Flat/Perpendicular Cutting<br>Edges   |
| Drill/Countersinks<br>Drill/Countersink/Counterbore<br>(Single-Pass Tools) | Pilot Diameter<br>Countersink Angle<br>Seat Angle<br>Drill Diameter                   | Countersink Angle<br>Countersink Axial Rake Angle<br>Transition Between Countersink and Drill<br>(radius or counterbore)<br>Lip Height Variation<br>Chisel Edge Centrality<br>Web Thickness (W2)<br>Shank Diameter<br>Margin Width<br>Alignment of Secondary Cutting Edges<br>Key Characteristics Identified by Drawing |
| Taper-Lok Drills<br>and Reamers  | See Paragraph IV for<br>Verification by Buyer   |   |

|                                    | MARIETTA, MERIDIAN, & CLARKSBURG  | FORT WORTH |
|------------------------------------|---|------------|
| <b>Circular Saw Blades</b>         | Outside Diameter<br>Arbor Hole<br>Kerf Width<br>Number of Teeth<br>Magnetic Particle Inspection (per ASTM-E-1444) |            |
| <b>Hole Saws</b>                   | Diameter<br>End Configuration<br>Arbor Threads  |            |
| <b>Routers</b>                     | Diameter<br>End Configuration   |            |
| <b>Bucking Bars</b>                | Surface Finish<br>Hardness  |            |
| <b>Drill &amp; Reamer Bushings</b> | Inside Diameter<br>Outside Diameter<br>Length   |            |
| <b>Keller-Lok Bushings</b>         | Inside Diameter<br>Outside Diameter<br>Length   |            |
| <b>Safety Apparel</b>              | Size<br>Logo  |            |
| <b>Process Tooling</b>             | Dimensional Check with Tape Measure or Equivalent   |            |
| <b>Slings</b>                      | Over-All-Length with Tape Measure or Equivalent   |            |

D. Seller shall inspect the following characteristics by Standard Tool Number for the Marietta, Meridian, and Clarksburg facilities for the specific features identified below:

1. 550H006  
Hole must be centered with no burrs per Buyer specification
2. 550H007  
Dash number must match bushing size per Buyer specification
3. 550H008  
Slot dimension = 0.141" +.002"/-.000"
4. 550H203  
Surface coating adherence  
Dash number location per Buyer specification

IV. TAPER-LOK DRILL AND REAMER VERIFICATION BY BUYER (Applies only to Items shipped by Seller to Marietta, Meridian or Clarksburg)

- A. Seller shall submit a sample quantity of Taper-Lok drills and/or reamers to Buyer for verification. The verification process consists of the Buyer drilling and/or reaming holes to verify conformance to Engineering standards.
- B. Seller shall ship the test samples to Buyer at no increase in Buyer's cost or fee.
- C. Seller shall use the following guidelines to determine the proper quantity to be sent by Seller to Buyer for verification.
  - 1. Two (2) drill or reamers from the first 50 received and one (1) drill or reamer for every additional 50 (or portion of 50).
  - 2. The minimum quantity to be sent will be two (2) and the maximum quantity will be six (6).
- D. Seller shall complete the Tapered Cutter Verification Request form or a Buyer-approved alternate for submitting the samples to Buyer. The form may be accessed at:  
<http://www.lockheedmartin.com/us/aeronautics/materialmanagement.html>. Highlight "Quality Requirements" and select "Forms". Seller shall submit an individual form, in triplicate, for each unique tool.
- D. Seller shall contact the buyer of record on the Purchase Order for specific shipping instructions for each sample to be submitted for verification.
- E. If and when Seller receives a completed and approved Tapered Cutter Verification Request form from Buyer, Seller shall ship the remaining quantity to Buyer.
- F. If Buyer has documented a rejection on the Tapered Cutter Verification Request form, Seller may submit additional sample quantities to Buyer for verification. If Buyer documents rejection of the additional sample(s), the entire lot is rejected and is not suitable for use by Buyer.