



Standard Guide for Selection of Committee F-16 Fastener Specifications¹

This standard is issued under the fixed designation F 1077; 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 guide is intended to provide a rapid, easy to use method for identifying Committee F-16 fastener specifications and their applicable marking requirements. Selection is made by product type (bolts, nuts, washers, etc.) and material (alloy steel, carbon steel, stainless steel, etc.) from Tables 1-5 as follows:

	Table Number	
	Inch	Metric
Ferrous Metals		
Alloy Steel	1	3
Carbon Steel	1	3
Weathering Steel	1	3
Non Ferrous		
Aluminum, Copper	2	3
Nickel, Titanium		
Stainless Steels	2	3
Others		
Coatings, Definitions, Test Methods, Surface Discontinuities	4	4
Marking	5	5

1.2 Table size limitations and the need for simplicity prohibit identifying the exact grade, type, condition, etc., for all product/material combinations. The product specification must be reviewed prior to specifying fasteners on drawings or ordering to properly and completely identify the fastener, and its available variations.

2. Referenced Documents

2.1 ASTM Standards:

- A 31 Specification for Steel Rivets and Bars for Rivets, Pressure Vessels²
- A 307 Specification for Carbon Steel Bolts and Studs, 60 000 psi Tensile Strength²
- A 325 Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength²
- A 325M Specification for High-Strength Bolts for Structural Steel Joints [Metric]²
- A 354 Specification for Quenched and Tempered Alloy Steel Bolts, Studs, and Other Externally Threaded Fasteners²

- A 394 Specification for Steel Transmission Tower Bolts, Zinc-Coated and Bare²
- A 449 Specification for Quenched and Tempered Steel Bolts and Studs²
- A 489 Specification for Carbon Steel Lifting Eyes²
- A 490 Specification for Heat-Treated Steel Structural Bolts, 150 ksi Minimum Tensile Strength²
- A 490M Specification for High-Strength Steel Bolts, Classes 10.9 and 10.9.3, for Structural Steel Joints [Metric]²
- A 502 Specification for Steel Structural Rivets²
- A 563 Specification for Carbon and Alloy Steel Nuts²
- A 563M Specification for Carbon and Alloy Steel Nuts [Metric]²
- A 574 Specification for Alloy Steel Socket-Head Cap Screws²
- A 574M Specification for Alloy Steel Socket-Head Cap Screws [Metric]²
- A 687 Specification for High-Strength Nonheaded Steel Bolts and Studs²
- C 514 Specification for Nails for the Application of Gypsum Board³
- F 432 Specification for Roof and Rock Bolts and Accessories²
- F 436 Specification for Hardened Steel Washers²
- F 436M Specification for Hardened Steel Washers [Metric]²
- F 467 Specification for Nonferrous Nuts for General Use²
- F 467M Specification for Nonferrous Nuts for General Use [Metric]²
- F 468 Specification for Nonferrous Bolts, Hex Cap Screws, and Studs for General Use²
- F 468M Specification for Nonferrous Bolts, Hex Cap Screws, and Studs for General Use [Metric]²
- F 541 Specification for Alloy Steel Eyebolts²
- F 547 Terminology of Nails for Use with Wood and Wood-Base Materials²
- F 568 Specification for Carbon and Alloy Steel Externally Threaded Metric Fasteners²
- F 592 Terminology of Collated and Cohered Fasteners and Their Application Tools²
- F 593 Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs²
- F 594 Specification for Stainless Steel Nuts²

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² *Annual Book of ASTM Standards*, Vol 01.08.

³ *Annual Book of ASTM Standards*, Vol 04.01.

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TABLE 1 Alloy, Carbon, and Weathering Steels, Inch

Product ^A	Alloy Steel	Carbon Steel			Weathering Steels
		Low	Medium	Martensitic	
Bolts^B:					
Eye	F 541		A 489		
General purpose:					
UTS 60K		A 307 Gr A, B			
UTS 120, 105, 90K			A 449 Type 1	A 449 Type 2	
UTS 125, 115K	A 354 Gr BC				
UTS 150, 140K	A 354 Gr BD				
Non Headed	A 687				
Roof and Rock			F 432		
Structural:					
UTS 120, 105K			A 325 Type 1 ^C		A 325 Type 3
UTS 150K	A 490 Type 1			A 490 Type 2	A 490 Type 3
Transmission tower		A 394 Type 0	A 394 Type 1	A 394 Type 2	A 394 Type 3
Nails:					
Gypsum wallboard		C 514			
Nuts^B:					
PL 69K		A 563 Gr 0			
PL 100, 90K		A 563 Gr A			
PL 133, 120, 116, 105K			A 563 Gr B		
PL 144K			A 563 Gr C		A 563 Gr C 3
PL 150, 135K			A 563 Gr D		
PL 175, 150K	A 563 Gr DH				
PL 175K					A 563 Gr DH3
Rivets:					
General purpose		A 502 Gr 1			
Pressure vessel		A 31 Gr A	A 31 Gr B		
Structural		A 502 Gr 1	A 502 Gr 2		A 502 Gr 3
Screws:					
Hex cap			A 449 Type 1	A 449 Type 2	
Socket head	A 574				
Socket button and flat CSK	F 835				
Socket set	F 912				
Studs:					
UTS 58-80K		A 307 Gr C			
UTS 60K		A 307 Gr A, B			
UTS 120, 105, 90K			A 449 Type 1	A 449 Type 2	
UTS 125, 115K	A 354 Gr BC				
UTS 150, 140K	A 354 Gr BD				
UTS 150K	A 687				
Washers:					
General Purpose, Soft		F 844			
General Purpose, Hard			F 436		F 436
Load Indicating	F 959 Type 490		F 959 Type 325		
Structural, Hard			F 436		F 436

^AUltimate tensile strengths (UTS) and proof loads (PL) where shown are approximations and vary with size. For break points, see applicable product specification.

^B For bolt/nut suitability guide, see (A 563 Table X 1.1.).

^CMay be furnished as carbon, alloy, or carbon boron steel.

TABLE 2 Aluminum, Copper, Nickel, Titanium, and Stainless Steels (Inch)

Product	Aluminum ^A	Copper ^A	Nickel ^A	Titanium ^A	Stainless ^A
Bolts:					
General purpose	F 468	F 468	F 468	F 468	F 593
Transmission tower	F 901				
Nuts:					
General purpose	F 467	F 467	F 467	F 467	F 594
Transmission tower	F 901				
Rivets					
Screws:					
Hex cap	F 468	F 468	F 468	F 468	F 593
Socket head					
Socket button and Flat CSK					F 879
Socket set					F 880
Studs	F 468	F 468	F 468	F 468	F 593
Washers					

^ASee product specification for available alloys.

F 606 Test Methods for Determining the Mechanical Properties of Externally and Internally Threaded Fasteners, Washers, and Rivets²

F 680 Test Methods for Nails²
F 738M Specification for Stainless Steel Metric Bolts, Screws, and Studs²

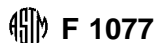


TABLE 3 Ferrous, Nonferrous, and Stainless Steel, Metric

Product	Ferrous ^A			Nonferrous ^A	Stainless Steel ^A
	Alloy Steel	Carbon Steel	Weathering Steel	Al, Cu, Ni, Ti	
Bolts:					
General purpose	A 568 Cl 12.9	F 568 Cl 4.6, 4.8, 5.8, 8.8, 9.8, 10.9	F 568 Cl 8.8.3, 10.9.3	F 468M	F 738M
Structural:					
8.8, 8.8.3		A 325M Type 1, 2	A 325M Type 3		
10.9, 10.9.3		A 490M Type 1, 2	A 490M Type 3		
Transmission tower					
Nuts		A 563M Cl 5.9, 8S, 10, 10S, 12	A 563M Cl 8S3, 10S3	F 467M	F 836M
Rivets					
Screws:					
Hex cap	F 568 Cl 12.9	F 568 Cl 4.6, 4.8, 5.8, 8.8, 9.8, 10.9	F 568 Cl 8.8.3, 10.9.3	F 468M	F 738M
Heavy hex	F 568 Cl 12.9	F 568 Cl 4.6, 4.8, 5.8, 8.8, 9.8, 10.9	F 568 Cl 8.8.3, 10.9.3		
Hex flange		F 568 Cl 4.6, 4.8, 5.8, 8.8, 9.8, 10.9	F 568 Cl 8.8.3, 10.9.3		
Socket head	A 574M				F 837M
Socket button and Flat	F 835M				F 879M
CSK					
Socket set	F 912M				F 880M
Studs	F 568 Cl 12.9	F 568 Cl 4.6, 4.8, 5.8, 8.8, 9.8, 10.9	F 568 Cl 8.8.3, 10.9.3	F 468M	F 738M
Washers:					
Hard		F 436M Type 1	F 436M Type 3		

^ASee product specifications for available alloys.

TABLE 4 Coatings, Test Methods, Definitions, and Surface Discontinuities



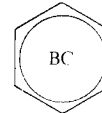
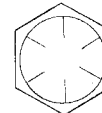
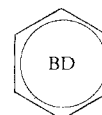
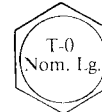
Products	Coatings	Definitions	Test Methods	Surface Discontinuities
Bolts	F 871M, F 1135, F 1136, F 1137		F 606	F 788
Collated and cohered fasteners		F 592		
Nails		F 547	F 680	
Nuts	F 871M, F 1135, F 1136, F 1137		F 606	F 812
Rivets			F 606	
Screws	F 871M, F 1135, F 1136, F 1137		F 606	F 788
Studs	F 871M, F 1135, F 1136, F 1137		F 606	F 788
Washers			F 606	

F 788/F788M Specification for Surface Discontinuities of Bolts, Screws, and Studs, Inch and Metric Series²
 F 812/F812M Specification for Surface Discontinuities of Nuts, Inch and Metric Series²
 F 835 Specification for Alloy Steel Socket Button and Flat Countersunk Head Cap Screws²
 F 835M Specification for Alloy Steel Socket Button and Flat Countersunk Head Cap Screws [Metric]²
 F 836M Specification for Stainless Steel Metric Nuts²
 F 837M Specification for Stainless Steel Socket Head Cap Screws [Metric]²

F 844 Specification for Washers, Steel, Plain (Flat), Unhardened for General Use²
 F 871M Specification for Electrodeposited Coatings on Threaded Components [Metric]²
 F 879 Specification for Stainless Steel Socket Button and Flat Countersunk Head Cap Screws²
 F 879M Specification for Stainless Steel Socket Button and Flat Countersunk Head Cap Screws [Metric]²
 F 880 Specification for Stainless Steel Socket-Set Screws²
 F 880M Specification for Stainless Steel Socket-Set Screws [Metric]²
 F 901 Specification for Aluminum Transmission Tower Bolts and Nuts²
 F 912 Specification for Alloy Steel Socket Set Screws²
 F 912M Specification for Alloy Steel Socket Set Screws [Metric]²
 F 959 Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners²
 F 1135 Specification for Cadmium or Zinc Chromate Organic Corrosion Protective Coating for Fasteners²
 F 1136 Specification for Chromium/Zinc Corrosion Protective Coatings for Fasteners²
 F 1137 Specification for Phosphate/Oil and Phosphate/Organic Corrosion Protective Coatings for Fasteners²

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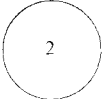

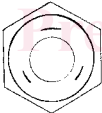



TABLE 5 Product Marking Requirements

ASTM Number	Grade, Type, or Alloy	Condition	Product and Size	Manufacturers Identification Required	Product Identification	Notes
A 31	A and B		rivets	no	not required	
A 307	A		bolts and studs	yes	"307A"	Stud grade marking applicable to sizes 3/8 in. and larger only.
	B		bolts and studs	yes	"307B"	Stud grade marking applicable to sizes 3/8 in. and larger only.
	C		studs	yes	"307C"	Stud grade marking applicable to sizes 3/8 in. and larger only.
A 325	1		bolts	yes		In addition may have 3 radial lines 120° apart.
	3		bolts	yes		In addition may have other distinguishing marks indicating weathering type steel.
A 325M	1		bolts	yes		
	2		bolts	yes		
	3		bolts	yes		In addition may have other distinguishing marks indicating weathering type steel.
A 354	BC		bolts and studs	yes		
	BD		bolts 0.25 through 2.5 in.	yes		In addition to the six radial lines, bolts may also be marked with the Grade Symbol "BD."
	BD		bolts over 2.5 in. and all sizes of all other Grade BD products	yes		
A 394	0		bolts	yes		In addition to the product identification, all types are marked with nominal length (Nom Lg).

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ASTM Number	Grade, Type, or Alloy	Condition	Product and Size	Manufacturers Identification Required	Product Identification	Notes
	1		bolts	yes		
	2		bolts	yes		
	3		bolts	yes		
A 449	1		bolts	yes		
	2	studs bolts		no yes	not required	See Supplemental Requirement S1.
A 489	1 and 2		eyebolts	yes	not required	
A 490	1		bolts	yes		
	2		bolts	yes		
	3		bolts	yes		In addition may have other distinguishing marks indicating weathering type steel.
A 490M	1		bolts	yes		

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ASTM Number	Grade, Type, or Alloy	Condition	Product and Size	Manufacturers Identification Required	Product Identification	Notes
	2		bolts	yes		
	3		bolts	yes		In addition may have other distinguishing marks indicating weathering type steel.
A 502	1		rivets	yes	Not required but "1" may be used at manufacturers option	
	2		rivets	yes		
	3		rivets	yes		
A 563	0, A, B		all nuts	no	not required	When specified on Purchase Order, mark with Grade Symbol.
	C		heavy hex nuts	yes		A 194 Grade 2 and 2H are acceptable alternatives. Such nuts are marked 2, 2B, 2H, or 2HB instead of the 3 circumferential marks.
			other than heavy hex	yes	not required	
	C3		heavy hex nuts	yes		In addition may have other distinguishing marks indicating weathering type steel. The numeral 3 may appear more than once.
			other than heavy hex	yes	not required	
	D		all nuts	yes		A 194 Grade 2 and 2H are acceptable alternatives. Such nuts are marked 2, 2B, 2H, or 2HB instead of the Grade Symbol "D".
A 563	DH		all nuts	yes		A 194 Grade 2H is an acceptable alternative. Such nuts are marked 2H or 2HB instead of the Grade Symbol "DH".