

INTRODUCTION

Beginning with the initial development of high-strength bolting, provisions were included for the use of hot-dipped or subsequently mechanically applied zinc to ASTM A325 bolts and suitable nuts. A strict prohibition exists for any metallic coatings applied to ASTM A490 bolts. In recent years the introduction of new inorganic and organic coatings has occurred. Because of the importance of these developments and attributes which are presented by these new coatings, it was felt that a standard procedure for qualification of these coatings as applicable to high-strength structural bolting should be established. This standard has been written to establish an orderly procedure to qualify a coating for use on A490 structural bolts. These have been selected because they are the highest strength structural fasteners, and successful qualification for use on these bolts should assure the use on A325 bolts as well.

1.0 Scope

This Standard defines the procedures and tests which demonstrate that a given coating should be considered by the Research Council on Structural Connections and ASTM Committee F-16 on Fasteners for inch series high-strength structural bolts.

Testing is to be carried out using ASTM A490 Type I bolts. A single lot for each size will be used. Multiple lots may be required for complete qualification and acceptance.

1.1 Referenced Standards

ASTM

- ASTM A325 Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
- ASTM A490 Specification for Heat Treated Steel Structural Bolts, 150 ksi Minimum Tensile Strength
- ASTM A563 Specification for Carbon and Alloy Steel Nuts
- ASTM B117 Test Method of Salt Spray (Fog) Testing
- ASTM F436 Specification for Hardened Steel Washers
- ASTM F606 Standard Test Methods for Determining the Mechanical Properties of Externally and Internally Threaded Fasteners, Washers and Rivets
- ASTM D1186 Method for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to a Ferrous Base
- ASTM F1554 Specification for Anchor Bolts, Steel, 36, 55, and 105 ksi Yield Strength
- ASTM F1624 Standard Test Method for Measurement of Hydrogen Embrittlement in Steel by the Incremental Loading Technique

IFI STANDARD ®	TEST EVALUATION PROCEDURES FOR COATING QUALIFICATION INTENDED FOR USE ON HIGH- STRENGTH STRUCTURAL BOLTS	IFI-144 Page 1 of 6
Published and issued by the Industrial Fasteners Institute of Independence, OH		Issued: May 18, 2000 Reaffirmed: 2013

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- ASTM F1789 Standard Terminology for F-16 Mechanical Fasteners
- ASTM F1940 Test Method for Process Control Verification to Prevent Hydrogen Embrittlement in Plated or Coated Fasteners

General Motors Corporation

- GM 9540P Accelerated Corrosion Test

Research Council on Structural Connections

- Specification for Structural Joints Using ASTM A325 or A490 Bolts
 - (LRFD) Load and Resistance Factor Design
 - (ASD) Allowable Stress Design

1.2 Related Standards

American Association of State Highways and Transportation Officials

- FBB06-10 Guardrail Bolt and Recessed Nut
- FBB01-05 Clipped Guardrail Bolt and Recessed Nut
- FBB1-5 Guardrail Bolt and Recessed Nut
- FBB6-10 Button Head Bolt and Recessed Nut
- FBH1-3 Cable Guardrail Hook Bolt
Federal Highway Administration

- High Strength Bolts for Bridges FHWA-SA-91-031

2.0 Test Hardware Required

2.1 Bolts. ASTM A490 bolts of sizes 3/4 and 1 inch shall be used for testing. Lengths of 3/4 inch diameter (D) bolts shall be 2½D minimum, and lengths of 1 inch diameter bolts shall be 5D minimum.

2.2 Washers. Flat washers in accordance with ASTM F436 shall be used for testing.

2.3 Nuts. Heavy hex nuts of Grade DH in accordance with ASTM A563 shall be used for testing.

2.4 Lot Control. All test hardware of each size and configuration shall be from a homogeneous lot traceable to a given mill heat of material.

2.5 Coating. The coating to be evaluated shall be applied to all fastener components used under normal production conditions.

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