



**DEPARTMENT OF THE NAVY**  
NAVAL SURFACE WARFARE CENTER  
CARDEROCK DIVISION

NAVAL SHIP SYSTEMS  
ENGINEERING STATION  
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IN REPLY REFER TO  
9505

Ser 924/006

**31 Aug 2006**

From: Commander, Carderock Division, Naval Surface Warfare Center,  
Philadelphia, PA 19112-1403

To: Program Executive Officer, Ships (PMS 400D)

Subj: SELECTIVE APPROVAL OF MONEL ¼" TO 1" SWAGELOK MECHANICALLY  
ATTACHED FITTINGS (MAF) IN FLUID SYSTEMS ON SURFACE SHIPS

- Ref:
- (a) Swagelok Company ltr of 25 January 2005, Re: Alloy 400/405 ¼" through 1" Swagelok Tube Fittings and ASTM F 1387-99
  - (b) Swagelok Company, Test Report, Alloy 400/405 Swagelok Tube Fitting Testing per ASTM F 1387-99 with 70/30 Copper-Nickel Tubing per MIL-T-16420K, 21 Jan 2005
  - (c) ASTM F 1387-99, Standard Specification for Performance of Piping and Tubing Mechanically Attached Fittings
  - (d) MIL-T-16420K, Military Specification, Tube, Copper-Nickel Alloy, Seamless and Welded, 14 April 1978
  - (e) MIL-STD-777E, Military Standard, Schedule of Piping, Valves, Fittings, and Associated Components for Naval Surface Ships, 7 Feb 1986
  - (f) Naval Ship's Technical Manual (NSTM), S9086-RK-STM-010/CH-505, Piping Systems, Revision 2 dated 1 Dec 2001

1. As requested by Program Executive Office Ships, PMS 400D, Carderock Division, Naval Surface Warfare Center (NSWCCD-SSES) Code 924 has reviewed reference (a), a request for approval of Swagelok Company's Alloy 400/405 (Monel) ¼" through 1" OD Mechanically Attached Fittings (MAFs) in fluid systems on surface ships.

2. Reference (a) forwarded reference (b), a report of testing conducted by Swagelok in accordance with reference (c). The fittings tested included:

a) Type IV (Grip-type, Separable), Grade C, (Nickel-Copper), Class 8 (3,750 psi) for reference (d), Class 3300, alloy 715 (70-30) tubing for the temperature range -65° to 600° F. Sizes tested included ¼" and 1".

b) Type IV (Grip-type, Separable), Grade C, (Nickel-Copper), Class 10 (6,000 psi) for reference (d), Class 6000, alloy 715 (70-30) tubing for the temperature range -65° to 600° F. Sizes tested included ¼".

3. Reference (e) specifies the Service Categories and Groups of non-nuclear piping systems on surface ships. References (e) and (f) address fire hardened fittings and their applications. Note that there may be some differences between the categories and groups delineated in reference (e) and a Project Peculiar Document for piping components for new construction of a specific ship/class.

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4. Approval is granted for use of monel 3/8” to 1”, Class 8, Swagelok Mechanically Attached Fittings as braze equivalents (not fire hardened) for tubing, maximum pressure, and temperatures discussed in paragraph 2.a. The ¼” Class 8 fitting is approved for fire hardened applications and also approved for use on reference (d), Class 200, alloy 715 tubing for the temperature range listed in fire hardened applications. The monel, ¼”, Class 10 fittings are approved for fire hardened applications for the tubing, maximum pressure, and temperatures discussed in paragraph 2.b. Note that this approval is not applicable to Submarines, Nuclear Systems, or Nuclear Surface Ship Machinery Spaces.

5. Use of subject MAFs is contingent upon Navy approval of a training program based on reference (f) requirements noting that care must be taken during construction and maintenance of piping systems to ensure that the different material fittings, including their components (i.e. nuts and ferrules), are only used on the proper tubing. Also, care must be taken not to mix components from different manufacturers of tubing fittings. Navy contractors must submit a process control procedure to the Naval contracting activity for approval prior to installation.

6. The requirements of this letter will be incorporated into reference (f). NSWCCD-SSES point of contact is Domenic Luciani, Code 924, Commercial (215) 897-7875, DSN 443-7875 or e-mail: [domenic.luciani@navy.mil](mailto:domenic.luciani@navy.mil).



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