

## Quality Clause Q16

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

The latest issue of this document is the version on the Lockheed Martin website:  
<https://www.lockheedmartin.com/en-us/suppliers/business-area-procurement/aeronautics/quality-requirements/clauses.html>

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The terms "Item", "PO", and "Buyer" used herein have the same meaning as "work", "contract", and "Lockheed Martin", respectively, as may be defined in another provision of the Purchase Order (PO) of which this Quality Clause Q16 is a part.

#### 1. 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.

#### 2. 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, if 3<sup>rd</sup> party inspection is not utilized.

- C. Seller shall be permitted to perform sample inspection on the Items (reference Paragraph II. A.) if one (1) of the following statistically valid sampling plans is used, unless otherwise specified by Buyer in writing.

1. MIL-STD-1916

*Note: The sampling tables in MIL-STD-105 can still be used*

2. ISO 2859-1
3. NSI/ASQ Z1.4-2003

### **3. 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, Tool Manufacturing Standard (TMS), and/or National Aerospace Standard (NAS) :
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 Inspection Requirements by Tool Category**

| Lockheed Martin Aeronautics                                   |   |   |  |
|---|---|---|--|
| <b>Common Characteristics for Cutting Tools (Except Saws)</b> | Damage Check  | <b>End Mills</b>                          | Radial Rake Angle                              |
|   | Identification  |   | Corner Radius                                  |
|   | Material Type   |   | Radius Mismatch                                |
|   | Surface Finish/Treatment  |   | Preset Flats Length/Depth                      |
|   | Overall Length  |   | End Concavity                                  |
|   | Flute Length  | <b>Counter-sinks</b>                      | Countersink Angle                              |
|   | Cutter Diameter   |   | Axial Rake Angle                               |
|   | Backtaper   |   | Seat Angle                                     |
|   | Pilot Diameter (Where Applicable)   |   | Thread 2A Fit                                  |
|   | Pilot Length (Where Applicable)   |   | Countersink/Pilot Radius                       |
|   | Helix   | <b>Counter-bores</b>                      | Radial/Axial Rake                              |
|   | Margin Width  |   | Corner Radius                                  |
|   | Relief & Clearance Angles   |   | Flat/Perpendicular Cutting Edges               |
|   | Run-Out (Concentricity)   |   |  |
|   | Shank Diameter  |   |  |
| Hardness (Shank, Adapters)                                    | <b>Drill/Countersinks<br/>Drill/Countersink/Counterbore<br/>(Single Pass Tools)</b> | Countersink Angle                         |  |
| Threaded Shank (Integrated or Adapted)                        |   | Countersink Axial Rake Angle              |  |
| Hex Size, Length, Seat Angle and Thread                       |   | Transition Between Countersink and Drill  |  |
| Key Characteristics   |   | Radius or Counterbore                     |  |
|   |   | Lip Height Variation                      |  |
|   |   | Chisel Edge Centrality                    |  |
|   |   | Web Thickness (W2)                        |  |
|   |   | Alignment of Secondary Cutting Edges      |  |
|   |   | Key Characteristics Identified by Drawing |  |
|   |   |   |  |
| <b>Straight Shank Drills</b>                                  | Lip Height Variance   | <b>Taper-Lok Drills</b>                   | See Paragraph IV for Verification by Buyer     |
|   | Chisel Edge Centrality  |   |  |
|   | Core Diameter (W1)  |   |  |
|   | Web Thickness (W2)  |   |  |
|   | Point Type  |   |  |
| <b>Threaded Shank Drills</b>                                  | Alignment of Secondary Cutting Edges  | <b>Circular Saw Blades</b>                | Arbor Hole                                     |
|   | Lip Height Variance   |   | Kerf Width                                     |
|   | Chisel Edge Centrality  |   | Number of Teeth                                |
|   | Core Diameter (W1)  |   | Magnetic Particle Inspection (per ASTM-E-1444) |
|   | Web Thickness (W2)  |   |  |
| <b>Chucking Reamers</b>                                       | Point Type  | <b>Hole Saws</b>                          | End Configuration                              |
|   | Alignment of Secondary Cutting Edges  |   | Arbor Threads                                  |
|   |   |   |  |
| <b>Threaded Reamers</b>                                       | Chamfer Lip Height  | <b>Drill &amp; Reamer Bushings</b>        | End Configuration                              |
|   | Chamfer Angle   |   | Inside Diameter                                |
|   | Core Diameter   |   | Outside Diameter                               |
| <b>Threaded Reamers</b>                                       | Concentricity (between centers)   | <b>Keller Lok Bushings</b>                | Length   |
|   |   |   | Inside Diameter                                |
|   |   |   | Outside Diameter                               |

For all PO's with "Buyer Source Inspection" as the point of acceptance, seller will utilize the designated approved 3<sup>rd</sup> party inspection facility as called out by the PO.

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

**4. 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 Buyer's request.
- 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:

<https://www.lockheedmartin.com/en-us/suppliers/business-area-procurement/aeronautics.html>

Highlight "Quality Requirements" and select "Forms". Seller shall submit an individual form, in triplicate, for each unique tool.

- E. Seller shall contact the buyer of record on the Purchase Order for specific shipping instructions for each sample to be submitted for verification.

- F. If Seller receives a completed and approved Tapered Cutter Verification Request form from Buyer, Seller shall ship the remaining quantity to Buyer.
  
- G. 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.