SAE International™

# SURFACE VEHICLE STANDARD

SAE J2271 MAY2009

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Superseding J2271 JAN2009

## Ship Systems and Equipment—Part Standard for Studs—Continuous and Double End (Inch Series)

RATIONALE

This limited scope revision only makes editorial changes and clarifications as to the scope of the document. Technical requirements are not changed. Changes are made to 1.1.b and 1.1.c to indicate that different thread forms can be used on each end of the stud. Changes in the January 2009 revision of this standard are listed below.

Configuration changes include:

- Added UNRF thread configurations for diameters 0.190 inch to 1-1/2 inches. Expanded the size (diameter) range of UNRC and 8UN studs.
- Added NC-5 HF and NC-5 CSF interference threads for use where a larger diameter is required for interference fit in an oversize tapped hole. Added ONF interference fit threads in Appendix B.
- The constant strength (undersize) stud body has been deleted in favor of the more commonly used reduced diameter body. Added Full Diameter Body configuration.
- The tap end thread length dimensions have been revised to minimize variations in thread length.
- Due to configuration changes, the Part Identification Number System has been revised and all part numbers are different from earlier revisions.
- Added Appendix A to provide guidance on the selection and installation of NC-5 Interference-Fit Tap End Studs.

Materials added and other material changes are:

- Titanium alloy 32 (Ti-5-1-1-1) to ASTM F 468.
- Ni-Cr-Mo-Cb (UNS N06625) to ASTM F 468 for high temperature and seawater applications.
- Ni-Cr-Mo-W alloy (UNS N06686) to ASTM F 468.
- Stainless steel B8 and B8M to ASTM A 193.
- Stainless steel 300 series per ASTM F 593 Group 1.
- Carbon Steel Grade B per ASTM A 307.
- Carbon and Alloy Steels - SAE J429 Grades 2, 5 and 8 (Grade 5 replaces ASTM A 449 Type 1 and Grade 8 replaces ASTM A 354 Grade BD for diameters of 1-1/2 inches and less).
- Added note comparing titanium materials and on material selection to minimize galling.
- The Part Identification Number Field for materials was expanded to two characters for all materials.

Changes in coating materials:

- MIL-L-46010 deleted for dry film coatings.
- Adding marking requirements for use of coated B7 material per ASTM A 193.
- Added Zinc/Aluminum Inorganic coatings per ASTM F 1136.
- Substituted ASTM F 1941 for ASTM B 633 and ASTM B 695 for zinc coating requirements.
- Identified recommended coatings for each stud material.
- Added a designator for coatings not covered by SAE J2271.



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Changes in Quality Assurance requirements:
Identified sampling levels for tests and inspections.
Added ASTM F 788/F 788M and SAE J1061 as references for surface defects inspection.
Changed primary inspection method for decarburization/carburization to ASTM F 2328
Deleted several supplementary inspections for ASTM A 193 materials.

## 1. SCOPE

### 1.1 Purpose

This SAE Parts Standard provides dimensional and quality assurance requirements for studs in the following configurations in standard materials used for ship system applications:

a. Continuous thread studs in UNRC and 8UNR series in the following threads and diameters:
- UNRC threads (1/4 through 4 inches)
- UNRF threads (1/4 through 1-1/2 inches)
- 8UNR threads (1-1/8 through 4 inches)

b. Double end studs (clamping type) where both ends are of the same minimum thread length in the following threads and diameters:
- UNRC threads (1/4 through 4 inches)
- UNRF threads (1/4 through 1-1/2 inches)
- 8UNR threads (1-1/8 through 4 inches)

Different thread forms on each end are permissible.

c. Double end studs (tap end type) where the tap end thread length is equivalent to 1-1/2 nominal diameters:

| Tap End Thread Forms and Diameters | Nut End Thread Forms and Diameters |
|---|---|
| • NC-5 interference-fit tap end threads (1/4 through 1-1/2 inches) | |
| • UNRC threads (1/4 through 4 inches) | • UNRC threads (1/4 through 4 inches) |
| • UNRF threads (1/4 through 1-1/2 inches) | • UNRF threads (1/4 through 1-1/2 inches) |
| • 8UNR threads (1-1/8 through 4 inches) | • 8UNR threads (1-1/8 through 4 Inches) |

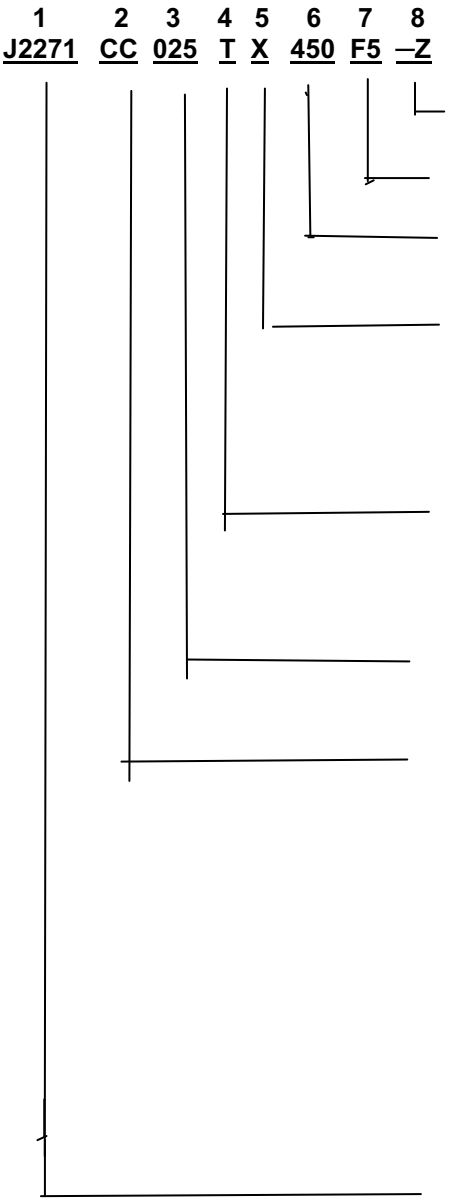
### 1.2 Field of Application

These studs are primarily for use in ship systems and equipment. The continuous thread studs and the reduced body diameter double end studs are configurations particularly suited to applications that are subject to high impact (H.I.) shock requirements.

### 1.3 Configurations and Part Identification Numbers

Figure 1 identifies the type and body configurations of the studs covered by the document. Figure 1 also provides a part numbering system with a unique part identification number for each stud. Table 1 is a listing of the materials covered by this standard. The part identification number identifies thread type, diameter, type of stud, body diameter, length of the stud, and material (including coating, where applicable). See 6.9 for change in Part Identification Numbers from the previous issue.

**Part Numbering System for Studs**




**Field** (Description)

**Coating Designator** (When applicable – See 4.10 for designators)

**Material Designator** – See Table 1 for material designations)

**Length** (3 digits in hundredths of an inch for lengths under 10 inches and 4 digits for longer lengths) See 4.4.2 for permitted length increments

**Stud Body Configurations** (See 4.2 and Table 5)
**F –** Double End Stud – Full Diameter Body (See 4.2.2)
**R –** Double End Stud – Reduced Diameter Body (See 4.2.1)
**S –** Double End Stud – (Body diameter Optional – See 6.9.2)
**X –** No body (continuous thread)

**Stud Type**
**C –** Double End Clamping Type (See 4.1.2, Table 3 and Figure 3)
**D –** Double End With Tap End (See 4.1.2. Table 4 and Figure 4)
**T –** Continuous Thread (See 4.1.1. Table 2 and Figure 2)

**Nominal Diameter –** 3 digits in hundredths of an inch
as shown in Table 2 (See Tables 2 through 5 as applicable)

**Type Thread –** First Letter (Nut End). Second Letter (Tap End or other Nut End) – Two letters required
**1st and 2nd Letter Designators**
**C –** UNRC (UNC) thread form (See 4.3)
**F –** UNRF (UNF) thread form (See 4.3)
**U –** 8UNR (8UN) thread form (See 4.3)
**2nd Letter designators only**
**B –** NC-5 CSF Interference Fit Thread (See 4.3.3)
**H –** NC-5 HF Interference Fit Thread (See 4.3.3)
**N –** NC-5 ONF (See Appendix B for requirements)
**S –** NC-5 HFS Interference Fit Thread (See 4.3.3)
See 4.3.3 for additional Navy Developed NC-5 Interference Fit Thread Designators for improved performance

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The part number example shown above, J2271CC025TX450F5-Z is for a continuously threaded stud with 1/4-20 UNRC threads with a length of 4-1/2 inches manufactured of carbon steel per SAE J429 Grade 5 and zinc plated.

FIGURE 1 - PART IDENTIFICATION NUMBERS (PIN'S) FOR CONTINUOUS AND DOUBLE END STUDS (INCH SERIES)