Designation: F 467 – 01

Standard Specification for Nonferrous Nuts for General Use[1]

This standard is issued under the fixed designation F 467; 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 requirements for commercial wrought nonferrous nuts 0.250 to 1.500 in. inclusive in diameter in a number of alloys in common use and intended for general service applications.

1.2 Applicable bolts, cap screws, and studs for use with nuts covered by this specification are covered by Specification F 468.

NOTE 1—A complete metric companion to Specification F 467 has been developed—F 467M; therefore no metric equivalents are presented in this specification.

2. Referenced Documents

2.1 *ASTM Standards:*

B 154 Test Method for Mercurous Nitrate Test for Copper and Copper Alloys[2]

D 3951 Practice for Commercial Packaging[3]

E 18 Test Methods for Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials[4]

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications[5]

E 34 Test Methods for Chemical Analysis of Aluminum and Aluminum Base Alloys[6]

E 38 Methods for Chemical Analysis of Nickel-Chromium and Nickel-Chromium-Iron Alloys[6]

E 53 Test Methods for Chemical Analysis of Copper[6]

E 54 Test Methods for Chemical Analysis of Special Brasses and Bronzes[6]

E 55 Practice for Sampling Wrought Nonferrous Metals and Alloys for Determination of Chemical Composition[6]

E 62 Test Methods for Chemical Analysis of Copper and Copper Alloys (Photometric Methods)[6]

E 75 Test Methods for Chemical Analysis of Copper-Nickel and Copper-Nickel-Zinc Alloys[6]

E 76 Test Methods for Chemical Analysis of Nickel-Copper Alloys[6]

E 92 Test Method for Vickers Hardness of Metallic Materials[4]

E 101 Test Method for Spectrographic Analysis of Aluminum and Aluminum Alloys by the Point-to-Plane Technique[7]

E 120 Test Methods for Chemical Analysis of Titanium and Titanium Alloys[6]

E 165 Practice for Liquid Penetrant Inspection Method[8]

E 227 Test Method for Optical Emission Spectrometric Analysis of Aluminum and Aluminum Alloys by the Point-to-Plane Technique[7]

E 354 Test Methods for Chemical Analysis of High-Temperature, Electrical, Magnetic, and Other Similar Iron, Nickel, and Cobalt Alloys[6]

E 478 Test Methods for Chemical Analysis of Copper Alloys[6]

E 1409 Test Method for Determination of Oxygen in Titanium and Titanium Alloys by the Inert Gas Fusion Technique[7]

F 468 Specification for Nonferrous Bolts, Hex Cap Screws, and Studs for General Use[9]

F 606 Test Methods for Determining the Mechanical Properties of Externally and Internally Threaded Fasteners, Washers, and Rivets[9]

F 1470 Guide for Fastener Sampling for Specified Mechanical Properties and Performance Inspection[9]

2.2 *American National Standards:*

B 1.1 Unified Inch Screw Threads (UN and UNR Thread Form)[10]

B 18.2.2 Square and Hex Nuts[10]

3. Ordering Information

3.1 Orders for nuts under this specification shall include the following information:

3.1.1 Quantity (number of pieces of each item and size),

3.1.2 Name of item,

[1] This specification is under the jurisdiction of ASTM Committee F16 on Fasteners and is the direct responsibility of Subcommittee F16.04 on Nonferrous Fasteners.

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[2] *Annual Book of ASTM Standards*, Vol 02.01.

[3] *Annual Book of ASTM Standards*, Vol 15.09.

[4] *Annual Book of ASTM Standards*, Vol 03.01.

[5] *Annual Book of ASTM Standards*, Vol 14.02.

[6] *Annual Book of ASTM Standards*, Vol 03.05.

[7] *Annual Book of ASTM Standards*, Vol 03.06.

[8] *Annual Book of ASTM Standards*, Vol 03.03.

[9] *Annual Book of ASTM Standards*, Vol 01.08.

[10] Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

TABLE 1 Chemical Requirements

UNS Designation Number	Composition, %												
	Copper and Copper-Base Alloys												
	Alloy	General Name	Aluminum	Copper, min	Iron, max	Manganese, max	Nickel, max	Phosphorus	Silicon	Zinc, max[A]	Lead, max	Tin	Arsenic, max
C11000	110	ETP copper		99.9									
C27000	270	brass		63.0–68.5	0.07					balance	0.10		
C46200	462	naval brass		62.0–65.0	0.10					balance	0.20	0.5–1.0	
C46400	464	naval brass		59.0–62.0	0.10					balance	0.20	0.5–1.0	
C51000	510	phosphor bronze		balance[A]	0.10			0.03–0.35		0.30	0.05	4.2–5.8	
C61300	613	aluminum bronze	6.0–7.5	[B]	2.0–3.0	0.10	0.15[C]	0.015	0.10	0.05	0.01	0.20–0.50	
C61400	614	aluminum bronze	6.0–8.0	88.0[D]	1.5–3.5	1.0							
C63000	630	aluminum bronze	9.0–11.0	78.0[D]	2.0–4.0	1.5	4.0–5.5		0.25 max			0.20 max	
C64200	642	aluminum silicon bronze	6.3–7.6	88.65[D]	0.30	0.10	0.25		1.5–2.2[E]	0.50	0.05	0.20 max	0.15
C65100	651	silicon bronze		96.0[D]	0.8	0.7			0.8–2.0	1.5	0.05		
C65500	655	silicon bronze		94.8[D]	0.8	1.5	0.6		2.8–3.8	1.5	0.05		
C66100	661	silicon bronze		94.0[D]	0.25	1.5			2.8–3.5	1.5	0.20–0.8		
C67500	675	manganese bronze	0.25 max	57.0–60.0	0.8–2.0	0.05–0.5				balance	0.20	0.5–1.5	
C71000	710	cupro-nickel		74.0[D]	0.60	1.00	19.0–23.0[C]			1.00	0.05		
C71500	715	cupro-nickel		65.0[D]	0.40–0.7	1.00	29.0–33.0[C]			1.00	0.05		

[A] Elements shown as balance shall be arithmetically computed by deducting the sum of the other named elements from 100.
[B] Copper plus specified elements = 99.8 min; copper plus silver = 88.5–91.5.
[C] Cobalt is to be counted as nickel.
[D] Minimum content of copper plus all other elements with specified limits shall be 99.5 %.
[E] An alloy containing as high as 2.6 % silicon is acceptable provided the sum of all the elements other than copper, silicon, and iron does not exceed 0.30 %.

TABLE 1 *Continued*

Nickel and Nickel-Base Alloys

UNS Designation Number	Alloy	General Name	Aluminum	Carbon, max	Chromium	Copper[A]	Iron, max	Manganese, max	Nickel[A]	Phosphorus, max	Silicon, max	Titanium	Cobalt, max	Molybdenum	Sulfur, max	Vanadium	Tungsten
N10001	335	Ni-Mo		0.05	1.0 max		4.0–6.0	1.0	balance	0.025	1.00		2.50	26.0–30.0	0.030	0.2–0.4	
N10276	276	Ni-Mo-Cr		0.02	14.5–16.5		4.0–7.0	1.00	balance	0.040	0.08		2.50	15.0–17.0	0.030	0.35 max	3.0–4.5
N04400	400	Ni-Cu Class A		0.3		balance	2.5	2.0	63.0–70.0		0.5		[B]		0.024		
N04405	405	Ni-Cu Class B		0.3		balance	2.5	2.0	63.0–70.0		0.5		[B]		0.025–0.060		
N05500	500	Ni-Cu-Al	2.30–3.15	0.25		balance	2.0	1.5	63.0–70.0		0.5	0.35–0.85	[B]		0.01		
N06686	686	Ni-Cr-Mo-W		0.010 max	19.0–23.0		5.0 max	0.75 max	balance	0.04 max	0.08 max	0.02–0.25		15.0–17.0	0.02 max		3.0–4.4

[A] Elements shown as balance shall be arithmetically computed by deducting the sum of the other named elements from 100.
[B] Cobalt is to be counted as nickel.

TABLE 1 *Continued*

Composition, %													
Aluminum-Base Alloys[A]													
UNS Designation Number	Alloy	General Name	Aluminum[A]	Chromium	Copper	Iron, max	Manganese, max	Silicon, max	Titanium, max	Zinc, max	Magnesium	Other Elements, max	
												Each	Total
A92024	2024	Aluminum 2024	balance	0.10 max	3.8–4.9	0.50	0.30–0.9	0.50	0.15[B]	0.25	1.2–1.8	0.05	0.15
A96061	6061	Aluminum 6061	balance	0.04–0.35	0.15–0.40	0.7	0.15	0.40–0.8	0.15	0.25	0.8–1.2	0.05	0.15
A96262	6262	Aluminum 6262	balance	0.04–0.14	0.15–0.40	0.7	0.15	0.40–0.8	0.15	0.25	0.8–1.2	[C]	

[A] Analysis shall regularly be made only for the elements specified in this table. If, however, the presence of other elements is suspected or indicated in amounts greater than the specified limits, further analysis shall be made to determine that these elements are not present in excess of the specified limits.

[B] Titanium + zirconium 0.20 %, max.

[C] Lead 0.4–0.7 %; bismuth 0.4–0.7 %.