

NAVSEA  
STANDARD ITEM

*FY-21CH-2*

ITEM NO: 009-84  
DATE: 06 MAR 2020  
CATEGORY: I

1. SCOPE:

1.1 Title: Threaded Fastener Requirements; accomplish

2. REFERENCES:

2.1 Standard Items

2.2 S9086-CJ-STM-010/075, Fasteners

3. REQUIREMENTS:

3.1 General

3.1.1 Replace the following non-Level I fasteners 1/2-inch nominal diameter and smaller with new fasteners of the same material, strength and design;

3.1.1.1 Monel, QQ-N-281, FF-S-85, ASTM 468 Alloy 400

3.1.1.2 CRES, 300 Series, FF-S-85

3.1.1.3 Steel, ASTM A193/A193M B16

3.1.1.4 Steel, Grade 5 and Grade 8

3.1.2 Inspect each fastener intended for reuse for wear and defects. For the exposed portion of each body-bound stud use 075-8.2 of 2.2 for accept or reject criteria. For each other fastener, use Attachment A and paragraph 075-8.3 of 2.2 for accept or reject criteria.

3.1.3 Fasteners larger than 1/2-inch nominal diameter must be retained for reuse to the maximum extent possible. Reuse existing fasteners if the acceptance criteria of Attachment A and paragraph **075-8.2 and** 075-8.3 of 2.2 are met.

3.1.3.1 Maintain fastener accountability to ensure fasteners meeting the criteria of this item are reused in the same joint from which they came.

3.1.3.2 Clean each fastener free of foreign matter (including paint).

### 3.1.3.3 Chase and tap exposed threaded areas.

3.1.4 Install new threaded fasteners, washers, and lock washers in place of those identified to be missing or defective.

3.1.4.1 Utilize table one and 2.2 to select each replacement fastener when necessary.

3.1.5 Use of black-oxide coated brass threaded fasteners (BOCBTF) is prohibited in the accomplishment of any work. BOCBTFs are most commonly marked with “462”, “464”, “F467C”, “F467D”, “F468C”, and “F468D.”

3.1.6 Fasteners, body-fitted bolts, and studs requiring a permeability factor of 2.0 or less must conform to 500 Series Monel, 316L CRES, or 304 CRES where required.

3.2 Externally threaded fastener installation acceptance criteria unless otherwise specified or approved:

3.2.1 The minimum thread protrusion for each male threaded fastener must be one full thread beyond the face of the nut. The maximum thread protrusion for each male threaded fastener is 10 full threads beyond the face of the nut.

3.2.2 For self-locking (plastic insert) nut installations, the minimum thread protrusion for bolt or stud end may be flush with the face of the nut after the threaded fastener(s) have been installed and tightened. The maximum thread protrusion for self-locking nuts must be 5 threads after the threaded fastener(s) have been installed and tightened.

3.3 Internally threaded fastener installation acceptance criteria must be in accordance with paragraph 075-7.6 of 2.2.

### 3.4 Use of Temporary Fasteners

3.4.1 Maintain a single log/file of installed/removed temporary fasteners with the following information:

3.4.1.1 System

3.4.1.2 Component (valves, flanges, foundations, brackets)

3.4.1.3 Location (deck, frame, port, starboard, tank, manhole)

3.4.1.4 Company name/badge number/name of mechanic

3.4.1.5 Date installed/date removed

3.4.2 Paint temporary fasteners blaze orange unless an alternate color has been authorized by the SUPERVISOR. Minimum requirements for painting fasteners are as follows:

3.4.2.1 Nut Bearing faces (top)

3.4.2.2 Bolt Top of bolt head

3.4.2.3 Stud Both ends of stud

3.4.2.4 Washer Faces (edge and bottom of washer)

3.4.3 Remove temporary fasteners prior to any testing, lagging, and/or painting of systems or components.

3.4.4 Logging-in of temporary fasteners must be accomplished no later than the end of the work shift.

3.4.5 Existing system fasteners used for blanking that will be reused for installation are excluded from the requirement of 3.4.2.

#### 4. NOTES:

4.1 For purposes of this item, temporary fasteners are defined as those fasteners that are installed in lieu of the final fasteners that are specified for system installation. Examples would include temporary fasteners used to hold fittings, valves, or machinery in place.

4.2 One complete thread or one thread length is defined as one complete rotation (360 degrees on a single thread), starting at a point along the thread.

## Attachment A

The following criterion applies to the inspection of fasteners:

1 General inspection: Fasteners must bear markings identifying material to be compatible with the system. Black-oxide coated fasteners and fasteners without markings are not acceptable. Joints with mixed material fasteners are not acceptable.

2. Engaged Thread Area: Cracks are not acceptable.

2.1 Broken, chipped, or missing threads or other indications of brittle material failure, are not acceptable.

2.2 Galling, spalling, or pitting is not acceptable.

2.3 Major defects are not acceptable. A major defect is a single defect (after removal of sharp edges and raised metal) that has a depth over one-half the thread depth.

2.4 Isolated minor defects are acceptable. A minor defect is a single nick, gouge, or flattened thread (after removal of sharp edges and raised metal) that has a depth greater than 1/64-inch, but less than one-half the thread height (depth), and a width less than the thread spacing (pitch). Defects less than 1/64-inch deep may be ignored.

2.4.1 An isolated minor defect that exceeds the width criterion for a minor defect is acceptable when the total length of the defect does not exceed 15 percent of one thread length in any one complete thread.

2.4.2 Any combination of minor defects is acceptable when the total combined length of the defects does not exceed 15 percent of one thread length in any one complete thread.

2.5 Repaired threads that engage with a non-self-locking Class 3-B fit nut, turned with fingers, are acceptable.

3. Non-Engaged Thread Area:

3.1 Cracks are not acceptable.

3.2 For externally threaded fasteners, no minimum thread form is required, except as needed to provide initial thread engagement and passing of the nut.

4. Self-locking nuts must have prevailing torque in accordance with 2.2. Cuts, tears, or looseness in self-locking elements or the adjacent metal is not acceptable.

4.1 Determine adequate torque values in accordance with Table 075-5-1 of 2.2.

5. Deformed or damaged flats on fasteners are not acceptable.
6. Discard fasteners not meeting the acceptance requirements of this item.

ATTACHMENT B

VALVE BODY MATERIAL

	<u>1/</u> Alloy Steel	Carbon Steel	Nonferrous <span style="float: right;"><u>2/</u></span>
<u>3/</u> Studs and Bolts to MIL- DTL-1222	Grade B-16	Grade B-16	Phosphor Bronze - Any Grade Silicon Bronze - Any Grade Nickel Copper - Class A <span style="float: right;"><u>4/</u></span>
Nuts to MIL-DTL-1222	Grade 4 or 7	Grade 4 or 7	Phosphor Bronze - Any Grade Silicon Bronze - Any Grade Nickel Copper - Class A or Class B <span style="float: right;"><u>5/</u></span>
Socket Head Cap Screws	FF-S-86	FF-S-86	

NOTES

1/ Alloy steel is of Composition A - 2-1/4 percent Chromium, one percent Molybdenum, Composition B - 1-1/4 percent Chromium, 1/2 percent Molybdenum, and Composition C - Carbon Molybdenum.

2/ Nonferrous Alloy except Aluminum.

3/ Studs must be Class 2 or 3 fit on the nut end and Class 5 fit on the stud and, except that a Class 3 fit with a thread locking compound may be used where temperatures do not exceed 250 degrees Fahrenheit. The thread locking compound must conform to ASTM D 5363. Check Class 3 fit stud ends in accordance with SAE-J2270.

4/ Fasteners of Nickel Copper Aluminum must be the only type used on sea chest and hull valves.

5/ Nuts of Nickel Copper Alloy, conforming to QQ-N-281 Class A or B, or Nickel Copper Aluminum conforming to QQ-N-286 must be the only type used on sea chest and hull valves.

ATTACHMENT C (DDG-51 Class)

VALVE BODY MATERIAL

	1/ Alloy Steel/Carbon Steel	2/ Nonferrous
3/ Studs and Bolts to MIL-DTL-1222	5/ For services up to and including 650 degrees Fahrenheit; Grade 5 steel	4/ 5/ Phosphor Bronze - Any Grade
	For services to 775 degrees Fahrenheit; Grade B-7 or B-16	Silicon Bronze - Any Grade  Nickel Copper - Class A
	For services to 1,000 degrees Fahrenheit; Grade B-16	
	For services in which JP-5 lubricating oil, or inflammable gas or liquid of any kind, regardless of pressure and temperature, which are within 3 feet of hot surfaces (above 650 degrees F) and where steel tubing is required; Grade 2, 5 or 8 steel	
	Bolting subject to seawater corrosion (other than hull integrity bolting; for hull integrity bolting see Note 4) Connections in contact with bilge regions. Where strength requires ferrous bolting and is exposed to the weather; Class A Nickel - Copper alloy to QQ-N-281 or silicon bronze to ASTM B 98 with dimensions of MIL-DTL-1222. Where greater strength is required, use Nickel - Copper - Aluminum alloy QQ-N-286.	
Nuts to MIL-DTL-1222	5/ For services up to and including 650 degrees Fahrenheit; Grade 5 steel	Phosphor Bronze - Any Grade
	For service to 775 degrees Fahrenheit; Grade 2H or 4 steel	Silicon Bronze - Any Grade
	For services to 1,000 degrees Fahrenheit; Grade 4 steel	
	For services in which JP-5, lubricating oil, or inflammable gas or liquid of any kind, regardless of pressure and temperature which are within 3 feet of hot surfaces (above 650 degrees F) and where steel tubing is required; Grade 5 or 8 steel	Nickel Copper - Class A or Class B  4/ 5/

Nuts to MIL-DTL-1222 (Con't)	Nuts subject to seawater corrosion. Connections in the bilge regions. Where strength requires ferrous material and is exposed to the weather; Class A or B Nickel Copper Alloy to QQ-N-281 or Silicon Bronze to ASTM B 98 with dimensions to MIL-DTL-1222.	
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NOTES

1/ Alloy steel is of Composition A - 2-1/4 percent Chromium, one percent Molybdenum, Composition B - 1-1/4 percent Chromium, 1/2 percent Molybdenum, and Composition C - Carbon Molybdenum.

2/ Nonferrous Alloy except Aluminum.

3/ Studs must be Class 2 or 3 fit on the nut end and Class 5 fit on the stud end, except that a Class 3 fit with a thread locking compound may be used where temperatures do not exceed 200 degrees Fahrenheit. The thread locking compound must conform to ASTM D 5363. Check Class 3 fit stud ends in accordance with SAE-J2270.

4/ Fasteners of Nickel Copper Aluminum must be the only type used on sea chest and hull valves.

5/ Where these materials would constitute part of a galvanic couple, proposals for alternate materials must be submitted for approval.



TABLE ONE  
REPLACEMENT FASTENERS MATERIAL

Application	Fastener	Nut	Other	Comments
Temporary Access (009-05 of 2.1)	MIL-DTL-1222, Grade 304			
Meter, Gauge, Switch, and Thermometer Repair (009-13 of 2.1)	ASTM A 449, Type I, Zinc Coated for Bolts	ASTM A 563 Zinc Coated		May be selected and identified in accordance with SAEJ 2280
Gauges, Switches & Thermometers (009-14 of 2.1)	ASTM A 449, Type I, Zinc Coated for Bolts	ASTM A 563 Zinc Coated		May be selected and identified in accordance with SAEJ 2280
Rotating Electrical Equipment (009-17, 009-33 of 2.1)	MIL-DTL-1222 Type I or II, Grade 5, Zinc Coated	Lock Nuts must conform to requirements of the Equipment Technical Manual	Lock Washers must conform to requirements of the Equipment Technical Manual	Self-Locking Hex Nuts must conform to NASM 25027, excluding body fitted bolts and studs.
Electrical Controllers (009-36 of 2.1)	MIL-DTL-1222 Type I or II, Grade 5, Zinc Coated	Lock Nuts must conform to requirements of the Equipment Technical Manual	Lock Washers must conform to requirements of the Equipment Technical Manual	Self-Locking Hex Nuts must conform to NASM 25027, excluding body fitted bolts and studs.
Woodwork (009-37 of 2.1)  Fasteners subject to contact with sea water and bilge water must be coated with a light viscosity epoxy resin prior to installation.	Nickel copper alloy conforming to QQ-N-281, Grades 400 or 405. Nickel copper aluminum alloy conforming to QQ-N-286 (UNS N05500) where greater strength is required. Copper silicon alloy conforming to ASTM B 98, Grades 651 or 655.	Nuts must conform to MIL-DTL-1222.	Flat washers must conform to FF-W-92, Grade I. Lock washers must conform to FF-W-100.	Bolts, studs, and cap screws must conform to MIL-DTL-1222. Wood screws must conform to FF-S-111. Lag bolts (screws) must conform to ASME B18.2.1. Round head bolts must conform to ASME B18.5, Type I, Class One.

<p>Woodwork (009-37 of 2.1)</p> <p>Aluminum and aluminum alloy components and structural members.</p> <p>To avoid bi-metallic corrosion, fastener material composition must be the same material composition as that of the metal components and structural members that they are fastening except as noted in this table.</p>	<p>Corrosion resistant steel (CRES) conforming to SAE-AMS-STD-66, Grades 304 or 316.</p>		<p>Install non-metallic (epoxy plastic, phenolic, polyimide [nylon], Teflon) sleeves over CRES fasteners where they come in contact with the aluminum and aluminum alloy components and structural members.</p>	<p>Fasteners with compositions of copper alloys must not be used in contact with aluminum and aluminum alloy components and structural members.</p>
<p>Shipboard Electrical / Electronic Cable (009-73 of 2.1)</p>	<p>MIL-DTL-1222, Type I</p>			<p>Grade 316, stainless steel, for areas exposed to weather and high moisture areas</p> <p>Grade 2 or 5, carbon steel, zinc plated, for other areas to support work required by individual Work Items</p>

Rotating SIS Electrical Equipment (009-113 of 2.1)	MIL-DTL-1222, Type I or II, Grade 5, zinc coated	NASM-25027, self-locking hexagon nuts, excluding body-fitted bolts and studs.	Lock Washers must conform to requirements of the Equipment Technical Manual	
Valves (009-45, 009-47 through 009-55, and 009-96 of 2.1) – See Attachment B or C (for DDG-51 class).				