



Standard Specification for Heavy Hex Structural Bolt/Nut/Washer Assemblies, Alloy Steel, Heat Treated, 200 ksi Minimum Tensile Strength^{1,2}

This standard is issued under the fixed designation F3111; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification covers heat treated, alloy steel, heavy hex structural bolt/nut/washer assemblies, also referred to as “sets,” having a tensile strength of 200 to 215 ksi. These assemblies are capable of developing a minimum predetermined tension when installed by applying an initial torque followed by rotation to the nut or bolt head, while at the same time preventing the rotation of the opposite side of the assembly.

NOTE 1—The installations in [Appendix X1](#) are important to the proper application of this product.

1.2 An assembly consists of a heavy hex structural head bolt, nut and two washers covered by this specification.

1.3 The assemblies are available in sizes 1 in. to 1 ¼ in. inclusive.

1.4 The fastener assemblies are intended for use in structural connections in the following environmental conditions:

1.4.1 Interiors, normally dry, including interiors where structural steel is embedded in concrete, encased in masonry or protected by membrane or noncorrosive contact type fireproofing.

1.4.2 Interiors and exteriors, normally dry, under roof, where the installed assemblies are soundly protected by a shop-applied or field-applied coating to the structural steel system.

1.5 The fastener assemblies are not intended for use in structural connections in the following environments, with or without protection by a shop-applied or field-applied coating to the structural steel system:

1.5.1 Exteriors not under roof.

1.5.2 Chemical environments in which strong concentrations of highly corrosive gases, fumes, or chemicals, either in solution or as concentrated liquids or solids, contact the fasteners or their protective coating.

1.5.3 Heavy industrial environments severe enough to be classified as a chemical environment as described in [1.5.2](#).

1.5.4 Condensation and high humidity environments maintaining almost continuous condensation, including submerged in water and soil.

1.5.5 Cathodically protected environments, in which current is applied to the structural steel system by the sacrificial anode method or the DC power method.

1.6 *Units*—The values stated in inch-pound units are to be regarded as standard. No other units of measurement are included in this standard.

1.7 The following precautionary statement pertains only to the test method portions, [Section 13](#), [Section 14](#) and [Annex A2](#) of this Specification: *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards*:³

[A751 Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products](#)

[E709 Guide for Magnetic Particle Testing](#)

[E1444/E1444M Practice for Magnetic Particle Testing](#)

[F606/F606M Test Methods for Determining the Mechanical Properties of Externally and Internally Threaded Fasteners, Washers, Direct Tension Indicators, and Rivets](#)

¹ This specification is under the jurisdiction of ASTM Committee [F16](#) on Fasteners and is the direct responsibility of Subcommittee [F16.02](#) on Steel Bolts, Nuts, Rivets and Washers.

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² The “Heavy-Hex Structural Bolt/Nut/Washer Assemblies, Alloy Steel, Heat Treated, 200 ksi Minimum Tensile Strength” of Grade 2 is covered by US patent number 7 070 664, July 4, 2006. Interested parties are invited to submit information regarding the identification of an alternative(s) to this patented item to the ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend.

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