



AEROSPACE RECOMMENDED PRACTICE

ARP584™**REV. D**

Issued	1960-03
Reaffirmed	2002-05
Revised	2012-01
Stabilized	2017-06

Superseding ARP584C

Coiled Tubing - Corrosion Resistant Steel, Hydraulic Applications, Aerospace

RATIONALE

This document has been determined to contain basic and stable technology which is not dynamic in nature.

STABILIZED NOTICE

This document has been declared "Stabilized" by the SAE A-6C5 Components Committee and will no longer be subjected to periodic reviews for currency. Users are responsible for verifying references and continued suitability of technical requirements. Newer technology may exist.

SAE Technical Standards Board Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be revised, reaffirmed, stabilized, or cancelled. SAE invites your written comments and suggestions.

Copyright © 2017 SAE International

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of SAE.

TO PLACE A DOCUMENT ORDER: Tel: 877-606-7323 (inside USA and Canada)
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
<http://www.sae.org>

SAE WEB ADDRESS:

Full document details: [SAE ARP584D](#)

SAE values your input. To provide feedback on this Technical Report, please visit <http://standards.sae.org/ARP584D>

Documents
Document Sharing Hub

TABLE OF CONTENTS

1.	SCOPE.....	3
1.1	Purpose.....	3
1.2	Field of Application.....	3
2.	REFERENCES.....	3
2.1	Applicable Documents	3
2.1.1	SAE Publications.....	3
2.2	U.S. Government Publications.....	4
3.	CONFIGURATIONS	4
3.1	Style A - Helical Torsion Configuration	4
3.2	Style B - Torsion Tube Configuration.....	6
3.3	Style C - Non Standard Configurations.....	8
4.	MAXIMUM ANGULAR DEFLECTIONS	8
5.	MATERIALS	9
6.	STRESS ANALYSIS	9

7.	FABRICATION	9
7.1	Springback	9
7.2	Tooling Required	9
7.3	Feed Block	9
7.4	Ovality	10
7.4.1	Autofrettage	10
8.	INSTALLATION (STYLES A AND B ONLY)	10
8.1	Design Considerations	10
8.2	Excessive Deflection	10
8.2.1	Style A Installation	11
8.2.2	Style B Installation	12
8.3	Fitting Installation	13
9.	QUALIFICATION TESTING	14
9.1	Combined Tube Deflection and Pressure Impulse Test	14
10.	NOTES	14
10.1	Document Change Identification	14
TABLE 1	DIMENSIONS FOR STYLE A - INCHES	6
TABLE 2	DIMENSIONS FOR STYLE A - MM	6
TABLE 3	DIMENSIONS FOR STYLE B - INCHES	8
TABLE 4	DIMENSIONS FOR STYLE B - MM	8
TABLE 5	SYSTEM OPERATING TEMPERATURE RANGE VS ANGULAR DEFLECTION	8
FIGURE 1	STYLE A - HELICAL TORSION CONFIGURATION	5
FIGURE 2	STYLE B - TORSION TUBE CONFIGURATION	7
FIGURE 3	INSTALLATION OF STYLE A	11
FIGURE 4	INSTALLATION OF STYLE B	12
FIGURE 5	FITTING CONNECTION TOLERANCES FOR STYLES A OR B WITH FLARELESS OR BEAM SEAL FITTINGS	13

1. SCOPE

This SAE Aerospace Recommended Practice (ARP) addresses the design, installation, and testing of coiled tube assemblies ranging from 1/4 inch (6.3 mm) to 1.0 inch (25 mm) diameter using CRES tubing per AMS-T-6845, unless otherwise approved by the Procuring Activity.

This ARP specifically details three different configurations of coiled tubing. These configurations should be compatible with pressure levels up to 3000 psi (20.7 MPa) upon the completion of the analysis for the actual stress and life requirement of the intended application. However, formal qualification tests are recommended to verify the satisfactory installation, clamping, and the life of each unique design.

NOTE: Refer to ARP4146 for information on design of coiled tube assemblies using Titanium tubing.

1.1 Purpose

The purpose of this document is to provide data and information relative to design, fabrication, and installation of formed tubing made from CRES alloy. The formed tubing has the function of accepting relative motion between two points in a hydraulic or pneumatic system.

1.2 Field of Application

The use of coiled tubes is encouraged in the design of hydraulic systems per AS5440 or ARP4752/ARP4925, and for pneumatic systems per MIL-P-5518 when standard flexible hoses are not feasible due to installation constraints, compliance limitations, and effusion requirements.

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this document 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 International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

AIR1379	Prestressing (Autofrettaging) of Hydraulic Tubing Lines
ARP4146	Coiled Tubing-Titanium Alloy, Hydraulic Applications
ARP4752	Aerospace - Design and Installation of Commercial Transport Aircraft Hydraulic Systems
ARP4925	Aerospace - Design and Installation of Commercial Transport Helicopter Hydraulic Systems
AS5440	Hydraulic Systems, Military Aircraft, Design and Installation, Requirements For
AMS-T-6845	Tubing, Steel, Corrosion Resistant (S30400), Aerospace Vehicle Hydraulic System 1/8 Hard Condition
AS33611	Tube Bend Radii

2.2 U.S. Government Publications

Available from the Document Automation and Production Service (DAPS), Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094, Tel: 215-697-9495, <https://assist.daps.dla.mil/quicksearch/>.

MIL-P-5518 Pneumatic Systems, Aircraft, Design and Installation, General Requirements for

3. CONFIGURATIONS

There are three configurations detailed in this ARP, which are as follows:

- a. Style A - Helical Torsion Configuration
- b. Style B - Torsion Tube Configuration
- c. Style C - Non Standard Configurations

Each configuration is described in the following sections.

3.1 Style A - Helical Torsion Configuration

Refer to Figure 1.

This configuration typically consists of a 540 degree (1-1/2 coil) helical coil of tubing with a straight section projecting from each end of the coil.

In the actual application, it operates principally in bending and allows 13 degrees angular motion of one end with respect to the other about the helix axis in a plane perpendicular to the helix axis

Tables 1 and 2 provide the dimensions to be called up for this configuration.