

WMT Maintenance Technik AG Richthofenstrasse 140 D-53757 Sankt Augustin	Operating, Mounting and Maintenance Manual (OMMM)	DO - Handbook - AP466 Appendix 1 - Forms Form: DOH FO-011 Doc. No.: OMMM Issue 02
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Log of Revisions

Issue. No	Issue. Date	Affected pages	Description
00	13.10.2017		Initial Issue
01	27.08.2020	all	Shortened to existing standards
02	23.09.2020	3	Reference to appendix II added
02	23.09.2020	4	Reference to appendix I added
02	23.09.2020	3	Time requirements added

The information's described herein is approved and issued from ADO AP 466

1.0 PURPOSE: This document should be used a guidance for the selection, mounting, inspection and maintenance of hose assemblies manufactured by WMT.

Nevertheless, the user must determine actual characteristics and performance requirements for each application.

2.0 APPLICABLE DOCUMENTS:

There is a lot of existing literature for every kind of information about hose assemblies. The following documents should be used as guidance material.

European Aviation Safety Agency - EASA

ETSO-C53a Fuel And Engine Oil System Hose Assemblies

ETSO-2C75 Hydraulic Hose Assembly

Copies of documents are available from EASA, <https://www.easa.europa.eu>

Society of Automotive Engineers - SAE

AIR797 Hose Characteristics and Selection Chart. See MIL H 25579 in Table 1.

ARP908 Torque Requirements, Installation and Qualification Test, Hose and Tube Fitting
- for Torque values see chapter 3.1.2 table I.
- for MPT 1 hose assembly use the values for material I
- for Lubrication see chapter 3.1.1

AIR1569 Handling and Installation Practice for Aerospace Hose Assemblies
In this information Report is provided information's for
- fitting types,
- handling, packaging, storage, and cleaning
- installation guide lines with regard routing, correct length and fastening of hose lines

ARP1658 Hose Assemblies, Installed, Visual Inspection Guide For
with a general description for all types of hose assemblies which contents
- definition of possible defects which can occur on lines
- illustrated examples
- inspection requirements
- classification of defects
The requirements and illustrated examples for medium pressure PTFE hose lines have to be selected in this document. See table on page 7 column "Low & Medium pressure PTFE hose (e)

Copies of documents are available from SAE, <https://www.sae.org>

WMT

DDP-MPT1 Declaration of Design and Performance

Copies of documents are available from WMT Maintenance Technik AG, <https://www.wmtonline.eu>

3.0 SELECTION & TECHNICAL CHARACTERISTICS

3.1 AIR797 provides charted information regarding hose types, by specification (military and industry), pressure rating, temperature rating, size(s) available and special notes or application. Additional guidance to common fluids in aerospace applications is provided in Appendix II

3.2 AIR797 also provides similar data for various sleeves that may be selected for abrasion, fire or contamination protection.

3.3 list of approved WMT ETSO hose assemblies.

- DDP MPT1
 - ETSO-C53a Type B
 - ETSO-C53a Type D
 - ETSO-2C75 IIIA S/P

3.4 An MSDS (material safety data sheet) is not required for hose assemblies. When used for their designed and intended purpose these articles do not result in exposure to hazardous chemical. Thus no Material Safety Data Sheet is required.

3.5 AS150 specifies aerospace hose assemblies by specification/standard (see AIR797) and fire resistance codes.

3.6 Current EASA Technical Standard Orders (ETSO) for hose assemblies are:

1. ETSO-C53a, Fuel and Engine Oil System
2. ETSO-2C75, Hydraulic

3.7 Age Limits for MTP1 Hose and Hose Assemblies

- Shelf life until installation – 12 years
- Service Life – 10 years

SHELF-LIFE: SHELF-LIFE IS THAT PERIOD OF TIME FROM CURE DATE TO THE LIMIT THAT A HOSE ASSEMBLY MAY BE STORED, UNDER PROPER CONDITIONS, AND STILL RETAIN A REASONABLE EXPECTED SERVICE LIFE

SERVICE LIFE : Service life is that period from installation to retirement . CONTROL and LIMITS are established and exercised by the **USER** .

4.0 MOUNTING

4.1 AIR1569 provides guidance and considerations regarding routing materials (tube and reinforcement), routing, clamping, accessories, etc.

4.2 ARP908 lists test installation torque for some connection styles; it may be used as functional installation torque(s) unless a particular installation(s) dictates otherwise.

5.0 INSPECTION

5.1 ARP1658 provides visual inspection guidance as an aid to identifying abrasion, kinking or other damage common to hose assemblies.

If not otherwise described in the associated aircraft manual and regardless of the given timely sequence in ARP 1658, we recommend a thorough visual inspection of the hose line at least once a year.

5.2 Reliability and Maintainability: Most hose assembly failures are attributable to incorrect application or external damage.

Reliability is the probability that a system, subsystem, unit, group, assembly, subassembly or part will perform its intended function for a specified interval

- WMT manufactures hose assemblies according to applicable standards and communicates the applicable ratings for the hose assembly to the user. Only the user can determine the reliability of the hose assembly in each application.

MAINTAINABILITY

- Proper installation, inspection and vigilance are the only maintenance required or possible for hose assemblies.
- Hose assemblies do not require maintenance *per se* (other than inspection.) However, the integral, silicone firesleeve (ISFS) must be kept dry and uncontaminated from chemical attack or rubbing against close by parts such as clamps, other hoses or nearby auxiliary equipment. Hose assemblies have to be protected against damage from external mechanical factors to prevent damage that may lead to failure. Hose assemblies take a "set" as they age. Replace all hose assemblies that are no longer flexible

6.0 MAINTENANCE

6.1 Hose assemblies are not considered repairable except replacement of some accessory components such as sleeves.

6.2 Inspection (see Section 5) is the recommended control procedure for installed assemblies.

7.0 Record of Failures and malfunctions

Appendix 1 provide a failure and malfunction report.
This document can be download on our webpage.

If our hose assemblies have evidence of failures and malfunctions, this sheet can be downloaded, completed and provided to WMT Maintenance Technik AG.

Appendix I Failure and malfunction report for Service Request

WMT Maintenance Technik AG Richthofenstrasse 140 D-53757 Sankt Augustin	Failure and malfunction report	DO - Handbook - AP466 Appendix 1 - Forms Form: DOH FO-022 Doc. No.: FMR.... Issue: 00
Note This Document is intended to capture and judge the possible failures and malfunctions of approved ETSO hose assemblies, while they are in operation. Page 1 reports the failure or malfunction. Page 2 rates the report. Further details are given in the appendix to this document on the last 2 pages.		1.) → Ident number of Report FMR Noticed from HOA
2. Data of issuing this report		
2.1 Date and time:	2.2 Component:	
2.3 Article No.:	2.4 Serial No.: From to	
2.5 In aircraft type:	2.6 Register No of Aircraft:	
2.7 Organisation Name	2.8 Department:	
2.9 Reference No. of reporter:	2.10 Name of reporter:	
2.11 Attached documents:		
3. Information regarding the failure and malfunction		
3.1 Description of the malfunction (can also be done with further documents referenced here)		
3.2 Consequences or possible consequences of malfunction		

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Appendix II Common fluids in aerospace applications

COMMONLY FOUND FLUIDS IN AEROSPACE APPLICATIONS. THIS LIST IS NOT EXHAUSTIVE.			
FLUID	PTFE AND AMS MATERIALS	INTEGRAL SILICONE FIRE SLEEVE AND SLIP-ON TYPE 2650 FIRE SLEEVE	COMMENTS
FUELS			
NATO codes F34, F35, F37, F44, F46; D Eng RD2454 (F40)	Compatible	Casual contact only	(jet) turbine engine fuel
MIL-T-5624 superceded by MIL-PRF-5624 (JP-4, JP-5)	Compatible	Casual contact only	JP-4 and Jet B are wide-cut type turbine fuels. JP-5 is a high flashpoint kerosene
MIL-T-83133 JP-8	Compatible	Casual contact only	JP-8, Jet A-1, TS-1 and Jet A are kerosene type turbine fuels
JP-8 with +100 additive	Compatible	Casual contact only	The additive attacks certain paper containing fuel filter/water separator elements.
ASTM-D-1655, Type A, A1, or B	Compatible	Casual contact only	Alternate turbine engine fuel These are diesel fuels.
GOST 10227-86, TS-1 (neat)	Compatible	Casual contact only	Kerosene type jet fuel
AA-52557	Compatible	Casual contact only	Alternate turbine engine fuel. These are diesel fuels.
MIL-G-3056 & ASTM-D-910	Compatible	Casual contact only	Alternate turbine engine fuel. These are gasoline type fuels.
MIL-F-23699	Compatible	Casual contact only	Alternate turbine engine fuel; primary application as a turbine lubricant. These are marine distillates.
LUBRICATING OIL			
MIL-L-23699 & MIL-L-7808 & DOD-L-85734	Compatible	Casual contact only	Used in High Temp Burst Machine Turbine lubricating oil
MIL-L-2104	Compatible	Casual contact only	Used in Impulse test circuit and hot oil circulation machine. This is motor oil.
HYDRAULIC FLUID			
DEF STAN 91-48 (NATO CODE H515/H20) AIR 3520	Compatible	Casual contact only	Petroleum based hydraulic fluids
MIL-H-5606 & MIL-H-83282 (replaces 5606) (NATO code for MIL-H-83282 is H-537)	Compatible	Casual contact only	Used in Burst machine; MIL-H-5606 is obsolete for new applications and is replaced by MIL-H-83282
AS1241	Compatible	Casual contact only	Phosphate ester

Appendix II ongoing

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FLUID	PTFE AND AMS MATERIALS	INTEGRAL SILICONE FIRE SLEEVE AND SLIP-ON TYPE 2650 FIRE SLEEVE	COMMENTS
MIL-PRF-87257 (NATO code H-538)	Compatible	Casual contact only	
STANDARD TEST FLUID			
Standard Test Fluid, hydrocarbon	Compatible	Casual contact only	TT-S-735 has been superceded by ASTM D471 (Reference fuel B)
CLEANING FLUID			
ZOK 27, ZOK 27A, DTD5507	Compatible	Casual contact only	
(Degreasing solvent) MIL-PRF-680	Compatible	Casual contact only	P-D-680 has been superceded by MIL-PRF-680 (Stoddard solvent)
British Standard BS 245	Compatible	Casual contact only	White (mineral) spirits
British Standard BS 1595	Compatible	Casual contact only	Isopropyl Alcohol
DE-ICING FLUID			
De-Icing AL5, AL34, AL36	Compatible	Casual contact only	
WATER DISPLACEMENT FLUID (used for cleaning the skin of the airframe)			
DEF STAN 68-10/2 & PX24	Compatible	Casual contact only	Contains no chlorine/chlorides.
FIRE SUPPRESSANT FLUIDS			
HFC-125 (CF3CF4H) FE-25 (CF3CF2H)	Compatible	Casual contact only	