



AEROSPACE STANDARD

AS5902

Issued 2002-05
Reaffirmed 2015-07

Installation of Externally Swaged Fittings

RATIONALE

AS5902 has been reaffirmed to comply with the SAE five-year review policy.

1. SCOPE:

This document describes engineering requirements for installation of externally swaged fittings used in aerospace fluid systems.

2. REFERENCES:

2.1 Applicable Documents:

The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

2.1.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

AS4215	Fitting, Adapter, Beam Seal, External Thread, External Swage Tube End, Hydraulic, 3000 psi
AS4217	Fitting, Adapter, Beam Seal, Bulkhead, External Swage Tube End, Hydraulic, 3000 psi
AS4218	Fitting, Elbow, 45 deg., Beam Seal, External Thread, External Swage Tube End, Hydraulic, 3000 psi
AS4219	Fitting, Elbow, 45 deg., Beam Seal, Bulkhead, External Swage Tube End, Hydraulic, 3000 psi
AS4225	Fitting, Elbow, 90 deg., Beam Seal, External Thread, External Swage Tube End, Hydraulic, 3000 psi
AS4226	Fitting, Elbow, 90 deg., Beam Seal, Bulkhead, External Swage Tube End, Hydraulic, 3000 psi

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Documents

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2.1.1 (Continued):

AS4234	Fitting, Adapter, Beam Seal, Swivel Nut, External Swage Tube End, Hydraulic, 3000 psi
AS4459	Fittings, Tube, Fluid System, 3,000 psig Maximum, Permanently Attached, Specification for
AS5266	Fitting, Adapter, Straight, Flared, External Swage, Hydraulic
AS5267	Fitting, Adapter, Straight, Flareless, External Swage, Hydraulic

2.2 Definitions:

SWAGED DIAMETER: A permanently deformed diameter on the fitting caused by crimping with the swage dies designed with predetermined after swaged diameter governed by the go-no gage.

SWAGED LENGTH: A permanently deformed length on the fitting caused by crimping with the swage dies designed with predetermined after swaged length governed by the go-no gage.

TUBE INSERTION: Predetermined distance of tube entry inside the fitting beyond the silicone grooves governed by the witness marking tool.

WITNESS MARK: Ink or electroetched mark put on tube end with the aid of witness marking tool to assure proper tube insertion.

3. ASSEMBLY AND INSTALLATION OF EXTERNALLY SWAGED FITTING:

In order to achieve anticipated hardware performance per AS4459, the criteria for assembly and installation of externally swaged fittings shall be as follows:

All personnel assigned to the installation of tube fittings shall be a qualified installer trained and certified (as required) by the applicable department(s) of the organization or the approved fitting and/or tooling manufacturer(s).

3.1 Assembly of Fitting and Tubing Material Combinations and Tube Wall Requirements:

The fitting materials are available in 21-6-9 Cres, commercially pure (CP) Titanium and 6061-T6 overaged Aluminum Alloy for use on different tubing materials per allowable fitting and turbine material combinations as shown in Table 1:

TABLE 1

Fitting Material	Tubing Material
Cres	3AL-2.5V Titanium Alloy
Cres	21-6-9 Cres
Cres	304 1/8 Hard Cres
Cres	6061-T6 Aluminum Alloy
CP Titanium	3Al-2.5V Titanium Alloy
Aluminum Alloy	6061-T6 Aluminum Alloy

The selection of tubing wall up to 3000 psi system operating pressure shall be in accordance with AS4444 and/or AS4459 recommendations.

3.2 Fitting Installation:

The recommended steps of installing externally swaged fittings onto tubing are as follows:

1. TUBE PREPARATION:

Tube end may be cut by any conventional cutting methods such as saw cutting or grinding. It shall be cut square within 0.5 degree and remove burrs and slivers on inside and outside of tube.

Hand cutter and deburring tools are available for manual tube end preparation as needed (refer to 3.3.1 for further tooling reference).

Determination of optimum tube lengths shall include compensation of material growth factor from swaging and tooling clearance as follows (see Figures 1 through 2 and Table 2):