

INCH-POUND

MIL-F-45764C(MI)
 9 July 1990
 SUPERSEDING
 MIL-F-45764B(MI)
 28 June 1974

MILITARY SPECIFICATION

FLUID LINES AND FITTINGS FOR MISSILES
 AND RELATED GROUND EQUIPMENT:
 FABRICATION AND INSTALLATION OF

This specification is approved for use by the Army Missile Command, Department of the Army, and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers the fabrication, assembly, and installation of metal fluid lines and connecting fittings for missiles and related ground equipment.

1.2 Classification. Tubing assemblies covered by this specification shall be of the following classes as specified (see 6.2):

- Class 1 - Tubing assemblies using flared tube fittings
 Class 2 - Tubing assemblies using flareless tube fittings.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, US Army Missile Command, ATTN: AMSMI-RD-SE-TD-ST, Redstone Arsenal, AL 35898-5270 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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 FSC 1410

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SPECIFICATIONS

FEDERAL

- GGG-W-686 - Wrench, Torque
- WW-T-700/4 - Tube, Aluminum Alloy, Drawn, Seamless
- WW-T-700/6 - Tube, Aluminum Alloy, Drawn, Seamless, 6061

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- MIL-C-5501 - Caps and Plugs, Protective, Dust and Moisture Seal
- MIL-F-5509 - Fittings, Flared Tube, Fluid Connection
- MIL-T-6845 - Tubing Steel, Corrosion-Resistant (530400), Aerospace Vehicle Hydraulic System, 1/8 Hard Condition
- MIL-T-7081 - Tube, Aluminum Alloy, Seamless, Round, Drawn, 6061, Aircraft Hydraulic Quality
- MIL-T-8504 - Tubing, Steel, Corrosion-Resistant (304), Aerospace Vehicle Hydraulic Systems, Annealed, Seamless and Welded
- MIL-T-8808 - Tubing, Steel, Corrosion-Resistant (18-8 Stabilized), Aircraft Hydraulic Quality
- MIL-D-9898 - Drawings, Tube Bend
- MIL-F-18280 - Fittings, Flareless Tube, Fluid Connection
- MIL-H-25475 - Hydraulic Systems, Missile, Design, Installation and Tests, General Requirements for

STANDARDS

MILITARY

- MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes
- MIL-STD-1247 - Markings, Functions and Hazard Designations of Hose, Pipe, and Tube Lines for Aircraft, Missile, and Space Systems
- MIL-STD-1250 - Corrosion Prevention and Deterioration Control in Electronic Components and Assemblies
- MS 19059 - Balls, Bearing, Chrome Alloy Steel
- MS 20819 - Sleeve, Flared Tube Fitting
- MS 21344 - Fittings - - Installation of Flared Tube, Straight Threaded Connectors, Design Standard for
- MS 21921 - Nut, Sleeve Coupling, Flareless
- MS 21922 - Sleeve, Coupling, Flareless

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MS 33583	-	Tubing End - Double Flare, Standard Dimensions for
MS 33584	-	Tubing End - Standard Dimensions for Flared
MS 33611	-	Tube Bend Radii

AIR FORCE - NAVY AERONAUTICAL

AN 818	-	Nut, Tube Coupling, Short
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(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Bldg. 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.2 Order of precedence. In the event of a conflict between the text of this document and the 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.

3. REQUIREMENTS

3.1 Materials.

3.1.1 Tubing. Tubing used in the fabrication, assembly and installation of fluid lines for missiles and ground equipment shall conform to MIL-T-6845, MIL-T-7081, MIL-T-8504, MIL-T-8808, WW-T-700/4, WW-T-700/6, and the applicable design drawings.

3.1.2 Fittings. Material used in the manufacture of fittings for class 1 and class 2 assemblies shall be in accordance with MIL-F-5509 or MIL-F-18280 as applicable.

3.1.3 Special fittings. Special fittings shall be subject to approval by the procuring activity (see 6.2).

3.1.4 Nut, sleeve, and tube combinations. Unless otherwise specified on the design drawing, steel nuts and sleeves shall be used on steel tubing. Aluminum nuts and sleeves shall be used with aluminum tubing. Dissimilar metals are defined and grouped in MIL-STD-1250 and shall be used accordingly.

3.2 Construction.3.2.1 Fabrication of tubing assembly.

3.2.1.1 Forming. Tubing bend radii and the angle of the bend shall be as specified on the design drawing and are subject to the bend radii limitations specified in MIL-D-9898.

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3.2.1.2 Tubing end preparation. Prior to flaring class 1 tubing assemblies or presetting the sleeve of class 2 tubing assemblies, the tubing end shall be cut square within 0.5 degree, and all burrs shall be removed from inside and outside of the tube ends. The break or chamfer on either the inside or outside diameter shall not exceed 25 percent of the tube wall thickness.

3.2.1.3 Flaring. Class 1 tubing, size 0.375 (3/8) and of material conforming to WW-T-700/4, shall be flared in accordance with MS33583, unless otherwise stipulated on the design drawing. Other material shall be flared in accordance with MS33584, unless otherwise stipulated on the design drawing.

3.2.1.4 Presetting of sleeves. The sleeves of class 2 tubing assemblies must be present on the tubing before assembly with the fitting. The three approved presetting methods in order of preference are machine presetting, hand tool presetting, and hand presetting using steel fittings. The tubing end shall be firmly seated against the shoulder in the presetting tool or fitting before applying a setting force to the sleeve. Use of a mandrel is optional in all methods except when hand presetting thin wall tubing of the following sizes:

- a. 0.375 diameter (dia) x .020 wall
- b. 0.50 dia x .025 wall
- c. 0.625 dia x .025 wall
- d. 0.725 dia x .025 wall
- e. 1.0 dia x .035 wall

3.2.1.4.1 Presetting procedure. Tubing ends shall be cut in accordance with 3.2.1.2. Slide the nut and then the sleeve onto the tubing. The pilot of the sleeve must point toward the seat of the connector. The sleeve, working surfaces, and the threads of the fitting should be lubricated, except for oxygen lines, with approved lubricant (see 6.4). Bottom the tubing firmly on the seat of the connector. Tighten the nut on the connector until the cutting edge of the sleeve grips the tubing. This can be determined by slowly turning the tubing with the fingers while tightening the nut. When the tube can no longer be turned by the fingers, it is ready for final tightening. Tighten nut one more turn for aluminum tubing up to and including 0.5 inch diameter. All stainless steel tubing and aluminum tubing over 0.5 inch diameter should be preset by tightening the nut 1 and one-sixth turns.

3.2.1.5 Assembly of tubing and fittings. The assembly of tubing and fittings shall be in accordance with the design drawing and as specified by the procuring activity (see 6.2).

3.3 Cleaning and protective sealing.

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3.3.1 Particle size limitations. Oxygen, nitrogen, helium, fuel handling tubing used in missiles and ground support equipment, and hydraulic and/or pneumatic system lines shall be cleaned to comply with the limits specified herein. Particles of contamination per square foot of component surface area shall not exceed the following limits:

- a. No particle larger than 2500 microns in any dimension
- b. One particle measuring between 700 and 2500 microns
- c. Five particles measuring between 175 and 700 microns.

3.3.2 Nonvolatile residue content.

3.3.2.1 Oxygen systems. The nonvolatile residue contamination on the significant surfaces of tubing assemblies used in oxygen systems shall be not greater than .001 g. per square foot of surface area as determined by analysis of the solution extracted in the reliability test of the system checkout.

3.3.2.2 Fuel system. No volatile residue requirements are established.

3.3.2.3 Pneumatic and hydraulic systems.

3.3.2.3.1 Onboard systems. The cleaning procedure shall be as specified on the design drawing.

3.3.2.3.2 Ground support equipment. The nonvolatile residue contamination on the significant surfaces of tubing assemblies used in ground support equipment pneumatic systems shall be not greater than .001 g. per square foot of surface area as determined in analysis of the solution extracted in the reliability test of the system checkout.

3.3.3 Rinsing. Cleaned tubing shall be rinsed, as applicable, to remove cleaning and preparation chemicals. The cleaned and rinsed tubing surfaces shall register a pH value within a range from 6.0 to 8.0.

3.3.4 Drying. Tubing shall be thoroughly dried as evidenced by no moisture pickup in the prefiltered drying gas passed through the tubing.

3.3.5 Protection. If the cleaned tubing assembly is not being used immediately the ends shall be capped in accordance with MIL-C-5501.

3.4 Installation of tubing.

3.4.1 Fit of tube assemblies. Tubing shall be aligned so as to have a firm seat on the fitting. The nut shall be started with no tubing strain in any direction.

3.4.2 Thread lubricants. Thread lubricant, when required to prevent seizure and galling during assembly or installation of fluid lines and fittings, shall be applied in accordance with the design drawing or as recommended in 6.4. Generally, the male threads of the fitting and the sleeve should be lubricated with a thin film of lubricant. The fitting shall not be over-lubricated, and lubricant shall not be allowed to enter the interior of the tube.

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3.4.3 Tightening.

3.4.3.1 Tightening requirements. Unless otherwise specified in the design drawing, the nut shall be started on the fitting and turned until the flare is firmly seated. A wrench should never be used until the nut is finger tight.

3.4.3.2 Torque requirements for class 1. Tubing shall be aligned so as to have a firm seat on the fittings, and a torque wrench shall be used to tighten it to the proper torque value in accordance with the design drawing, table I or MS 21344. Use a second wrench on the hex of the body to counteract the torque of the wrench on the nut. When a torque wrench cannot be used, tighten with a wrench until a distinct increase in torque occurs, then tighten the nut an additional one-sixth to one-third turn. Do not tighten more than one-third turn beyond the sharp torque rise position.

3.4.3.3 Torque requirements for class 2. Tubing shall be assembled and preset in accordance with 3.2.1.4.1. Torque requirements shall be in accordance with design drawing or table II.

3.4.4 Support of tubing. Fluid lines shall be supported or tied in accordance with the design drawing, table III or MIL-H-25475. This requirement is to prevent vibration and chafing after installation.

TABLE I. Installation wrench torque for tightening AN818 nuts

Tube diameter (inches)	Aluminum 52S0 ^{1/} (inch-pounds)		Aluminum 61ST6 ^{1/} (inch-pounds)		Stainless steel (inch-pounds)	
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
0.125	20	25	-	-	60	80
0.1875	25	35	30	70	90	100
0.250	40	65	70	120	135	150
0.313	60	80	70	120	180	200
0.375	75	125	130	180	270	300
0.500	150	250	300	400	400	500
0.625	200	350	430	550	650	700
0.725	300	500	650	800	900	1000
1.000	500	700	900 ^{2/}	1100 ^{2/}	1200	1400
1.125	600	900	1200 ^{2/}	1450 ^{2/}	-	-
1.500	600	900	1550 ^{2/}	1850 ^{2/}	-	-
1.750	700	1000	2000 ^{2/}	2350 ^{2/}	-	-
2.000	800	1100	2500 ^{2/}	2900 ^{2/}	-	-

^{1/} CAUTION! To prevent damage, refer to the applicable design drawing for tubing material before applying listed torque values.

^{2/} These values normally are not applicable for missile use.

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TABLE II. Installation wrench torque (inch-pounds) for flareless fittings (MS 20819, MS 21922 and MS 21921)

Fitting Size	Tubing outer diameter (OD) (inches)	Wall Thickness (inches)	Aluminum		Annealed Stainless		Stainless	
			Min.	Max.	Min.	Max.	Min.	Max.
3	0.1875	0.016	-	-	-	-	90	110
		0.018	80	90	-	-	-	-
		0.020	-	-	-	-	90	110
4	0.250	0.016	-	-	-	-	110	140
		0.020	100	110	90	110	110	140
		0.035	110	140	-	-	140	170
5	0.313	0.020	-	-	-	-	100	120
		0.035	125 ^{1/}	180 ^{1/}	-	-	-	-
6	0.375	0.020	145	175	-	-	170	230
		0.028	-	-	-	-	200	250
		0.035	145	175	-	-	-	-
		0.042	-	-	145	175	-	-
8	0.500	0.020	-	-	-	-	300	400
		0.028	270	330	300	400	400	500
		0.035	270	330	-	-	500	600
		0.049	320	380	500	600	-	-
10	0.625	0.020	-	-	-	-	300	400
		0.028	-	-	-	-	500	600
		0.035	360	440	-	-	600	700
		0.042	-	-	-	-	700	850
		0.049	425	525	-	-	-	-
12	0.750	0.028	-	-	-	-	650	800
		0.035	380	470	-	-	-	-
		0.049	-	-	-	-	800	960
16	1.000	0.020	-	-	-	-	800	950
		0.035	750	900	750	900	-	-
		0.065	-	-	-	-	1600	1750

^{1/} (For dry lubed nuts.)

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TABLE III. Maximum hydraulic line support spacings between (measured along the tubes)

Nominal tube OD (inches)	Aluminum alloy (inches)	Steel (inches)
0.125	9.50	11.50
0.1875	12.0	14.0
0.250	12.50	16.0
0.313	15.0	18.0
0.375	16.50	20.0
0.500	19.0	23.0
0.625	22.0	25.50
0.725	24.0	27.50
1.000	26.50	30.0
1.250	28.50	31.50
1.500	29.50	32.50

3.4.5 Color coding. Fluid lines shall be permanently marked in accordance with MIL-STD-1247. Lines shall be conspicuously marked between each bulkhead in order that each run of line may be traced and identified.

3.5 Performance and product characteristics.

3.5.1 Hydrostatic pressure resistance. Unless otherwise specified in the design drawing, the tube assembly shall be capable of withstanding an internal hydrostatic pressure as specified in tables IV, V or VI, as applicable, without exhibiting any leakage, bursting or other abnormal effects.

3.5.2 Tube capacity. The tubing assemblies shall be capable of allowing a steel ball of a nominal size, as specified in table VII, and in conformity with MS 19059, to pass freely through the tubing after flaring or presetting and forming.

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Table IV. Proof pressure (aluminum alloy tubing), PSI

Wall Thickness (Inches)	Tubing - sizes and outside diameter							
	3	4	5	6	8	10	12	16
	0.1875	0.250	0.313	0.375	0.500	0.625	0.750	1.000
0.016	4000	4000						
0.020	6000	4000	4000	3000	1500	1500	1500	
0.028	6000	6000	6000	4000	3000	1500	1500	1500
0.035		6000	6000	6000	4000	3000	3000	1500
0.042			6000	6000	4000	4000	3000	1500
0.049				6000	6000	4000	4000	3000
0.058					6000	6000	4000	3000
0.065					6000	6000	4000	4000
0.072						6000	6000	4000
0.083						6000	6000	4000
0.095							6000	6000
0.109							6000	6000

TABLE V. Proof pressures (annealed stainless steel), PSI

Wall Thickness (Inches)	Tubing - sizes and outside diameter							
	3	4	5	6	8	10	12	16
	0.1875	0.250	0.313	0.375	0.500	0.625	0.750	1.000
0.016	4000	3000	1500	1500	1500	1500		
0.020	6000	4000	3000	3000	1500	1500		
0.028	6000	6000	4000	4000	3000	1500	1500	1500
0.035		6000	6000	4000	4000	3000	1500	1500
0.042		6000	6000	6000	4000	3000	3000	1500
0.049			6000	6000	4000	4000	3000	1500
0.058				6000	6000	4000	4000	3000
0.065					6000	6000	4000	3000
0.072						6000	4000	4000
0.083						6000	6000	4000
0.095						6000	6000	4000
0.109							6000	6000

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TABLE VI. Proof pressures (stainless steel), PSI

Wall Thickness (Inches)	Tubing - sizes and outside diameter							
	3	4	5	6	8	10	12	16
	0.1875	0.250	0.313	0.375	0.500	0.625	0.750	1.000
0.016	6000	6000	6000	4000	4000	3000		
0.020	6000	6000	6000	6000	4000	4000	3000	
0.028	6000	6000	6000	6000	6000	6000	4000	3000
0.035	6000	6000	6000	6000	6000	6000	6000	4000
0.042			6000	6000	6000	6000	6000	4000
0.049				6000	6000	6000	6000	6000
0.058					6000	6000	6000	6000
0.065						6000	6000	6000
0.072							6000	6000
0.083							6000	6000
0.095								6000

TABLE VII. Tube capacity and ball diameter.

Material	OD (inch)	Wall thickness (inch)	Ball diameter (inch)
CRES ^{1/}	0.125	0.020	0.625
CRES	0.250	0.020	0.1875
AL ALLOY	0.250	0.035	0.1562
CRES	0.312	0.028	0.2188
AL ALLOY	0.312	0.042	0.1875
CRES	0.375	0.028	0.2812
AL ALLOY	0.375	0.049	0.2500
CRES	0.500	0.035	0.4062
AL ALLOY	0.500	0.065	0.3438
CRES	0.625	0.042	0.5000
AL ALLOY	0.625	0.083	0.4062
CRES	0.750	0.049	0.5938
AL ALLOY	0.750	0.095	0.5312
AL ALLOY	1.00	0.049	0.8125
AL ALLOY	1.250	0.065	1.0312

^{1/} (Corrosion-Resistant Steel.)

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3.6 Finish.

3.6.1 Tubing. Finishes of interior and exterior surfaces of the tubing shall conform to the design drawing, MIL-T-6845, MIL-T-7081, MIL-T-8504, MIL-T-8808, MS33611, or MS33584, as applicable.

3.6.2 Fittings. The fittings shall be finished in accordance with the design drawing, MIL-F-5509 or MIL-F-18280, as applicable.

3.7 Product marking.

3.7.1 Tube stamping. There shall be no impression stamped on the tubing for any purpose.

3.7.2 Marking and stamping of AN and MS fittings. All standard (AN and MS) fittings shall be marked and stamped in accordance with MIL-F-5509 and MIL-F-18280.

3.7.3 Marking and stamping of special fittings. Special fittings manufactured to AN standards, but manufactured of alternate materials, shall not receive any identifying color markings.

3.8 Workmanship. Uniformity of shapes and dimensions shall permit interchangeability of tube assemblies of the same design. The interior and exterior surfaces of the tubing and fittings shall be clean, smooth, and free from corrosion, scale, splits, cracks, pits, die or tool marks, "orange peel" appearance, nicks, scratches or similar mechanical damage which may adversely affect the performance, strength or endurance of the tube assembly.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for

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acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.2 Classification of inspections. The inspection requirements specified herein are classified as quality conformance inspection (see 4.3).

4.3 Quality conformance inspection. Quality conformance inspection shall be as specified in the examinations and tests in table VIII and in 4.6.

4.4 Lot. When this specification is used in conjunction with a procurement order for fittings, tubing, tubing assemblies or end articles in which these are installed, the lot for purposes of acceptance shall be as established for the items in the procurement order. When not thus established, a lot shall consist of all the items in a single production order which are submitted for inspection at one time in accordance with the same drawing, drawing revision, specification, and specification revision.

4.5 Sampling. Unless otherwise specified in the contract or order or applicable item procurement specification, inspection shall be 100 percent. Any sampling procedure used (less than 100% inspection) shall be approved by the procuring activity and shall be in accordance with MIL-STD-105 or other Government-approved documents.

TABLE VIII. Quality conformance inspection.

Inspection	Requirement paragraph	Test paragraph
Materials	3.1	4.6.1.1, 4.6.1.2
Construction	3.2	4.6.1.3
Cleaning and protective sealing	3.3	4.6.1.3
Installation of tubing	3.4	4.6.1.3
Performance and product characteristics	3.5	4.6.2
Finish	3.6	4.6.1.4
Product marking	3.7	4.6.1.5
Workmanship	3.8	4.6.1.6

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4.6 Inspection.4.6.1 Examination.

4.6.1.1 Tubing. Prior to fabrication, all tubing shall be visually examined to determine compliance with requirements of 3.1.1.

4.6.1.2 Fittings. All fittings prior to assembly shall be inspected in accordance with MIL-F-5509 and MIL-F-18280. All special fittings prior to assembly shall be visually examined to determine compliance with the requirements of 3.1.3 and 3.6.2 of this specification and the applicable design drawings.

4.6.1.3 Inspection of construction. All fabrication of tubing assemblies, cleaning of tubing and the installation of tubing shall be visually and dimensionally examined to ensure conformance to the requirements of 3.2, 3.3, 3.4 and the applicable design drawings.

4.6.1.4 Finish. All tubing and fittings shall be examined to determine compliance with the finish requirements of 3.6.

4.6.1.5 Product marking. The marking of all tubing and fittings shall be examined for compliance with the requirements of 3.7.

4.6.1.6 Workmanship. Visual examination shall be made of complete tube assemblies to verify compliance with the requirements of 3.8.

4.6.2 Test procedure.

4.6.2.1 Torque. Torque requirements of 3.4.3.1 shall be tested by an applicable and accurately calibrated torque wrench conforming to GGG-W-686 and in accordance with a test method specified in the contract or order.

4.6.2.2 Steel ball test. After flaring or presetting, a steel ball as specified in table VII and conforming to MS 19059, shall be passed through the tubing in accordance with 3.5.2. Assemblies failing to pass the test shall be rejected.

4.6.2.3 Hydrostatic pressure. Unless exceptions are made in the contract or order, no part of a hydraulic system shall fail, take any permanent set, or be damaged in any manner, when subjected to applicable proof pressure. The hydrostatic testing equipment shall have the approval of the Government inspector prior to use.

5. PACKAGING

This section is not applicable to this specification.

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6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. Tubing assemblies covered by this specification are intended for use in missiles and related ground equipment.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number and date of the specification
- b. Issue of the DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1)
- c. Whether special fittings, other than as specified on the design drawing, are required (see 3.1.3), and the title, number, and date of applicable specifications for nonstandard items
- d. Class of assembly required (see 1.2 and 3.2.1.5)
- e. Color coding required (see 3.4.5).

6.3 Metriation. Wherever inch-pound dimensions are used in this document, metric equivalents in accordance with FED-STD-376 shall be acceptable.

6.4 Lubricants. Lubricants which may be used during installation of fluid lines (see 3.2.1.4.1) are noted in table IX.

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TABLE IX. Lubricant for gaskets and fittings.

Service	Name	Type
Liquid oxygen	"Lox Lube"	Grease
Nitrogen tetroxide	"Molykote Z" Teflon	Dry powder -
Hydrogen peroxide	"Fluorolube LG" "UCON-LB-35"	Grease Oil
U-Deta	"DC 200" Fluid, 350 centistokes (cSt)	Oil
UDMH	"Apiezon L"	Grease
JP-4, JP-5 or RP-1	Parker "O-Lube"	Grease
Alcohol	"Apiezon L" "Versilube F-50" "Apiezon M"	Grease Grease Grease
Hydrazine	"Apiezon L" "Apiezon M"	Grease Grease
Pneumatic-General	"DC-4" Dimethyl Silicon Grease	Grease
Pneumatic Propellant Pressurization	Same as system being being pressurized	-

6.5 Subject term (keyword) listing.

Channel, metal
 Conduit, fluid
 Connecting devices
 Coupling, liquid-carrying
 Duct
 Junction, metal
 Pipelines
 Tubing assemblies
 Seam, pipe
 Union joints

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6.6 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodian:
Army - MI

Preparing activity:
Army - MI

Project No. 1410-A114

STANDARDIZATION DOCUMENT COMMENT FORM

INSTRUCTIONS: In a continuing effort to make our standardization documents better, the DoD provides this form for use in submitting comments and suggestions for improvements. All users of military standardization documents are invited to provide suggestions. This form may be detached, folded along the lines indicated, taped along the loose edge (DO NOT STAPLE), and mailed. In block 5, be as specific as possible about particular problem areas such as wording which required interpretation, was too rigid, restrictive, loose, ambiguous, or was incompatible, and give proposed wording changes which would alleviate the problems. Enter in block 6 any remarks not related to a specific paragraph of the document. If block 7 is filled out, an acknowledgement will be mailed to you within 30 days to let you know that your comments were received and are being considered.

NOTE: This form may not be used to request copies of documents, nor to request waivers, deviations, or clarification of specification requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

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