



HIGH STRENGTH FASTENERS**GENERAL**

This IM pertains to inspection, sampling, testing, certification, and acceptance of high strength fasteners for all specified applications. High strength fasteners shall be as specified in [Article 4153.06](#) of the Standard Specifications, and any other specified requirements. Only high strength fasteners for steel structures shall be required to meet rotational capacity testing requirements as described in Section D of this IM.

NOTE: When the thread length is changed, the bolt is no longer an A 325 bolt.

FASTENER ACCEPTANCE**A. Fasteners (Bolt, Nut, & Washer)****1. Manufacturer-Certified Test Report:**

Manufacturers of bolts, nuts, and washers shall supply a Manufacturer-Certified Test Report for each shipment of fastener components. This report shall be prepared for individual lots. Bolt nut and washer production lots shall include the Mill Test Report for that lot.

The manufacturer shall identify each production lot for bolts, nuts and washers with a unique lot identification number. This number shall be initiated prior to producing a specific lot, and must be maintained for identification of that lot through final shipment. A production lot for bolts nuts, and washers shall consist of components of the same nominal size, processed together through all production operations. Production lots for bolts, nuts and washers shall each be produced from the same mill heat number.

A manufacturer shall sample and test in accordance with the following schedule:

<u>Bolts</u>		<u>Nuts & Washers</u>	
No. of Pieces in <u>a Production Lot</u>	Min. No. Sampled & Tested	No. of Pieces <u>in a PO Lot</u>	Min. No. Sampled & Tested
Less than 800	1	Less than 800	1
801 to 8,000	2	801 to 8,000	2
8,001 to 35,000	3	8,001 to 22,000	3
35,001 to 150,000	8	Over 22,000	5
150,001 and Over	13		

2. Contracting Authority Sampling and Testing

The inspector will sample bolts, nuts, and washers at the production rate listed above. Samples will be sent to the Office of Materials, Ames, Iowa, for acceptance testing. A copy of the Manufacturer-Certified Test Report, Mill Test Report, and rotational capacity test (when required) must be forwarded with the sample.

B. Re-tests

Fasteners which fail to meet the requirements of any specified ASTM Specification shall be rejected or, at contractor option, will be re-sampled and tested at two times the original rate. All additional samples shall conform to the specifications or the production lot will be rejected.

NOTE: High strength bolts and nuts that have been torqued, shall not be re-used. This includes both black and galvanized bolts and nuts.

C. Small Quantities

If a production lot represents less than 20 fasteners (bolts, nuts, or washers), the District Materials Engineer may, without sampling, accept the small quantity lot on a basis of Manufacturer-Certified Test Report Certification.

D. Rotational Capacity Test

For Steel Structures:

1. The manufacturer, supplier or distributor of fasteners shall perform rotational capacity tests prior to shipment.
2. Rotational capacity test report shall be documented and shall include the rotational lot number.
3. For steel structures, the contractor shall perform field rotational capacity acceptance tests prior to assembly. For shop assembly, the Structural Materials Engineer may waive this requirement.

Site storage for fasteners is important. Storage shall be in a sealed container within a sheltered storage shed. Storage containers shall be covered (sealed) at all times. Bolts, nuts, and washers shall be free of moisture, dust, dirt, and / or any contaminants.

3. [Specification 4153.06](#) requires a Rotational Capacity (RC) Test for high strength fasteners. This test confirms component compatibility and the presence of adequate lubrication.
4. A pre-bolting meeting shall be held to establish a clear understanding of the Rotational Capacity Test, bolting procedures, turn-of nut methods, and the inspection process.

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5. Black bolts and nuts shall be clean, free of contaminants and “oily” to the touch when delivered, stored and installed.
 6. Galvanized nuts shall be checked to verify lubrication.
 7. All carbon steel and alloy steel bolts, studs, anchor bolts, screws, nuts, and washers and all special threaded fasteners shall be galvanized to the requirements of ASTM F 2329 (Hot dip with the required galvanizing temperature). Additionally, the average thickness of the production lot shall be furnished.
 8. High strength fasteners shall be mechanically galvanized in accordance with the requirements of ASTM B695 Class 50 or Class 55.
 9. All rotational capacity tests shall be conducted in accordance with [Appendix A](#) or [B](#), whichever is applicable.
 10. Fasteners, nuts and washers shall be made from domestic raw materials and manufactured in the USA.

EQUIPMENT CALIBRATION REQUIREMENTS FOR ROTATIONAL CAPACITY TEST

1. Torque Wrench: Torque Wrench shall be calibrated at least every six months by the Iowa DOT and / or by an approved / certified testing agency. The contractor shall furnish and use an inspected and calibrated torque wrench, which shall be capable of accurately measuring torque.
2. Bolt Tension Measuring Device (Skid-More): Bolt Tension Measuring Device shall be calibrated by the Iowa DOT and / or by an approved / certified testing agency. Calibration of the bolt tension measuring device shall be performed at least every six months.

Calibration of the Torque Wrench and the Bolt Measuring Device can be performed separately or combined as long as neither calibration have exceeded the six-month period.