



DEPARTMENT OF THE NAVY
NAVAL SEA SYSTEMS COMMAND
1333 ISAAC HULL AVE SE
WASHINGTON NAVY YARD DC 20376-0001

IN REPLY REFER TO
9505
Ser 05Z/746
30 Oct 19

Mr. Dale Arstein
Senior Principal Engineer
Swagelok Company
31500 Aurora Road
Solon, OH 44139

Dear Mr. Arstein:

Subj: APPROVAL OF SWAGELOK® ¼-INCH TO 1-INCH OUTSIDE DIAMETER, 3750 PSI, CORROSION RESISTANCE STEEL, ADVANCED FERRULE DESIGN MECHANICALLY ATTACHED FITTING SURFACE SHIPS ONLY

- Ref:
- (a) Swagelok® Company Letter, ¼" through 1" 3750 psig CRES Mechanically Attached Fittings (MAFs) Surface Ships only of 7 Feb 19
 - (b) ASTM F1387; Standard Specification for the Performance of Mechanically Attached Fittings
 - (c) 9505 Ser 260LCM/007; Approval of Swagelok ¼" through 1" OD, 3750 psi CRES Mechanically Attached Fittings (MAFs) Surface Ships Only
 - (d) NAVSEA 9505 Ser 05Z/282; Approval of Swagelok® 1" OD, 3750 PSI CRES Mechanically Attached Fittings (MAFs) Surface Ships Only of 10 Apr 19
 - (e) MIL-STD-901; Shock Tests, H.I. (High Impact) Shipboard Machinery, Equipment, and Systems, Requirements for
 - (f) LHA 8 CDRL B012 Issue 004; Ingalls Report No. E0012: LW Shock Test Report - Swagelok 1" Fitting of 18 April 2018; Figure 19 Submittal Number: 43474; Equipment Item Number: 106050
 - (g) RPT-2017-011; MIL-S-901E Lightweight, High Impact (H.I.) Shock Test Procedure for the 1" Swagelok Fitting of 21 Dec 2017
 - (h) Cert No. SSSD-00009, Ser No. 110910; Stainless Steel Tubing Fittings (1 inch), Naval Surface Warfare Center, Keyport Division, (NSWCKD) of 13 Mar 00
 - (i) Cert No. SSSD-00010, Ser No. 1403511, 1403516, 1406509, & 1406521; Stainless Steel Tubing Fittings (1/4"inch), Naval Surface Warfare Center, Keyport Division, (NSWCKD) of 13 Mar 00
 - (j) MIL-STD-777; Department of Defense Standard Practice, Schedule of Piping, Valves, Fittings, and Associated Piping Components for Naval Surface Ships
 - (k) S9086-RK-STM-010/CH-505; Naval Ships' Technical Manual, Piping Systems

1. Purpose. The purpose of this document is to provide approval for the Swagelok® Company "advanced" ferrule design between the size ranges of ¼-inch to 1-inch, outside diameter (OD), 3750 psi, Corrosion Resistance Steel (CRES) Mechanically Attached Fittings (MAF).

2. Background. Reference (a) provided a request for approval of 1/4-inch OD through 1-inch OD fittings with the advanced ferrule design along with reports of testing conducted by Swagelok® Company, Solon, OH, per reference (b). Reference (c) provided approval of the subject fittings in sizes ¼-inch to ½-inch OD, with the advanced ferrule design. These fittings were approved as fire-hardened fittings. Reference (d) provided approval of the 1-inch OD fitting with the advanced ferrule design. Reference (d) provided a

contingency on the approval of ¼-inch through 1-inch OD, with the advanced ferrule design, that would be removed upon approval of a shock extension.

3. Shock. The approved shock extension is available to Navy personnel and Navy contractors who have access to eShock, under item 2019-E-00654. eShock provides rationale on the approval of this extension, which is based upon reference (c) and (e) through (i).

4. Approval. Approval is granted for the Swagelok® Company, grip-type MAF, with the "advanced" ferrule design, designated as:

Type IV (Grip-type, separable), Grade B (CRES), Class 8 (3750 psi), for the temperature range -65°F to 1,000°F, when used with CRES tubing in accordance with ¼-inch to 1-inch OD by 0.035-inch to 0.109-inch thick alloy tubing to MIL-P-24691/3, MIL-T-8606, ASTM A213, ASTM A269, or equivalent.

This fitting is approved for use in systems requiring fire-hardened fittings and/or a Grade A shock designation and as identified in reference (j).

This approval supersedes approvals previously granted by references (c) and (d).

5. Action. NAVSEA 05Z41 has action to incorporate the below table excerpt into the new Table 505-6-2 (Table 505-6-5 of Revision 5) of the current revision draft of reference (k) in execution.

ASTM F1387		Fitting				Pipe			Remarks
Type	Class / Grade	P Max. (psi)	T. °F	P/N	Mat'l	Size	Mat'l	Wall Thick	Qual.
IV	8B	3,750	-65 to 1,000	SS-XXX- (Swagelok Advanced Design)	316 SS	¼" to 1" OD	CRES (MIL-P-24691/3, ASTM A213, A269, MIL-T-8606)	0.035 to 0.109"	Approval for fire hardened fitting applications

6. The NAVSEA point of contact for this letter is Ms. Erin Babik, SEA 05Z41, (202)781-0439, erin.babik@navy.mil.

Erin Babik for
 W. CALVERT
 Technical Warrant Holder,
 Machinery - Fluid Systems -
 Ships

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DEPARTMENT OF THE NAVY
NAVAL SEA SYSTEMS COMMAND
1333 ISAAC HULL AVE SE
WASHINGTON NAVY YARD DC 20376-0001

IN REPLY REFER TO
9505
Ser 05Z/702
4 Dec 20

From: Commander, Naval Sea Systems Command (SEA 05Z41)
To: Mr. Dale Arstein, Senior Principal Engineer, Swagelok Company
31500 Aurora Road, Solon, OH 44139

Subj: APPROVAL OF SWAGELOK® 1-INCH TO 2-INCH OUTSIDE DIAMETER 2000 PSI
CORROSION RESISTANCE STEEL ADVANCED FERRULE DESIGN MECHANICALLY
ATTACHED FITTING SURFACE SHIPS ONLY

Ref: (a) Swagelok® Company Letter, ¼" through 1" 3750 psig CRES Mechanically
Attached Fittings (MAFs) Surface Ships only of 7 Feb 19
(b) ASTM F1387; Standard Specification for the Performance of
Mechanically Attached Fittings
(c) 9505 Ser 05Z/746; Approval of Swagelok® 1" OD, 3750 PSI, CRES,
Advanced Ferrule Design, Mechanically Attached Fittings (MAFs)
Surface Ships Only of 30 Oct 19
(d) MIL-STD-901; Shock Tests, H.I. (High Impact) Shipboard Machinery,
Equipment, and Systems, Requirements for
(e) HII-Ingalls RPT-2017-011; MIL-S-901D Lightweight, High Impact
(H.I.) Shock Test Procedure for the 1" Swagelok Fitting
of 21 Dec 17
(f) HII-Ingalls PRT-2018-017; MIL-S-901D Lightweight, High Impact
(H.I.) Shock Test Procedure for the 2" Swagelok Fitting of 9 Nov 18
(g) S9086-RK-STM-010/CH-505; Naval Ships' Technical Manual, Piping
Systems

1. Purpose. The purpose of this document is to provide approval for the Swagelok® Company "advanced" ferrule design between the size ranges of 1-inch to 2-inch, outside diameter (OD), 2000 psi, Corrosion Resistance Steel (CRES) Mechanically Attached Fittings (MAF).

2. Background. Reference (a) provided a request for approval of ¼-inch OD through 1-inch OD and 1¼-inch to 2-inch fittings with the advanced ferrule design along with reports of testing conducted by Swagelok® Company, Solon, OH, per reference (b). Reference (c) provided approval of the subject fittings in sizes ¼-inch to 1-inch OD, with the advanced ferrule design. These fittings were approved as fire-hardened fittings.

3. Discussion

a. Shock. The approved Figure 19 forms for the 1-inch fitting, 2-inch fitting, and shock extension from 1-inch to 2-inch of the subject fittings, are available to Navy personnel and Navy contractors who have access to eShock, under items 2020-T-02743, 2020-T-02630, and 2020-E-02744. eShock provides rationale on the approval of this extension, which is based upon references (d), (e), and (f).

b. Fire. Approval for use in fire-hardened fittings cannot be provided for sizes 1¼-inch to 2-inch of the subject fittings.

4. Approval. Approval is granted for the Swagelok® Company, grip-type MAF, for non-fire-hardened applications designated as:

Subj: APPROVAL OF SWAGELOK® 1-INCH TO 2-INCH OUTSIDE DIAMETER 2000 PSI
CORROSION RESISTANCE STEEL ADVANCED FERRULE DESIGN MECHANICALLY
ATTACHED FITTING SURFACE SHIPS ONLY

Type IV (Grip-type, separable), Grade B (CRES), Class 6 (2000 psi), for the temperature range -65°F to 1,000°F, when used with CRES tubing in accordance with 1¼-inch to 2-inch OD by 0.083-inch to 0.188-inch thick alloy tubing to MIL-P-24691/3, MIL-T-8606, ASTM A213, ASTM A269, or equivalent.

The subject fittings are:

a. NOT approved for use in systems requiring fire-hardened fittings.

b. Grade A shock designation as identified in eShock under items 2020-T-02743, 2020-T-02630, and 2020-E-02744.

5. Action. NAVSEA 05Z41 has action to incorporate the below table excerpt into the new Table 505-6-2 (Table 505-6-5 of Revision 5) of the current Revision 6 draft of reference (g) in execution.

ASTM F1387		Fitting				Pipe			Remarks
Type	Class/Grade	P Max. (psi)	T. °F	P/N	Mat'l	Size	Mat'l	Wall Thick	Qual.
IV	6B	2,000	-65 to 1,000	SS-XXX-Swagelok	316 SS	1¼" to 2" OD	CRES (MIL-P-24691/3, ASTM A213, A269, MIL-T-8606)	0.083 to 0.188"	Brazing equivalent only. Not approval for fire hardened fitting applications.

6. NAVSEA point of contact for this letter is Ms. Erin Babik (SEA 05Z41), (202) 781-0439, erin.babik@navy.mil.

W. CALVERT
Technical Warrant Holder,
Machinery - Fluid Systems -
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