



A314  
**AP 101A-0305-1**

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# **AIRCRAFT FLEXIBLE HOSES NON-REPAIRABLE**

## **GENERAL AND TECHNICAL INFORMATION**

**BY COMMAND OF THE DEFENCE COUNCIL**

**Ministry of Defence**

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| AP 101A-0301-1  | Aircraft flexible hoses with reusable end fittings.             |
| AP 107D-0001-1  | General information on aircraft oxygen equipment.               |
| AP 107D-0404-12 | Liquid oxygen hoses and couplings.                              |
| AP 119A-0512-1  | Component cleaning processes.                                   |

PREFACE

Each leaf of this publication bears the date of issue. Subsequent amendments to the Initial Issue bear the date and number of the Amendment List with which they were issued. New or amended technical matter will be indicated by the use of markers positioned outside the type area, thus  $\blacktriangleleft$  or by the words 'completely revised' below the title of each prime element where this has been so changed that amendment indicators would be inappropriate.

Chapter 1

GENERAL DESCRIPTION

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- 1 Introduction  
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Introduction

1 This chapter contains basic information relating to the construction of non-repairable flexible hose assemblies for aircraft pipeline systems (AP 101A-0301-1 describes hoses with re-usable end fittings). Since these assemblies are non-repairable only limited information is given concerning end fittings. Chapter 2 includes hoses which are wholly metal and Chapter 3 hoses of composite construction including synthetic rubber or Teflon reinforced with metal braid or other material. Procedures for the cleaning, inspection and testing of hose assemblies are given in Chapter 4 of this publication.

2 The majority of pipeline systems utilize flexible hose in areas which are subject to movement or vibration, which could cause rigid pipes to fracture and, in areas where there is a fire risk, metallic hose is normally specified. However, to minimize on weight and space requirements, a Teflon inner tube with stainless steel braiding and permanently secured end fittings is now used in most applications where fire resistance is not vital. Older types of hose incorporating synthetic rubber still remain in use. For further information regarding non-metallic hose materials refer to AP 101A-0301-1, Chap 1, paras 6 to 13.

3 A hose assembly is defined as being of a specific length (Fig.1) measured over the end fittings and designed for a specific part of a pipeline system and, as such, it will have a unique part number.

HOSE CONSTRUCTION

Types of material

4 In general, all hoses are constructed in a similar manner, in having an inner tube of a specialized material: varieties of steel, bronze, rubber or plastic resin (Teflon), reinforced by layers of braid which is generally stainless steel but other materials may be used. The type of construction for a particular application is dictated mainly by the system pressure, working pressure and required flexibility.

### Specialized hose assemblies

5 Certain types of hose assembly are specific for use in a particular system such as oxygen or ejector seat systems. This publication gives only basic information and testing procedures for these hoses, since complete details are given in the appropriate Air Publication.

### NOTES

- (1) Oxygen system low pressure hoses are described in AP 107D-0404-12 (Normalair Garrett).
- (2) All maintenance tasks carried out on oxygen hose assemblies are to be in accordance with AP 107D-0001-1, in addition to the procedures detailed in this publication.

### IDENTIFICATION

#### Marking

6 Service stock numbers are allocated to all hose assemblies which are used in Service aircraft, but general reference to the hose used in the assembly may show the manufacturer's part number which is included in all identification markings, for example AE207 (Aeroquip).

7 Fireproof hose assemblies are marked in accordance with para 9 on a metal label fixed to the exterior of the assembly. Additional plastic labels may be applied to facilitate identification prior to installation.

8 Other hose assemblies are fitted with a permanently marked label secured to the outer covering.

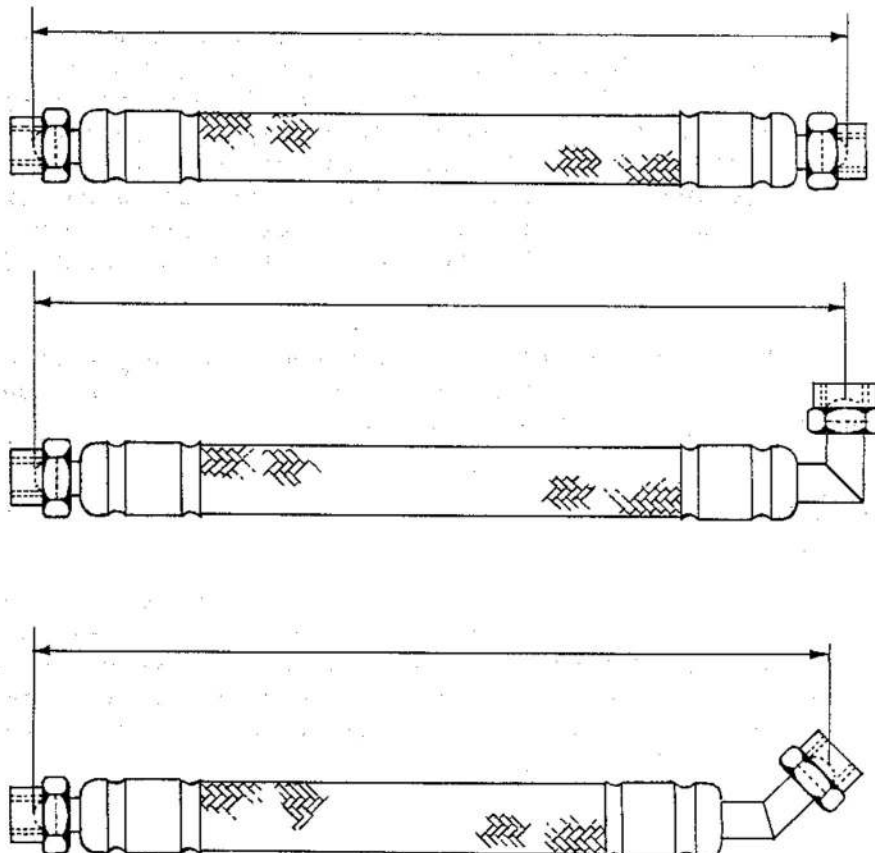


Fig.1 Effective lengths of hose assemblies

9 Typical label markings are as follows:

9.1 Manufacturers name

9.2 Manufacturers part number

9.3 Internal bore size

9.4 Date of manufacture (in 1/4 year/year, for example 2/81)

9.5 Service stock number

NOTE

Where the identification differs from that detailed in para 9 it is given in the appropriate chapter.

THE UNITED STATES OF AMERICA

DEPARTMENT OF JUSTICE

OFFICE OF THE ATTORNEY GENERAL

WASHINGTON, D. C.

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Chapter 2METALLIC HOSE ASSEMBLIES

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Introduction

1 This chapter describes the various types of flexible metallic hose used on aircraft. Metallic hose is used in a number of aircraft systems such as weapon heating, thermal de-icing, cabin pressurisation and engine and fuel systems. In heating systems, hot air is bled from the jet engine at a temperature beyond which rubber hose can be used. Other applications for metallic hoses are in gas, cryogenic and corrosive liquid systems.

Storage

2 Hose assemblies not in sealed cartons or transparent envelopes must, when stored, have their ends sealed with blanking plugs. Additional instructions on the storage of hose assemblies are given in AP 830, Vol 2.

Identification

3 Metallic hose assemblies may have a metal tag or label clipped around the hose, or a combination of numbers may be chemically etched onto one or both of the end fittings. On the tag is stamped the part number of the assembly, the date of manufacture, the manufacturer's name and the inspector's stamp. An additional label may be provided to facilitate identification prior to installation.

INSTALLATIONPre-installation procedures and checks

4 Before a hose assembly is installed, the following procedures should be followed and the checks detailed should be carried out:

- 4.1 Ensure that the assembly has the correct part number for the specific installation.
- 4.2 Visually examine the hose for any external damage or defects.
- 4.3 Remove the blanking plugs and ensure that the end fittings are undamaged and free from corrosion.

- 4.4 Examine the internal bore throughout its length for corrosion.
- 4.5 Refer to equipment/aircraft publication to ascertain if a pre-installation pressure test is required. Where specified, carry out pressure test in accordance with Chap 4-1 of this publication.
- 4.6 Allow a straight run of at least twice the internal diameter before commencing a bend; ensure that bends are of a smooth contour.

**CAUTION ...**

Stainless steel flexible metallic hose assemblies are thin-walled and highly stressed and must not be subjected to repeated flexing or mis-handling in any way.

- 4.7 On no account allow assemblies to twist when tightening nuts; certain assemblies have a datum line along their length for visual indication of twisting, see Fig.1.
- 4.8 Ensure that any clips or similar supporting devices are correctly fitted and that the hose assembly is clear of all other components.

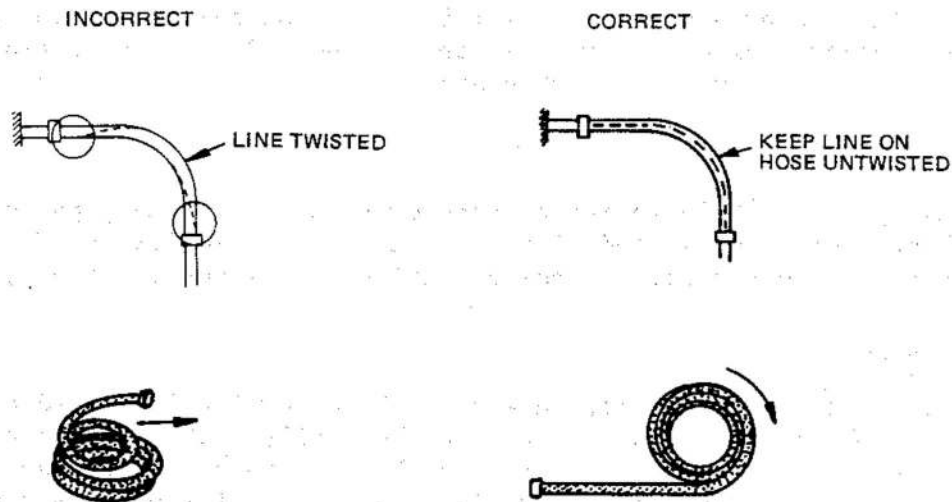


Fig.1 Correct/incorrect installations, reference twisting

Chapter 3RUBBER AND COMPOSITE CONSTRUCTION HOSE ASSEMBLIES

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Introduction

1 This chapter describes the main types of flexible hose assemblies used in aircraft systems, which have end fittings attached by the manufacturer and are of rubber and/or composite construction as distinct from metallic hose assemblies described in Chap 2 (hose assemblies with reuseable end fittings are included in AP 101A-0301-1). Short installation notes regarding precautions are also given.

2 The specific type of hose to be used in a particular aircraft is indicated in the relevant aircraft maintenance manual. Where the substitution of existing rigid metal pipes by flexible hoses is authorized, instruction is given in the Topic 2 leaflet of the relevant aircraft Air Publication.

3 Hose construction varies according to whether it is intended for use forward or to the rear of a fireproof bulkhead. Some hose assemblies have fireproof/protective sleeves fitted at manufacture.

Identification

4 The date of manufacture is indicated in various ways according to the type or construction of the hose. The date is either printed on the exterior surface, or stamped on a metal tab secured to the hose.

5 Hose assemblies bear an additional marking which denotes the manufacturer's drawing number for that particular item. This number may be incorporated on the tab bearing the date stamp, printed on the hose or on adhesive tape affixed to the hose. Some hoses have a continuous coloured marking along their length, to indicate that the hose is not to be twisted during installation.

INSTALLATIONInstallation technique

6 Flexible hoses are free to flex radially, but may have only a limited torsional flexibility. The larger sizes of hose are more easily kinked during installation than smaller sizes and other types.

Pre-installation procedures and checks

7 Before a hose assembly is installed the following procedures should be followed:

- 7.1 Ensure that the assembly has the correct part number for the specific installation.
- 7.2 Visually examine the hose for any external damage or defects.
- 7.3 Remove the blanking plugs and ensure that the end fittings are undamaged and free from corrosion.
- 7.4 Every hose assembly must be examined to ensure that the bore is free from obstruction and foreign matter. Looking through the bore of the hose at one end while a bright light or reflector is placed at the other, is a satisfactory visual examination. An alternative test using a steel ball or bobbin is described in Chap 4, para 15.
- 7.5 Refer to the equipment/aircraft publication to ascertain whether a pre-installation pressure test is required. Where specified, carry out in accordance with Chap 4-1 of this publication.
- 7.6 Allow a straight run of at least twice the internal diameter before commencing a bend, ensure that the bends are of a smooth contour and are never less than the minimum bend radius detailed in the equipment/aircraft publication.
- 7.7 Always guard against mechanical damage when removing/installing components such as engine change units.
- 7.8 Ensure that any clips or similar supporting devices are correctly fitted and that the hose assembly is clear of all other components.

## Chapter 4

EXAMINATION OF FLEXIBLE HOSE ASSEMBLIES

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Introduction

1 This chapter provides general information, damage criteria, and servicing guidelines for the examination of flexible metallic hose assemblies, and hose assemblies of rubber/composite construction. The information covers the examination of both types of hose assembly when fitted to their installed position and when removed from the aircraft. Both types of hose construction are multi-purpose and may be found in general use on aircraft pneumatic, hydraulic, pitot/static, fuel, oil and cryogenic systems.

2 In all cases, any hose assembly certified serviceable after examination "off aircraft", must be tested (Chap 4-1) and thoroughly cleaned (Chap 4-2) before the item is either refitted to the aircraft, or placed into storage.

3 The procedures to be adopted when refitting hose assemblies are detailed in Chap 2 for metallic hoses, or Chap 3 for hoses of rubber and composite construction.

WARNING ...

THE EXAMINATION, TESTING AND CLEANING OF LIQUID AND GASEOUS OXYGEN FLEXIBLE HOSE ASSEMBLIES ARE SUBJECT TO SPECIAL REQUIREMENTS WHICH ARE NOT DETAILED IN THIS AIR PUBLICATION. SUCH INFORMATION IS CONTAINED IN AP 107D-0001-1, GENERAL INFORMATION ON AIRCRAFT OXYGEN EQUIPMENT.

METALLIC HOSE ASSEMBLIESExamination for damage (hose installed)

4 Metallic hose assemblies generally consist of a metallic convoluted inner flexible hose which is protected by an outer steel wire braiding. This type of hose is subject to certain forms of damage which differs from the damage sustained to hoses of non-metallic construction. Some typical examples of damage experienced are illustrated in Figs.1 and 2.

5 At the appropriate periods stated in the aircraft maintenance schedule, or if the serviceability of a hose assembly is suspect, clean the assembly as far as possible in accordance with the procedure detailed in Chap 4-2 and examine the assembly for evidence of the following types of damage:

5.1 Distortion - evident by the outer wire braiding becoming detached from the hose end fittings (Fig.1A), or the outer wire braiding becoming trapped between inner hose convolutions (Fig.1B). This damage is caused by excessive flexing.

5.2 Chafing - evident by abrasions and broken strands to the outer wire braiding caused by vibration due to direct contact with adjacent components (Fig.2). Limitations of permissible broken strands are detailed in para 13.

5.3 Twisting - evident by a pronounced deformation of the outer wire braiding, i.e. bulging or bunching, caused by incorrect installation.

5.4 Corrosion - evident by the presence of surface oxidization due to the deterioration of the anti-corrosive treatment of the hose outer wire braiding and end fittings.

5.5 Overheating - evident by discolouration and/or corrosion of the hose outer wire braiding and end fittings, caused by the hose being subjected to excessive heat, either internally or externally.

5.6 Impact damage - evident by either indentations or depressions in the hose outer wire braiding, caused by a direct blow to the hose assembly.

5.7 Cracks - detected only by visual examination and dye penetrant checks of hose end fittings, caused by over-torquing of end fittings and vibration.

6 The presence of one or more items of damage arising from the examination detailed in paras 5.1 to 5.7 inclusive, is sufficient cause for rejection of the hose assembly.

Examination for damage (hose removed)

7 At the appropriate periods stated in the aircraft maintenance schedule, or if the serviceability of a hose assembly is suspect and it has been removed for examination, thoroughly clean the assembly in accordance with the procedure detailed in Chap 4-2.

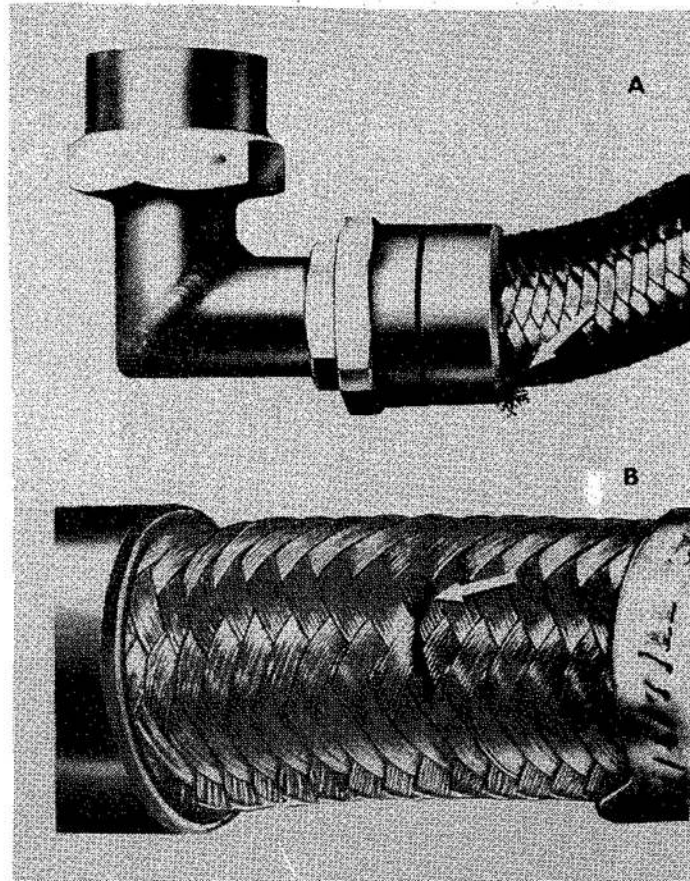


Fig.1 Damage caused by distortion

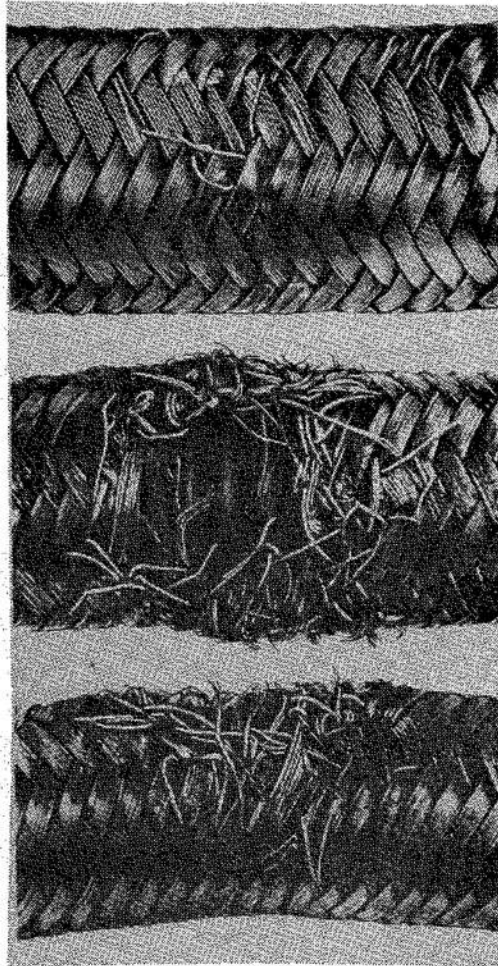


Fig.2 Damage caused by chafing

7.1 Carry out an examination of the hose assembly for evidence of damage as detailed in paras 5.1 to 5.7 inclusive.

7.2 With the hose assembly removed from the aircraft, further examine the item as follows:

7.2.1 Examine all mating surfaces of the hose end fittings particularly nipples, cone seatings and the surface of flanged connections, for evidence of scoring or other damage likely to cause leakage.

NOTE

Further details for the examination of end fittings are detailed in AP 101A-0301-1, Chap 3-3.

7.2.2 Examine the threads of the hose end fittings particularly for wear and damage due to over torquing.

7.2.3 Examine the condition of any locking devices on the hose end fittings, particularly for tearing of metal at locking wire locating holes.

7.2.4 Using an illuminated intrascope, examine the interior of the hose assembly particularly for corrosion, damage and hose collapse in accordance with para 15.

7.3 The presence of one or more items of damage arising from the examination detailed in paras 7.2.1 to 7.2.4 inclusive, is sufficient cause for rejection of the hose assembly.

RUBBER AND COMPOSITE CONSTRUCTION HOSE ASSEMBLIES

Examination for damage (hose installed)

8 These types of hose assembly may consist of an inner hose manufactured from rubber, teflon or other composite material and an outer reinforcing material manufactured from rubber or steel braiding. They may also have an outer protective sleeving manufactured from rubber, neoprene or steel braiding. Additionally, loose fire sleeves may also be found fitted.

9 At the appropriate periods stated in the aircraft maintenance schedule, or if the serviceability of a hose assembly is suspect, clean the assembly as far as possible in accordance with the procedure laid down in Chap 4-2, and examine the assembly for evidence of damage as detailed, and where applicable, in paras 5.1 to 5.7 inclusive.

10 For hose assemblies incorporating an outer protective sleeve manufactured from rubber or composite material the following additional examination is required:

10.1 Any hose assembly with a damaged outer protective sleeve or a damaged fire sleeve is to be removed from the aircraft for closer examination in accordance with para 12.

10.2 Examine hoses with the outer protective sleeve manufactured from rubber for evidence of blisters. Carry out instructions detailed in para 14 if blisters are present.

10.3 Age cracking may be evident in a neoprene or rubber outer protective sleeve. Hoses so affected are to be removed for further examination and may be considered serviceable provided that the underlying hose is not exposed, they are otherwise undamaged and satisfy a pressure test as detailed in Chap 4-1.

Examination for damage (hose removed)

WARNING ...

HOSES, WHICH ON REMOVAL ARE FOUND TO HAVE TAKEN A PERMANENT SET ADVERSELY AFFECTING THE FLEXIBILITY OF THE HOSE, ARE TO BE REJECTED.

11 At the appropriate periods stated in the aircraft maintenance schedule, or if the serviceability of a hose assembly is suspect and it has been removed from the aircraft, thoroughly clean the assembly in accordance with the procedure detailed in Chap 4-2.

12 Examine the hose assembly for evidence of damage as detailed in Chap 4-2 and, where applicable, paras 5.1 to 5.7, paras 7.2.1 to 7.2.4 and 10.1 to 10.3 inclusive.

GENERAL INFORMATION

Outer steel braiding - broken wire strands

13 The limitations of broken wire strands are as follows:

13.1 Hydraulic pressure line hoses are to be rejected if any broken strands are present.

13.2 Random broken wire strands are acceptable in fuel, oil and other low pressure systems. If the damage exceeds two broken wire strands per plait, or six broken strands within a length of 300mm, the assembly is to be rejected.

NOTE

Crossed over reinforcement wire strands are not cause for rejecting a hose assembly.

Outer protective sleeving - blisters

14 Blisters sometimes appear in the outer coverings of high pressure pneumatic or hydraulic hoses. Such blisters do not necessarily render the affected hose unserviceable, but in all instances an affected hose must be removed from the aircraft for further investigation as follows:

14.1 Pneumatic hose assemblies. Carefully puncture the blister with a needle, ensuring that the outer covering returns to its normal contour. Pressure test the hose assembly in accordance with Chap 4-1. When the hose is first pressurised air bubbles may emerge due to residual air inside the blister being forced out. This stream of bubbles should diminish and disappear. A constant flow of air bubbles indicates leakage and the hose must be rejected. If there is no sign of air leakage, the hose may be considered serviceable.

14.2 Hydraulic hose assemblies. Carefully puncture the blister with a needle and observe the result. If liquid emerges, the hose must be rejected. If only air emerges, ensure the outer covering returns to its normal contour, and pressure test the hose with fluid in accordance with Chap 4-1. If there is no fluid leakage apparent, the hose may be considered serviceable.

#### Hose internal examination

15 All hose assemblies should be examined internally for signs of restriction, tube collapse or other damage that might affect satisfactory performance. Visual examination is possible, size permitting, by applying the following techniques:

15.1 Straight hose assemblies. The hose bore can be examined by looking through the hose at a convenient light source.

15.2 Elbow fitting at one end. Insert a flexible inspection light into the elbow fitting and examine the hose bore by looking through from the straight fitting end.

15.3 Elbow fitting at each end. Insert a flexible inspection light into one end fitting and examine the hose bore from the opposite end with the aid of a dental type mirror.

#### Ball and bobbin tests

16 In addition to the visual examination, the hose bore should be checked for restrictions by the passage of a steel ball. The ball should be of a size which will just pass through the end fitting and can be selected by reference to Table 1. Should a suitable ball not be available, hose assemblies which contain at least one straight fitting can be checked using a locally manufactured steel bobbin as illustrated in Fig.3.

#### NOTES

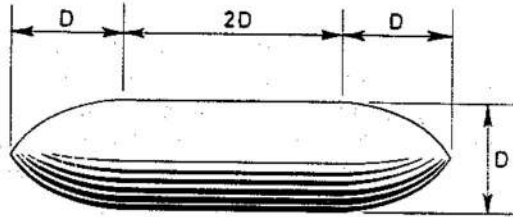
- (1) Ball sizes for 'dash' size hoses are given in AP 101A-0301-1, Chap 3-3, Table 1.
- (2) Since the hoses listed in Table 1 are manufactured to imperial sizes, metric bore diameters listed are nominal.

TABLE 1 BALL SIZE CHART FOR BORE OBSTRUCTION CHECK

| Hose internal diameter |    | Ball diameter |         |         |         |
|------------------------|----|---------------|---------|---------|---------|
| in.                    | mm | in.           | mm      | in.     | mm      |
|                        |    | minimum       | maximum | minimum | maximum |
| 5/32                   | 5  | 0.106         | 0.108   | 2.69    | 2.74    |
| 1/4                    | 6  | 0.144         | 0.146   | 3.66    | 3.7     |
| 5/16                   | 8  | 0.178         | 0.200   | 5.02    | 5.08    |
| 3/8                    | 10 | 0.224         | 0.226   | 5.69    | 5.74    |
| 1/2                    | 12 | 0.343         | 0.365   | 8.71    | 9.27    |
| 5/8                    | 16 | 0.468         | 0.490   | 11.89   | 12.45   |
| 3/4                    | 20 | 0.559         | 0.581   | 14.20   | 14.76   |
| 1.0                    | 25 | 0.793         | 0.803   | 20.14   | 20.40   |
| 1.1/4                  | 32 | 0.98          | 0.99    | 24.89   | 25.15   |
| 1.1/2                  | 40 | 1.23          | 1.24    | 31.24   | 31.50   |
| 2.0                    | 50 | 1.58          | 1.59    | 40.13   | 40.39   |

#### Returning hose assemblies to service

17 After completion of the examinations described in paras 4 to 12, a hose assembly must be tested and cleaned before it is either reinstalled in the aircraft or placed into storage (Chaps 4-1 and 4-2).



D = ball diameter (see Table 1)

Fig.3 Bobbin for hose bore tests

Chapter 4-1TESTING OF FLEXIBLE HOSE ASSEMBLIES

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TESTINGWARNING ...

THE EXAMINATION, TESTING AND CLEANING OF LIQUID AND GASEOUS OXYGEN FLEXIBLE HOSE ASSEMBLIES ARE SUBJECT TO SPECIAL REQUIREMENTS WHICH ARE NOT DETAILED IN THIS AIR PUBLICATION. SUCH INFORMATION IS CONTAINED IN AP 107D-0001-1, GENERAL INFORMATION ON AIRCRAFT OXYGEN EQUIPMENT.

General

1 It is essential that a clean work area is maintained and that care is exercised to prevent the ingress of foreign matter into hose assemblies under test.

WARNING ...

HOSE ASSEMBLIES UNDER TEST COULD BURST, PARTICULARLY AT MEDIUM AND HIGH PRESSURES AND MUST BE GUARDED TO AVOID INJURY TO THE OPERATOR.

2 Prior to testing, hose assemblies must be thoroughly cleaned in accordance with Chap 4-2, and examined in accordance with Chap 4.

Test equipment

3 The following equipment is required for testing of hose assemblies:

- 3.1 A regulated pressure supply incorporating a pressure gauge and a maximum pressure relief valve, using the appropriate fluid or nitrogen gas as a pressurising medium.
- 3.2 Facilities for drying with a continuous jet of nitrogen over the external surface and through the internal diameter of the hose assembly.
- 3.3 Hose assemblies which convey air under pressure require, in addition, a supply of clean, dry, regulated, compressed nitrogen, incorporating a maximum pressure relief valve and a pressure gauge, together with a container for water, at room temperature, of sufficient depth to enable the assembly to be submerged.

Test pressures

4 Where a hose assembly is considered to be serviceable after examination in accordance with Chap 4, it must be pressure tested to the appropriate test pressure for its type, size and system. The test pressure will generally be found to be the working pressure times 1.5, but there are exceptions. For this reason, test pressures must be established by reference to the hose installation data contained in the relevant aircraft/engine maintenance manual. Test pressures are never less than 1.5 times working pressure.

Test mediums

5 The test medium to be selected for fluid carrying hose assemblies in the first instance is the fluid which normally passes through the hose, but, fuel hoses are to be tested using oil OM15 and then cleaned (Chap 4-2). Hose assemblies used in gaseous systems are to be tested with nitrogen, the assembly being immersed in water and then cleaned (Chap 4-2).

Test proceduresWARNING ...

HOSE ASSEMBLIES UNDER TEST COULD BURST, PARTICULARLY AT MEDIUM AND HIGH PRESSURES AND MUST BE GUARDED TO AVOID INJURY TO THE OPERATOR.

6 Lay the hose assembly flat on a test bench/rig in an unrestricted position. Blank one end of the hose, and connect the opposite end to a regulated pressure supply. Avoid overtightening of end fittings; any leakage of end fittings must be investigated by examination of the sealing surfaces for scores and cleanliness.

## Fluid carrying hose assemblies

7 Establish the correct test pressure as detailed in para 4 and the correct test medium as detailed in para 5, then proceed as follows:

- 7.1 Prime and bleed the hose assembly under test.
- 7.2 Slowly apply the appropriate test pressure. Observe the hose and check for deformation of the hose, movement of the outer protective sleeving at the hose to coupling attachment and signs of leakage.
- 7.3 Once the appropriate test pressure is fully applied, and the assembly under test shows no evidence of the defects detailed in para 7.2, maintain the test pressure for five minutes and monitor the pressure gauge for excessive pressure decay.
- 7.4 On successful completion of the test, release the test pressure, disconnect the hose assembly from the test equipment and clean the assembly in accordance with Chap 4-2.

## Gas carrying hose assemblies

8 Establish the correct test pressure as detailed in para 4 and, using nitrogen as a test medium, proceed as follows:

WARNINGS ...

- (1) HOSE ASSEMBLIES UNDER TEST COULD BURST PARTICULARLY AT MEDIUM AND HIGH PRESSURES AND MUST BE GUARDED TO AVOID INJURY TO THE OPERATOR.
- (2) AN EXCESSIVE BUILD UP OF NITROGEN GAS IN THE WORKING AREA CAN BE HAZARDOUS TO HEALTH. USE NITROGEN ONLY IN WELL VENTILATED AREAS.

8.1 Connect the assembly to a regulated, clean, dry supply of nitrogen. Submerge the assembly in an unrestricted position in a container of water at room temperature, ensuring that the entire length of the hose can be observed during the submersion test.

8.2 Agitate the submerged hose assembly to disperse any air trapped in the hose outer protective braiding/covering. Slowly apply the appropriate test pressure, observe the hose, and check for evidence of the defects detailed in para 7.2.

8.3 Maintain the test pressure for five minutes, and examine the assembly for leakage. Leaks will be apparent either as a thin trickle, or a stream, of bubbles. Avoid mistaking leaks from test adaptors/connections for hose, or hose coupling, failures by locating the exact location of the emanation of bubbles.

8.4 On successful completion of the test, release the test pressure, disconnect the hose assembly from the test equipment and clean the assembly as detailed in Chap 4-2.

BlankingWARNING ...

ONLY APPROVED BLANKING PLUGS OR CAPS ARE AUTHORISED FOR USE ON FLEXIBLE HOSE ASSEMBLIES. THE USE OF MASKING TAPE, CLOTH OR SIMILAR MATERIAL LIKELY TO FRAGMENT AND LEAVE DEPOSITS OF FOREIGN MATTER IS NOT PERMITTED.

9 On completion of testing and post test cleaning, serviceable hose assemblies are to be blanked using the appropriate types and sizes of protective caps or plugs to prevent contamination and the ingress of foreign matter. If prolonged storage is envisaged, the hose assembly should be further protected by heat sealed polythene tubing.

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Dear Mr. [Name]

I have received your letter of the 15th and am glad to hear from you. I am sorry that I cannot give you a more definite answer at this time, but I am sure that you will understand my position.

I am sure that you will understand my position. I am sorry that I cannot give you a more definite answer at this time, but I am sure that you will understand my position.

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Chapter 4-2CLEANING OF FLEXIBLE HOSE ASSEMBLIES

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CLEANINGWARNINGS . . .

- (1) OBSERVE THE RELEVANT SAFETY PRECAUTIONS DETAILED IN AP 119A-0512-1 - COMPONENT CLEANING PROCESSES.
- (2) THESE PROCEDURES ARE NOT AUTHORISED FOR CLEANING LIQUID OR GASEOUS OXYGEN HOSE ASSEMBLIES. THE RELEVANT INFORMATION IS CONTAINED IN AP 107D-0001-1-Chap 4 AND MUST BE STRICTLY OBSERVED.

Introduction

1 Hose assemblies which have been removed from an aircraft must be internally and externally cleaned before examination, testing, storage or refitting and after testing. The selection of an appropriate cleaning agent is dependent upon the materials from which the hose has been manufactured.

2 Cleaning/de-greasing agents in general use are safe to use provided that care is exercised when handling, their use is controlled and the relevant safety precautions are strictly observed.

Cleaning flexible hose assemblies

3 Before commencing, refer to Table 1 and select compatible cleaning agents appropriate to the internal and external material from which the hose assembly has been manufactured, then proceed as follows:

WARNINGS . . .

- (1) THE ONLY AUTHORISED CLEANING FLUID FOR OXYGEN HOSE ASSEMBLIES IS TRICHLOROTRIFLUOROETHANE SECT REF 33D/2204018.
- (2) TRICHLOROTRIFLUOROETHANE IS THE PREFERRED SOLVENT FOR CLEANING HYDRAULIC COMPONENTS, AS 1:1:1 TRICHLOROETHANE CAN CAUSE CORROSION WHEN IN CONTACT WITH CERTAIN HYDRAULIC FLUIDS.

3.1 Using the appropriate cleaning agent, a lint free cloth, and if necessary, a bristle brush, clean the exterior of the hose assembly and end fittings.

WARNINGS ...

- (1) DO NOT ATTEMPT TO CLEAN THE BORE OF THE HOSE ASSEMBLY BY BRUSHING, AS DAMAGE MAY OCCUR TO THE INTERNAL STRUCTURE.
- (2) DO NOT USE WHITE SPIRIT FOR CLEANING RUBBER HOSE.
- (3) DO NOT USE TRICHLOROETHANE FOR CLEANING TEFLON HOSE.

3.2 Using the appropriate cleaning agent, flush the hose assembly at a pressure not exceeding 10 lbf/in<sup>2</sup> (0.7 bar), ensuring the bore is completely filled, until the hose is internally clean.

3.3 Pass a low flow of clean, dry, nitrogen over the external surface and through the bore of the hose to evaporate the cleaning agent.

WARNING ...

TRICHLOROETHENE, WHEN USED FOR FLUSHING, IS UNFIT FOR FURTHER USE IF ONE DROP ON CLEAN WHITE PAPER LEAVES A PERCEPTIBLE DIRT MARK AFTER EVAPORATION.

3.4 Examine the hose assembly to ensure that the item is internally and externally clean, and that all traces of the cleaning agent have evaporated.

WARNING ...

ONLY APPROVED BLANKING PLUGS OR CAPS ARE AUTHORISED FOR USE ON FLEXIBLE HOSE ASSEMBLIES. THE USE OF MASKING TAPE, CLOTH OR SIMILAR MATERIAL LIKELY TO FRAGMENT AND LEAVE DEPOSITS OF FOREIGN MATTER IS NOT PERMITTED.

3.5 On completion of cleaning, blank the hose assembly using the appropriate types and sizes of protective caps or plugs to prevent contamination and the ingress of foreign matter. If prolonged storage is envisaged, the assembly should be further protected by heat sealed polythene tubing.

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