

Standard Specification for

Hardened Steel Washers [Metric]

AASHTO Designation: M 293M-06

ASTM Designation: F 436M-04



AASHTO M 293M-06 is identical to ASTM F 436M-04 except for the following provisions:

1. All references to the ASTM standards contained in ASTM F 436M-04, listed in the following table, shall be replaced with the corresponding AASHTO standard.

<i>Referenced Standards</i>	
ASTM	AASHTO
A 153/A 153M	M 232M/M 232
A 325M	M 164M
A 490M	M 253M
A 709/A 709M	M 270M/M 270
B 695	M 298

2. Add Sections 10.3 and 10.4 to Section 10 of ASTM F 436M-04 as follows:
10.3 If zinc-coated washers are supplied, hardness testing shall be performed after zinc coating. The zinc coating shall be removed prior to taking hardness measurements.
10.4 If zinc-coated washers are supplied, the thickness of the zinc coating shall be measured.
3. Replace Section 14.1 of ASTM F 436M-04 with the following:
14.1 The party responsible for the washers shall be the organization that supplies the washers to the purchaser. The responsible party shall supply test reports, certified by the manufacturer, that indicate the washers were manufactured, sampled, tested, and inspected in accordance with this specification and all of its requirements.



Designation: F 436M – 04

METRIC

Standard Specification for Hardened Steel Washers [Metric]¹

This standard is issued under the fixed designation F 436M; 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.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope*

1.1 This specification covers the chemical, mechanical, and dimensional requirements for metric hardened steel washers for use with fasteners having nominal thread diameters M12 through M100. These washers are intended for general-purpose mechanical and structural use with bolts, nuts, studs, and other internally and externally threaded fasteners. These washers are suitable for use with fasteners covered in Specifications A 325M, A 490M, A 563M and with fasteners of Specification F 568 property classes 8.8 and higher.

1.2 The types of washers covered in this specification are:

1.2.1 *Type 1*—Washers made of carbon steel.

1.2.2 *Type 3*—Washers made of steel having atmospheric corrosion resistance and weathering characteristics comparable to that of steels covered in Specifications A 242/A 242M, A 588/A 588M, and A 709/A 709M. The atmospheric corrosion resistance of these steels is substantially better than that of carbon steel with or without copper addition. See 5.1. When properly exposed to the atmosphere, these steels can be used bare (uncoated) for many applications.

1.3 The styles of washers covered in this specification are:

1.3.1 *Circular Washers*—Circular washers in nominal sizes 12 mm through 100 mm, are suitable for applications where sufficient space exists and angularity permits.

1.3.2 *Beveled Washers*—Beveled washers are square and rectangular, in nominal sizes 12 mm through 36 mm, with a beveled 1:6 surface for use with American Standard beams and channels.

1.3.3 *Clipped Washers*—Clipped washers are circular or beveled for use where space limitations necessitate that one side be clipped.

NOTE 1—This specification is the metric counterpart of Specification F 436.

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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1.4 Terms used in this specification are defined in Terminology F 1789 unless otherwise defined herein.

2. Referenced Documents

2.1 *ASTM Standards:*²

A 153/A 153M Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

A 242/A 242M Specification for High-Strength Low-Alloy Structural Steel

A 325M Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength [Metric]

A 490M Specification for High-Strength Steel Bolts, Classes 10.9 and 10.9.3, for Structural Steel Joints [Metric]

A 563M Specification for Carbon and Alloy Steel Nuts [Metric]

A 588/A 588M Specification for High-Strength Low-Alloy Structural Steel with 50 ksi [345 MPa] Minimum Yield Point to 4-in. [100-mm] Thick

A 709/A 709M Specification for Carbon and High-Strength Low-Alloy Structural Steel Shapes, Plates, and Bars and Quenched-and-Tempered Alloy Structural Steel Plates for Bridges

A 751 Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products

B 695 Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel

D 3951 Practice for Commercial Packaging

F 568M Specification for Carbon and Alloy Steel Externally Threaded Metric Fasteners

F 606M Test Methods for Determining the Mechanical Properties of Externally and Internally Threaded Fasteners, Washers, and Rivets [Metric]

F 1789 Terminology for F16 Mechanical Fasteners

G 101 Guide for Estimating the Atmospheric Corrosion

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

*A Summary of Changes section appears at the end of this standard.

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