ES-113, rev 1
Northrop Grumman Innovation Systems Tailored NASA-STD-6008

The following are required to meet NASA-STD-6008: a certificate of conformance (CoC), manufacturer’s test report (MTR), certification validation testing (CVT) inspections, manufactured to a government specification or industry specifications, complete traceability and approved suppliers. Commingling of fasteners or inserts from two or more different lots is expressly prohibited. Failure to meet requirements will be cause for rejection.

Approved Supplier List (ASL)

All fasteners and retention and containment devices shall be purchased from Northrop Grumman Innovation Systems (NGIS) approved supplier list. Fasteners shall be procured in lots; each lot shall be traceable to its original material batch/lot. A single lot of fasteners shall only include traceability to a single material batch/lot. The certification shall identify the original manufacturers and their lot numbers for each lot in the shipment. Multiple lots within a shipment shall be kept separated and clearly identified as to the original manufacturers and their lot numbers.

Manufacturer’s Test Report (MTR)

An MTR certifies the information required by the governing document/specification. The MTR shall include the fastener lot number, manufacturing date, lot quantity, raw material heat number, chemical composition and mechanical and metallurgical test results. Each fastener lot is required to have a separate MTR.

Certificate of Conformance (CoC)

A CoC affirms that the product has met all the requirements of the relevant specification(s), contract(s), and any regulations and Quality Control has verified that the product is acceptable and conforms to all requirements, specifications, drawings, storing, identification and material. Certification shall include the name and address of the manufacturer of the material, the manufacturer’s designation of the material, the program/project organization/NGIS purchase order (PO), and a statement that the manufacturer is an approved supplier that appears on the current ASL for the NASA-STD-6008 specification. This document affirms that the product meets the contractual, drawing, regulation and specification requirements. Each fastener lot is required to have a separate CoC.

Complete Traceability

Complete traceability shall demonstrate a solid chain of custody from the original fastener manufacturer through all intermediate distributors down to the buyer. This consists of a history of POs from the original manufacturer down through each distributor or vendor, linking the sale of a particular lot of fasteners with a unique fastener manufacturer’s lot number.

Fastener: An item such as a bolt (that is, a tensile or shear bolt, shoulder bolt, screw, HiLok®, HiTigue®, or lockbolt), nut, nut plate or anchor nut, rivet, shear pin, helical or cylindrical insert, setscrew, washer, safety wire, cotter pin, etc., that joins or retains components or structural elements.
Traceability shall provide a solid chain of custody that traces back through the manufacturing process to the raw material test certification, original manufacturer’s lot number and any modifications. The manufacturer that performed the process shall document modifications performed to a fastener and shall identify the fastener with its own unique lot number. Any subsequent supplier(s) or vendor(s) shall have lot traceability back through to the original manufacturer. The supplier(s) shall maintain documentation that demonstrates the solid chain of custody from the original manufacturer for a retention period of 10 years.

**Certificate of Validation Testing (CVT) Inspections**

All inspections shall be conducted at an accredited laboratory or by using NASA center-approved processes independent of the manufacturer and distributor. Validation testing inspections include visual, dimensional, tensile, hardness and chemical analysis.

Visual shall require that 100 percent of each lot receive an unaided visual at 1X magnification and a minimum of 10 parts per lot be examined at 10X minimum magnification.

Dimensional shall require 100 percent of each lot to be inspected; however, not every characteristic of each fastener needs to be inspected. Major characteristics shall be inspected and recorded/documented. Inspection verification required to be recorded for each threaded fastener is head height, fillet radius, thread length and shank length. For threaded products, dimensional inspection of the threads shall be performed according to ASME B1.3, Screw Thread Gaging Systems for Dimensional Acceptability – Inch and Metric Screw Threads, System 22.

Tensile testing shall be completed using NASM1312-8, Fastener Test Methods, Method 8, Tensile Strength; NAM1312-108, Fastener Test Methods, Metric, Method 108, Tensile Strength; ASTM F606, Standard Test Methods for Determining the Mechanical Properties of Externally and Internally Threaded Fasteners, Washers, Direct Tension Indicators, and Rivets; or a NASA-approved equivalent standard with a minimum of 10 parts per lot tested. The location of the tensile break and ultimate load/ultimate strength shall be recorded and the specific minimum shall be recorded for comparison of the validation testing results.

Hardness testing shall be completed to NASM1312-6, Fastener Test Methods, Method 6, hardness. A minimum of 10 parts per lot shall be cross-sectioned (longitudinally) and tested. Measurements shall be made at the cross section of the shank or threaded areas. Acceptance of hardness measurement shall be in accordance with the applicable specification(s). *Superficial hardness or microhardness testing may be employed in lieu of Rockwell hardness testing only for fasteners that are No. 8 or smaller.*

Microstructural examination shall be completed on 10 parts which may be the same parts cross-sectioned for hardness testing. The examination consists of inspection for gross defects or anomalies, a check of the flow lines pertaining to forging and/or rolling operation(s), and a grain size determination.

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Chemical analysis shall be performed on a minimum of 10 parts per lot, per any quantitative or semiquantitative chemical/elemental analysis technique. The preferred test method is optical emission spectroscopy (OES).

OTHER FASTENERS (NON-BOLTS):

For non-bolt items such as nuts, nut plates, rivets, pins, inserts, setscrew, washers and safety wire requirements are detailed below. Unless explicitly stated, the minimum quantity for each requirement (test or visual) is 10 pieces per each lot.

Retention devices*, Pins*, and Safety wire*

- Must include these documentation as-defined in the above sections: CoC, MTR, CVT and partial traceability
- CVT requirements is a minimum: visual (100% at 1x, 10 at 10x), and chemical analysis

Inserts*

- Must include these documentation as-defined in the above sections: CoC, CVT and partial traceability
- CVT requirements is a minimum: visual (100% at 1x, 10pcs at 10x), lot dimensional, chemical analysis

Washers*

- Must include these documentation as-defined in the above sections: CoC, CVT and partial traceability
- CVT requirements is a minimum: visual (100% at 1x, 10pcs at 10x), lot dimensional, lot hardness, chemical analysis

Rivet*

- Must include these documentation as-defined in the above sections: CoC, MTR, CVT and partial traceability
- CVT requirements is a minimum: visual (100% at 1x, 10pcs at 10x), lot dimensional, lot hardness, chemical analysis

* = If complete traceability, as-defined above, is obtained through procurement, the CVT requirements may be reduced or waived by customer. Notification and approval from customer must be documented officially in the certification package of parts. Failure to include approval form will be a cause for rejection.