



DEPARTMENT OF THE NAVY
NAVAL SURFACE WARFARE CENTER
CARDEROCK DIVISION

NAVAL SHIP SYSTEMS
ENGINEERING STATION
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PHILADELPHIA, PA 19112-1403

IN REPLY REFER TO

9165
924/004
19 Feb 2010

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

Subj: TUBE-MAC INDUSTRIES LTD., SWAGE MARINE FITTINGS (SMFs), USE ON
SURFACE SHIPBOARD PIPING SYSTEMS

Ref: (a) NAVSEA Ltr OPR:56Y236 Ser 56Y23/282 of 7 Apr 1989
(b) NAVSEA Ltr OPR:56Y239, Ser 56Y/167 of 12 Dec 1986
(c) Uniform Industrial Process Instruction (UIPI) No. 0505- 901 dated 20 March 1987;
Swage Marine Fitting Shipboard Installation Procedure.

Encl: (1) Summary of Swage Marine Fittings (SMF) Approvals By MIL-STD 777E Category
for Fossil Fueled Surface Ships
(2) Summary of Swage Marine Fittings (SMF) Approvals By MIL-STD 777E Category
for Nuclear Powered Surface Ships (Outside the Machinery Box)

1. This letter supercedes reference (a). The Department of the Navy recognizes Tube-Mac Industries Ltd., as the manufacture of PYPLOK and hereby approves SMFs manufactured by Tube-Mac Industries Ltd for use on shipboard applications specified in enclosures (1) and (2). Note that approval of Type I SMF for category and group K-5, of enclosures (1) and (2), is hereby rescinded due to temperature restrictions. Note that this letter, as well as reference (a) and all other NAVSEA correspondence approving swage marine fittings, applies to Tube-Mac Industries Ltd. (Trademark "PYPLOK") fittings only.

2. This letter does not constitute approval for the use of SMFs in nuclear submarine piping. SMFs are approved for the use on fossil fueled surface ships as listed in enclosure (1) and on nuclear powered surface ships (outside of machinery box) as listed in enclosure (2).

3. SMFs shall not be seal welded due to possible weld contamination by the silicone environmental seal. Installation must comply with the following guidelines and shall not be installed in systems where possible operation may exceed the design rating of the fitting.

- a. Type I SMF, made of 70-30 copper-nickel alloy material, has a maximum system design pressure (as defined in NSTM 505 and the General Specifications) rating of 6000 psi and temperature rating of -60 deg. F to 400 deg. F. Type I SMF may be used in sizes not to exceed $\frac{3}{4}$ NPS and 1 inch OD for copper and copper-nickel tubing.

Subj: TUBE-MAC INDUSTRIES LTD. (PYPLOK) SWAGE MARINE FITTINGS (SMFs),
USE ON SURFACE SHIPBOARD PIPING SYSTEMS

- b. Type II SMF, made of CRES 316L material, has a maximum system design pressure rating of 3750 psi and temperature rating of -60 deg. F to 400 deg. F. Type II SMF may be used in sizes not to exceed 1 ½ NPS and 1 ½ inch OD for carbon steel and CRES pipe.
- c. Type III SMF, made of 70-30 copper-nickel alloy, has a maximum system design pressure rating of 3750 psi and temperature rating of -60 deg. F to 400 deg. F. Type III SMF may be used in sizes ¼ OD through 1 NPS for copper-nickel pipe (class 200 through 3300 only) and copper pipe (wall thickness not to exceed that required for 3750 PSI). At this time, Type III can only be used as an alternative to brazed fittings (wherever the latter are allowed by MIL-STD 777) with the exception that Type III shall not be used on systems listed below in the following specified fire hazardous areas.

FIRE HAZARDOUS AREAS

- Main machinery rooms
- Auxiliary machinery rooms with fuel pumps or fossil fueled equipment
- Fire rooms and engine rooms of fossil fuel powered ships
- Propulsion engine enclosures
- Electric power generator engine enclosures
- Auxiliary fossil fuel boiler rooms
- Aviation storerooms (flammable)
- Enclosed gasoline service stations
- Flammable gas cylinder storerooms
- Flammable liquid issue rooms
- Flammable liquid storerooms and cargo holds
- Fuel pump rooms (DFM, fuel oil, JP-5, LCAC, or MOGAS)
- Paint mixing and issue rooms
- RAST machinery rooms
- Ship service or emergency generator rooms
- Storerooms for gasoline powered bomb hoists
- TACTAS handling rooms
- Hangars

MIL-STD-777 SYSTEMS

- I-1: JP-5
- H-1: Gasoline
- G-3, G-4, G-5, G-6, and G-7: Hydraulic oil
- K-3, K-5, and K-7: Oxygen, nitrogen and propane
- S-1: AFFF

Subj: TUBE-MAC INDUSTRIES LTD. (PYPLOK) SWAGE MARINE FITTINGS (SMFs),
USE ON SURFACE SHIPBOARD PIPING SYSTEMS

- d. Type IV SMF, made of 70-30 copper-nickel alloy, has a maximum system design pressure rating of 200 psi on copper-nickel pipe and 600 psi on copper pipe (the fittings will only be marked "200 WOG"). The temperature rating is -60 deg F to 400 deg. F. Type IV may be used on copper-nickel pipe (class 200 only) and copper pipe (wall thickness not to exceed that required for 600 PSI) in sizes not to exceed 2.875 OD and 2 ½ NPS. Type IV can only be used as an alternative to brazed fittings (wherever the latter are allowed by MIL-STD 777) with the same area and system restrictions specified for Type III SMFs, above.
4. Special adapter fittings, (not previously approved by NAVSEA letter) incorporating approved SMF end standards (para. 4, above) with NAVSEA recognized end standards (ANSI, SAE, Mil Spec, etc.), shall be reviewed and approved by NAVSEA on a case by case basis.
5. Due to this approval, Type II SMFs are no longer permitted on ¼ inch OD, 6000 PSI CUNI instrumentation tubing (initially approved in reference b, paragraph 4). Only approved CUNI fittings (Types I, III and IV) shall be used for this application, not to exceed their individual system design ratings.
6. Approval to use SMFs in shipboard piping system applications is contingent upon completion of a training program for fabrication, safety, quality control, storage, inventory, installation, and issuing of the fittings. The training program shall be based on reference (c) when issued. Each activity is to certify completion of such a training program in writing to NAVSEA prior to using SMFs in shipboard piping applications. Any activity which has previously certified completion of such a program need only provide evidence of certification.
7. The POCs for this subject are Joseph Hungerbuhler and Philip Marino, NSWCCD-SSES Code 924, (215) 897-7195.



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By Direction

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DEPARTMENT OF THE NAVY
NAVAL SEA SYSTEMS COMMAND
WASHINGTON, DC 20362-5101

IN REPLY REFER TO

9000
OPR:56Y239
Ser 56Y23/282
April 7, 1989

From: Commander, Naval Sea Systems Command
To: Distribution List

Subj: DEUTSCH METAL COMPONENTS (PYPLOK), SWAGE MARINE FITTINGS
(SMFs), USE ON SURFACE SHIPBOARD PIPING SYSTEMS

Ref: (a) NAVSEA Ltr OPR:56Y236, Ser 56Y/167 of 12 Dec 1986
(b) NAVSEA Ltr OPR:56Y239, Ser 56Y239/153 7 March 1988
(c) Uniform Industrial Process Instruction (UIPI) No. 0505-901 dated 20 March 1987; Swage Marine Fitting Shipboard Installation Procedure

Encl: (1) Summary of Swage Marine Fittings (SMF) Approvals By MIL-STD 777E Category for Fossil Fueled Surface Ships
(2) Summary of Swage Marine Fittings (SMF) Approvals By MIL-STD 777E Category for Nuclear Powered Surface Ships (Outside the Machinery Box)

1. This letter supercedes reference (a), and expands and modifies SMF applications. Specifically, additional SMFs (Types III and IV), to those specified in reference (a), are hereby approved for shipboard applications specified in enclosures (1) and (2). Note that approval of Type I SMF for category and group K-5, of enclosures (1) and (2), is hereby rescinded due to temperature restrictions. Note, also, that this letter, as well as reference (a) and all other NAVSEA correspondence approving swage marine fittings, applies to Deutsch Metal Components's (Trademark "PYPLOK") fittings only. Fittings of other manufacturers are not approved at this time.

2. Reference (b), approving Type III SMFs, was never officially issued due to fire test reconsiderations, and all copies obtained through vendors shall be destroyed.

3. This letter does not constitute approval for the use of SMFs in nuclear submarine piping. SMFs are approved for use on fossil fueled surface ships as listed in enclosure (1) and on nuclear powered surface ships (outside the machinery box) as listed in enclosure (2).

4. SMFs shall not be seal welded due to possible weld contamination by the silicone environmental seal. Installation must comply with the following guidelines and shall not be installed in systems where possible operation may exceed the design rating of the fitting.

- a. Type I SMF, made of 70-30 copper-nickel alloy material, has a maximum system design pressure (as defined in NSTM 505 and the General Specifications) rating of 6000 psi and

Subj: DEUTSCH METAL COMPONENTS (PYPLOK) SWAGE MARINE FITTINGS (SMFs), USE ON SURFACE SHIPBOARD PIPING SYSTEMS.

temperature rating of -60 deg. F to 400 deg. F. Type I SMF may be used in sizes not to exceed 3/4 NPS and 1 inch OD for copper and copper-nickel tubing.

- b. Type II SMF, made of CRES 316L material, has a maximum system design pressure rating of 3750 psi and temperature rating of -60 deg. F to 400 deg. F. Type II SMF may be used in sizes not to exceed 1 1/2 NPS and 1 1/2 inch OD for carbon steel and CRES pipe.
- c. Type III SMF, made of 70-30 copper-nickel alloy, has a maximum system design pressure rating of 3750 psi and temperature rating of -60 deg. F to 400 deg. F. Type III SMF may be used in sizes 1/4 OD through 1 NPS for copper-nickel pipe (class 200 through 3300 only) and copper pipe (wall thickness not to exceed that required for 3750 PSI). At this time, Type III can only be used as an alternative to brazed fittings (wherever the latter are allowed by MIL-STD 777) with the exception that Type III shall not be used on systems listed below in the following specified fire hazardous areas.

FIRE HAZARDOUS AREAS

- Main machinery rooms
- Auxiliary machinery rooms with fuel pumps or fossil fueled equipment
- Fire rooms and engine rooms of fossil fuel powered ships
- Propulsion engine enclosures
- Electric power generator engine enclosures
- Auxiliary fossil fuel boiler rooms
- Aviation storerooms (flammable)
- Enclosed gasoline service stations
- Flammable gas cylinder storerooms
- Flammable liquid issue rooms
- Flammable liquid storerooms and cargo holds
- Fuel pump rooms (DFM, fuel oil, JP-5, LCAC, or MOGAS)
- Paint mixing and issue rooms
- RAST machinery rooms
- Ship service or emergency generator rooms
- Storerooms for gasoline powered bomb hoists
- TACTAS handling rooms

Subj: DEUTSCH METAL COMPONENTS (PYPLOK) SWAGE MARINE FITTINGS
(SMFs), USE ON SURFACE SHIPBOARD PIPING SYSTEMS

MIL-STD-777 SYSTEMS

- I-1: JP-5
- H-1: Gasoline
- G-3, G-4, G-5, G-6, and G-7: Hydraulic oil
- K-3, K-5 and K-7: Oxygen, nitrogen and propane
- S-1: AFFF

- d. Type IV SMF, made of 70-30 copper-nickel alloy, has a maximum system design pressure rating of 200 psi on copper-nickel pipe and 600 psi on copper pipe (the fittings will only be marked "200 WOG"). The temperature rating is -60 deg F to 400 deg. F. Type IV may be used on copper-nickel pipe (class 200 only) and copper pipe (wall thickness not to exceed that required for 600 PSI) in sizes not to exceed 2.875 OD and 2 1/2 NPS. Type IV can only be used as an alternative to brazed fittings (wherever the latter are allowed by MIL-STD 777) with the same area and system restrictions specified for Type III SMFs, above.
5. Special adapter fittings, (not previously approved by NAVSEA letter) incorporating approved SMF end standards (para. 4, above) with NAVSEA recognized end standards (ANSI, SAE, Mil Spec, etc.), shall be reviewed and approved by NAVSEA on a case by case basis.
 6. Due to this approval, Type II SMFs are no longer permitted on 1/4 inch OD, 6000 PSI CUNI instrumentation tubing (initially approved in reference a, paragraph 4). Only approved CUNI fittings (Types I, III and IV) shall be used for this application, not to exceed their individual system design ratings.
 7. Approval to use SMFs in shipboard piping system applications is contingent upon completion of a training program for fabrication, safety, quality control, storage, inventory, installation and issuing of the fittings. The training program shall be based on reference (c) for Types I and II only. Reference (c) is in the process of being revised to include Types III and IV requirements. When the revision is issued, training can proceed for the latter fittings (estimated issue date is June 1989). Each activity is to certify completion of such a training program in writing to NAVSEA prior to using SMFs in shipboard piping applications. Any activity which has previously certified completion of such a program need only provide evidence of certification.

Subj: DEUTSCH METAL COMPONENTS (PYPLOX) SWAGE MARINE FITTINGS
(SMF), USE ON SURFACE SHIPBOARD PIPING SYSTEMS

8. This letter does not authorize an increase to any contracts or purchase orders. On the contrary, it is expected that increased use of SMFs, vice welding/brazing fittings, will decrease the cost associated with fabricating piping joints (including tooling costs).

9. The TPOC for this subject is Mr. J. Reid, NAVSEA code 56Y239, A/V 222-0367, Commercial (202) 692-0367.



A. R. BECKER
By direction

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