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400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

METRIC AEROSPACE STANDARD

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Revised

TUBE FITTINGS, FLUID SYSTEMS, SEPARABLE, GENERAL SPECIFICATION FOR

CONTENTS

This Metric Aerospace Standard is the equivalent of ISO/DIS 7169. Revisions of this document shall be coordinated with ISO/TC20/SC10.

TUBE FITTINGS, FLUID SYSTEMS, SEPARABLE, GENERAL SPECIFICATION FOR

0. INTRODUCTION

This document was prepared following an ISO/TC20/SC10 agreement in 1973 to standardize on the qualification test and procurement requirements for metric standard fittings. The test requirements are intended to satisfy the most strenuous demands encountered in a high performance aircraft hydraulic system. The procurement requirements are intended to assure that fittings which are bought to this specification are of the same quality as the fittings used during the original qualification testing. Compliance with these test and procurement requirements is necessary for fittings which are used in control systems where a malfunction could affect the safety of flight.

1. SCOPE AND APPLICATIONS

1.1 SCOPE

This document establishes the basic performance and quality criteria for screw-together tube fitting assemblies and port connectors used in aircraft fluid systems.

1.2 FIELD OF APPLICATION

1.2.1 STANDARD FLARELESS FITTING, HYDRAULIC

Performance and quality requirements are stated to which standard 24 degree cone flareless fittings must be qualified and fabricated to assure reliable performance in aircraft hydraulic systems.

1.2.2 OTHER DESIGNS, HYDRAULIC FITTINGS

The performance and quality requirements in this document shall be regarded as a baseline to which new fitting designs and materials are to be qualified for hydraulic use. Some of the requirements of this document are special for the 24 degree cone flareless fitting and do not apply to other designs.

1.2.3 POWER PLANT AND OTHER SYSTEMS

System fittings not requiring hydraulic qualification testing shall be designed and fabricated to the general criteria in this document as far as these criteria are applicable and practical for the intended use and for general standardization.

1.3 CLASSIFICATION

1.3.1 TYPES AND CLASSES

Fittings covered by this specification shall be of the temperature types and pressure classes specified in ISO/DIS 6771.

2. REFERENCES

2.1 APPLICABLE DOCUMENTS

ISO 2859	Sampling Procedures and Tables for Inspection by Attributes
ISO/DIS 2659	Environmental Tests for Aircraft Equipment - Salt Mist
ISO/DIS 6771	Aerospace Fluid Systems and Components, Pressure and Temperature Classifications
ISO/DIS 6772	Impulse Testing of Hydraulic Hose Assemblies, Tubing and Fittings
ISO/DIS 6773	Thermal Shock Test
ISO/DIS 7525	Rotary Flexure Testing of Hydraulic Tubing Joints and Fittings

2.2 TERMINOLOGY

2.2.1 PRESSURE TERMS

Operating Pressure	Nominal pressure, the maximum steady working pressure to which a fitting assembly or component may be subjected. the basic operating pressure without regard to operating pressure variations.
Proof Pressure	The static pressure for testing an assembly, a prescribed multiple of the nominal or operating pressure.
Impulse Pressure	A rapidly occurring pressure rise, peaking at a prescribed multiple of the nominal or operating pressure. After the impulse peak the pressure trace follows a prescribed curve, with a hold at nominal and zero pressure during one impulse pressure cycle.

2.2.2 FITTING TERMS

(Fitting) Assembly	Assembled and torque tightened fitting, nuts, sleeves and tubing.
Port (also boss)	Threaded connection with a seal, component to pipe line, machined into the component.
Straight Fittings	Parts such as unions, machined out of bar stock.
Forged Parts, also "shapes"	Fitting parts such as elbows and tees, machined out of individual forging blanks.

2.2.3 WORKMANSHIP, SURFACE DEFECTS

Surface Irregularity	Nonconformity with general surface appearance, possibly defect.
Crack	Fissure, tear, separation.
Fold	Forging or thread rolling fold defect in the surface.
Lap	Fold like machining defect.
Seam	Extraneous material, stringer in the material, not homogeneous with base metal.
Pit	Void, hole in the surface as caused for example by corrosion.

2.2.4 QUALITY ASSURANCE

Lot	A fabrication run of a given part number from the same batch of material, processed at the same time.
Accepted Quality Level (AQL) Defect Classification etc.	Note: Quality control definitions used in Section 4 are further explained in DIS 2859.
Qualification, Qualify	The testing required to demonstrate performance of the fitting in simulated service, overload, destructive and accelerated tests.

3. REQUIREMENTS

3.1 QUALIFICATION

Fittings furnished under this specification shall be representative of products which have been subjected to and successfully passed the tests specified in Section 4 of this specification. Proposals for delivery will be regarded only from manufacturers whose products have passed the qualification tests as required prior to the time set for the opening of bids.

3.2 MATERIALS

3.2.1 FITTINGS

The fitting parts shall be fabricated from materials as listed in Table I or equivalents passing the specified qualification tests. The various materials are to be used according to the pressure and temperature requirements of the system (Tables I and II).

Note: Temperature types and system pressure classes are defined in ISO/DIS 6771.

3.2.2 TUBING

The tubing used with the assembled fittings shall be as described in Table II, or equivalents passing the specified qualification tests.

3.3 DESIGN AND FABRICATION

3.3.1 THREADS

Threads may be cut, rolled or, except for titanium, ground. The external threads of fittings should be rolled, and if machined, shall have a surface finish of 3,2 m or smoother. The grain flow in rolled threads shall be continuous and follow the general thread contour with the maximum density at the thread root.

Laps, cracks, surface irregularities and seams (2.2) are not acceptable on any part of the pressure thread flank, in the threadroot or on the non-pressure thread flank. Laps and seams, whose depths are within the limits of Table III are acceptable on the crest and the non-pressure thread flank above the pitch diameter.

TABLE I

MATERIALS, FITTINGS AND TUBING

FITTINGS					TUBING			
PART	MATERIAL	TYPE [1]	CODE LETTER [2]	STARTING STOCK	MATERIAL	F_{tu} (MPa) [3]	F_{ty} (MPa) [4]	El% (Min)
STRAIGHT FITTINGS & NUTS	ALUMINUM ALLOY	I	D	BAR, ROD	COLDWORKED CORROSION RESISTANT STEEL	725	515	20
FORGED FITTINGS	ALUMINUM ALLOY	I	D	FORGINGS	HIGH STRENGTH CORROSION RESISTANT STEEL	980	825	20
STRAIGHT & FORGED PARTS	CARBON STEEL	II	F	BAR, ROD FORGINGS	TITANIUM (UNALLOYED)	350	250	28
STRAIGHT & FORGED PARTS	CORROSION RESISTANT STEEL	I II III VI	J S K	BAR AND FORGINGS	TITANIUM COLDWORKED & STRESS RELIEVED	860	720	10
STRAIGHT & FORGED PARTS	TITANIUM ALLOY	IV	T	BAR AND FORGINGS	ANNEALED CORROSION RESISTANT STEEL	520	200	35
SLEEVES (BITE TYPE)	CARBON STEEL	II	F	BAR				
SLEEVES (SWAGED & BRAZED)	CORROSION RESISTANT STEEL	IV		BAR				

Notes:

[1] Types in accordance with ISO/DIS 6771

[2] See Table IV

[3] F_{tu} - Ultimate Tensile Strength, Minimum

[4] F_{ty} - Yield Strength (0.2% Proof Stress), Minimum

TABLE II

TUBING WALL THICKNESS REQUIREMENT
FOR QUALIFICATION OF FITTINGS (mm)

TUBE	TYPE II (-55 TO 135°C)						TYPE III (-55 TO 200°C)	
	CLASS C 20,000 kPa (200 BAR)			CLASS D 28,000 kPa (280 BAR)			CLASS C 20,000 kPa (200 BAR)	CLASS D 28,000 kPa (280 BAR)
MATERIAL	COLD WORKED CRES STEEL	HIGH STRENGTH CRES STEEL	COLD WORKED TITANIUM	UNALLOYED TITANIUM	HIGH STRENGTH CRES STEEL	COLD WORKED TITANIUM	COLD WORKED TITANIUM	COLD WORKED TITANIUM
F_{tu}/F_{ty} /EL	725/515 /20	980/825 /20	860/720 /10	350/250/ /28	980/825 /20	860/720 /10	860/720 /10	860/720 /10
DN05	0,40	0,40	0,40		0,60	0,60		
DN06	0,40	0,40	0,40	0,80	0,60	0,60	0,40	0,55
DN08	0,50	0,50	0,50	0,90	0,75	0,75		
DN10	0,70	0,50	0,50	1,20	0,80	0,80	0,60	0,90
DN12	0,80	0,60	0,60	1,40	0,90	0,90	0,70	1,0
DN14				1,6				
DN16	1,0	0,80	0,80	1,80	1,2	1,2	0,90	1,3
DN20	1,5	1,0	1,0		1,5	1,5	1,1	1,8
DN25	1,6	1,3	1,3		1,9	1,0	1,4	2,2
DN32	2,2	1,4	1,4		2,2	2,2	1,6	2,5
DN40								
CODE	F, J, S, T			T, F			T	
	Fitting Material, Code Letters							

TABLE III

MAXIMUM DEPTH OF LAPS, AND SURFACE IRREGULARITIES
IN ROLLED THREADS (mm)

SIZE DN	DEPTH	SIZE DN	DEPTH
05	0,15	10	0,20
06	0,18	12	0,23
08	0,18	14 THRU 40	0,25

3.3.2 PASSAGES

on fittings where the fluid passage is drilled from each end, the offset between the drilled holes at the meeting point shall not exceed 0,4 mm. It shall be possible to pass through the fitting passage a ball whose diameter is 0,5 mm less than the minimum diameter specified for the passage.

3.4 SURFACE PROTECTION AND COLOR IDENTIFICATION

The surfaces of fitting parts shall be protected and color coded in the following manner:

a. Aluminum alloy fittings by sulphuric or chromic acid anodizing, then dyed and hot water sealed, except for chromic acid anodized parts.

b. Carbon steel fittings by cadmium plating 0,007-0,012 mm thick, followed by chromate post-plate treatment.

c. Corrosion resistant steel fittings by passivation treatment. Sleeves may be cadmium plated.

d. titanium fittings by a fluoride conversion coating or anodizing process.

As a reference the material of the finished fitting may be distinguished by a yellowish color for aluminum alloy except for chromic acid anodized parts, gold brown for carbon steel, bright metallic for corrosion resistant steel and a dull dark gray or blue for titanium alloy (see Table IV).

3.5 MARKING

Unless specified otherwise on the standard, parts shall be permanently identified with the complete part number and the manufacturer's trademark. The method of marking shall be impression stamping or electro-etching, in that order of preference. When the complete part number cannot be used in 8 mm size and under because of the size of the part, the marking may be limited to the basic part number, without size designation. The marking shall be in a location not detrimental to the part or its surface protection. When material code letters are used, the code letter shall also be impression stamped on the part. Standard material code letters for use on fittings shall be as shown in Table IV. The complete part number shall always appear on the part container.

TABLE IV

MATERIAL CODES AND COLORS

CODE LETTER	MATERIAL	COLOR (3.4)
D	ALUMINUM	YELLOW (EXCEPT FOR CHROMIC ACID ANODIZED)
F	CARBON STEEL	GOLD BROWN
J	304 CRES	
K	316 CRES	BRIGHT METALLIC
S	321 OR 347 CRES	
T	TITANIUM	DULL GREY, OPTIONAL: BLUE

3.6 PERFORMANCE

The tubing-fitting assembly shall be capable of the performance specified in 3.6.1 through 3.6.10 below.

3.6.1 PROOF PRESSURE

The test assembly shall withstand pressure equal to twice the nominal operating pressure (2.2) of the system for five minutes without leakage, evidence of permanent deformation or other malfunction that would affect the ability to disconnect or connect using the specified range or torque values. The test shall be performedd in accordance with 4.6.1.

3.6.2 GASEOUS PRESSURE TIGHTNESS

Assemblies shall passs the gaseous pressure test to the specified system operating pressure (2.2) without leakage or other failure when tested in accordance with 4.6.2.

3.6.3 HYDRAULIC IMPULSE RESISTANCE

The test assembly shall withstand 200,000 impulse pressure cycles without leakage from the fitting or the fitting-tube junction when tested in accordance with 4.6.3.

3.6.4 MINIMUM BURST PRESSURE CAPABILITY

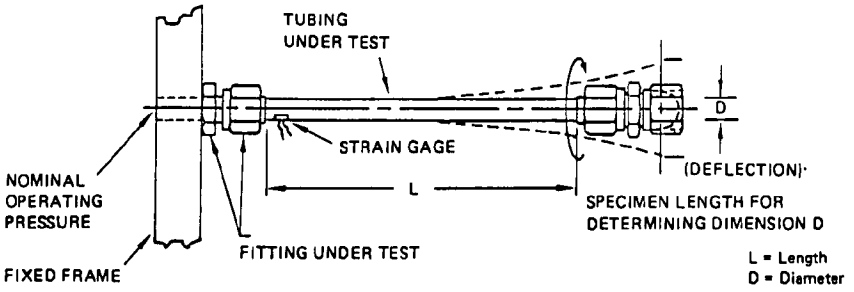
Pressure of four times the specified operating pressure shall be applied in accordance with 4.6.4. There shall be no leakage or burst at less than this pressure. Tubing expansion is permissible.

3.6.5 FLEXURE RESISTANCE

3.6.5.1 Standard Flexure Test, Type II, Class C

When tested with cold worked corrosion resistant steel tubing (725 MPa in accordance with Table II,) assemblies of Type II, Class C, fittings shall withstand ten million flexure cycles at a bending stress level of 107 MPa in sizes DN5 through DN16 and 72 MPa in sizes Dn20 through DN40. This bending stress is to be determined prior to the application of internal pressure. In order to obtain the true bending stress, it is necessary to always measure the microstrain dynamically at the flexure test frequency. The tolerance for the specified bending stress is to be +10/-0 degrees.

Six specimens as shown in Figure 1 shall pass this test without failure when tested in accordance with 4.6.5. Bulkhead tee fitting connections shall match the flexure fatigue life of straight unions.



BASIC FLEXURE TEST SPECIMEN

Figure 1

NOTES:

1. Basic Qualification Test to ten million cycles. Steel flareless fittings shall be used with Type II, Class C, cold worked corrosion resistant steel tubing and tested to the stress levels defined in 3.6.5.1 above.

2. Modifications of the Flareless Fitting, new coupling designs, new tubing materials or new attachment methods are to be qualified by comparing their fatigue life against that of the basic flareless fitting by testing to 10 million cycles. The performance of such new designs, materials or joining methods must meet or exceed that of the standard flareless Type II, Class C fitting and cold worked corrosion resistant steel tubing, i.e. all six specimens shall withstand ten million flexure cycles without failure.

3.6.5.2 Flexure Test - Other Types and Classes

Fitting assemblies of other temperature types and pressure classes (ISO/DIS 6771) are to be qualified by testing to the same deflection levels ("D" in Figure 1) as obtained for testing in accordance with 3.6.5.1. The performance of other type or class fittings must meet or exceed that of the Type II, Class C fitting.

3.6.6 STRESS CORROSION RESISTANCE

The test assembly shall withstand salt spray exposure without occurance of any of the following defects:

a. Indications of cracking or pitting of the exposed surfaces of the tube joint area when fittings and tubing are visually examined with 10 power magnification and the joint area is compared to the remainder of the tubing.

b. Indications of inter- or transgranular corrosive attack during metallurgical examination of longitudinal and transverse sections of the fitting and fitting-tube junction.

The test shall be conducted in acordance with 4.6.6.

3.6.7 REUSE CAPABILITY

The test assembly shall withstand eight repeated assemblies when tested in accordance with 4.6.7 without occurance of any of the following defects:

a. Leakage at any of the proof pressure tests.

b. Leakage or burst at a value less than four times the nominal operating pressure during the burst pressure testing - in case that secimens are used for burst tests also.

c. Inability to assemble the fitting to the bottoming or seal interface point by hand.

d. Nut deformation preventing engagement of the nut hexagon with an open-end wrench.

e. Gaseous leakage following final assembly when tested in accordance with 4.6.2.

3.6.8 TENSILE LOAD CAPABILITY

Flareless tube fitting assemblies shall withstand axial loads specified in Table V without rupture when tested in accordance with 4.6.8. New designs must hold, as a minimum, axial loads equivalent to those as generated in the fitting by four times the operating pressure.

TABLE V

JOINT STRENGTH STEEL FLARELESS FITTING ON CORROSION RESISTANT STEEL TUBING (kN)

SIZE DN	06	08	10	12	14	16	20	25	32	40
COLD WORKED STEEL TUBING (725 F_{tu}, 515 F_{ty}, 20% El.)	6,60	8,80	11,0	19,0		31,0	40,0	44,0		

3.6.9 THERMAL SHOCK RESISTANCE

The test assembly shall not leak during temperature and pressure cycling from the minimum to the maximum system temperature when tested in accordance with 4.6.9.

3.6.10 FIRE RESISTANCE

Aluminum alloy tube and fittings shall withstand exposure to a 1100 C flame without leakage or failure during five minutes of fire testing. Tubing and fittings manufactured from corrosion resistant steel shall withstand the fire test for fifteen minutes without leakage. The test procedure shall be in accordance with 4.6.10.

3.7 WORKMANSHIP

fitting parts shall conform with the requirements on the drawing and in this document, and must be free of burrs and slivers. Sealing surfaces must be machined smooth to a finish of 1,6 µm maximum. All other machined surfaces shall have a roughness of 3,2 µm or smoother. Unmachined surfaces of forgings or bar stock flats must be of uniform quality and condition, and free of cracks, folds, fissures, pits or defects which could adversely affect the serviceability of the part (2.2). Defects in the shear area along forging parting planes of aluminum alloy fittings may be explored by grinding (6,5 µm max) and etching. If the defects can be removed so that they do not reappear on re-etching, and the required section thickness can be maintained, they shall not be cause for rejection.

4. QUALITY ASSURANCE PROVISIONS

4.1 RESPONSIBILITY FOR INSPECTION

Unless otherwise specified in the contract or purchase order, the manufacturer is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the manufacturer may utilize his own facility or any commercial laboratory acceptable to the procuring activity. The procuring activity has the right to perform any inspection set forth in this specification whenever such inspections are deemed necessary to assure that supplies and services conform to prescribed requirements.

4.2 CLASSIFICATION OF INSPECTIONS AND TESTS

The inspection and testing of fittings, nuts, and sleeves shall be classified as

a. Qualification inspection
b. Quality conformance inspection

4.2.1 QUALIFICATION TESTS

Test assemblies shall consist of the parts specified in Section 4.5. Tests shall be conducted in accordance with 4.6 for each size and material for which qualification is required.

4.2.2 QUALITY CONFORMANCE INSPECTION

4.2.2.1 Non-Destructive Tests

Inspection for material, threads, finish, dimensions, marking, surface defects and workmanship shall be conducted on a sampling basis in accordance with ISO 2859.

a. Classification of Defects

Fitting defects are classified in accordance with Table VI according to the effect they have on safety and usability. Definition of classes is in accordance with ISO 2859. However, minor defects are further categorized as follows:

Minor A - may have a slight effect on usability.
Minor B - has no effect on usability.

b. Level of Inspection

The following Accepted Quality Levels (AQL's) shall apply to the defect classifications (2.2) shown in Table VI.

Major - 1.5
Minor A - 4.0
Minor B - 6.5

All defects not identified in Table VI will be inspected in accordance with the Minor A classification, AQL 4.0.

TABLE VI

CLASSIFICATION OF DEFECTS

FITTING END - DESIGN STANDARD	
CLASS	DEFECTS
Major	Depth, seal diameter to the tube stop Finish of seal area (cone and O-ring) Squareness, thread to hexagon face
Minor A	thread Seal angle Fluid bore diameter O-ring seal diameter Machining finish Diameters Thread length, size and form Marking

FITTING - UNION	
CLASS	DEFECTS
Major	Incomplete holes, internal burrs
Minor A	Thread size and form Concentricity of threads, seat, and face Hexagon Dimension Marking
Minor B	Over-all length Surface finish, radii, chamfer, color, and identification

SLEEVE (BITE TYPE)	
CLASS	DEFECTS
Major	Hardness of core and case Finish, seal area Cutting edge, sharpness
Minor A	Bore diameter Outside diameters Concentricity of ID and OD Surface finish, Marking
Minor B	Turn length Over-all length Width of shoulder Surface finish and color

FITTING - TEE, ELBOW	
CLASS	DEFECTS
Major	Holes - incomplete or missing, internal burrs
Minor A	Fluid passage diameter and depth Leg length, overall length, angle between legs Wrench pad dimension Marking
Minor B	Drill depth and size Counter bore diameter of seat, leg angularity

NUT	
CLASS	DEFECTS
Major	Thread, concentricity, thread to tube bore
Minor A	Thread length, size, and form Small bore diameter Hex dimension Concentricity of threads, minor diameter, and small ID Marking
Minor B	Minor diameter and depth Countersink dimension Turned diameter and length Over-all length Surface finish, radii, chamfer, color

PREPARATION FOR DELIVERY	
CLASS	DEFECTS
Major	Missing, incorrect, incomplete, illegible, of improper size, location, sequence or method of application of marking. Any nonconforming components; component missing, damaged, or otherwise defective. Inadequate assembly of components, number per container is more or less than stipulated. Gross or net weight exceeds the requirement

4.2.2.2 Destructive Tests

Sampling for all destructive tests - that is, hardness, burst pressure, grain flow, tube cut (sleeves only) and metallurgical properties (sleeve only) shall be performed in accordance with ISO 2859, Inspection level S-1, AQL 4.0, acceptance number zero.

4.2.2.3 Inspection

Each individual lot of fittings, nuts and sleeves shall be subjected to the following examinations and tests, as specified in Sections 3 and 4.

a. Examination of Product
b. Chemical Composition and Mechanical Properties
c. Grain Flow
d. Internal Passages

4.2.2.4 Rejection and Retest

Rejected lots shall be resubmitted for retest and acceptance in accordance with ISO 2859. Parts subjected to non-destructive tests and failing to conform to the requirements of these tests shall be rejected. parts subjected to destructive tests shall be discarded.

4.3 QUALITY CONTROL RECORDS

The supplier shall maintain a record of inspection applied to each lot for a minimum of five years. Records of chemical composition analysis, mechanical property tests showing conformance with the applicable material specifications and metallurgical tests shall be made available to the purchaser of each lot of fittings upon request.

4.4 QUALITY CONFORMANCE INSPECTION, PROCEDURES

4.4.1 EXAMINATION OF PRODUCT

Each lot of fittings will be examined to determine conformance with this specification and the applicable standard with respect to material, dimensions, threads, wall thickness, surface defects, finish, marking and workmanship.

4.4.2 MATERIAL CERTIFICATION

The manufacturer shall assure that all materials meet the requirements for chemical composition and mechanical properties as specified in the applicable material and heat treat specifications.

4.4.3 GRAIN FLOW IN THREADS

The grain flow in rolled threads shall be determined by macro examination. Specimens shall be taken from the finished part by sectioning on a longitudinal plane across the threaded area. The specimens shall be etched to reveal the macro-structure adequately.

4.4.4 PASSAGES

Each lot of fittings shall be inspected to determine conformance with 3.3.2. The offset between drill holes at intersections shall be inspected by rolling a steel ball with a diameter as specified under 3.3.2 through the fitting.

4.4.5 SAMPLING INSTRUCTIONS

Sampling shall be as specified under 4.2.2.1 for non-destructive and 4.2.2.2 for destructive tests.

4.5 TEST CONDITIONS

4.5.1 TEST FLUIDS

Unless otherwise specified, the tests shall be conducted using a petroleum base hydraulic fluid for Type I and II and a silicate ester base hydraulic fluid for Type III (in accordance with ISO/DIS 6771) system fittings. Water may be used whenever practical for proof, burst, stress corrosion and repeated assembly testing. For other than hydraulic system applications it is preferable to use system fluid for leakage and proof testing.

4.5.2 SPECIMEN PREPARATION

Test specimens shall be built as illustrated in Table VII and assembled using the maximum installing torque for one-half of the test specimens, and minimum torques for the other half.

4.5.3 LUBRICANTS

Hydraulic System fittings shall be assembled using system fluid as lubricant, or another lubricant which is compatible with the system fluid and which has essentially the same lubricity characteristics.

4.5.4 SAMPLING INSTRUCTIONS

Qualification inspection samples shall consist of the component parts illustrated in Table VII and shall be tested in the quantities shown in that table. Qualification tests are required for each size and material for which qualification is desired.

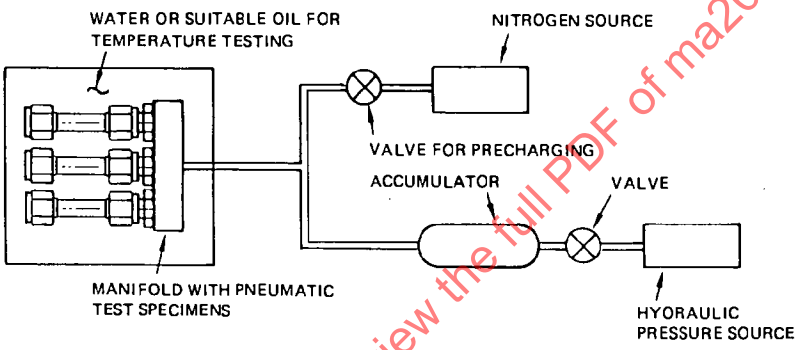
4.6 QUALIFICATION TEST PROCEDURES

4.6.1 PROOF PRESSURE TEST

Test assemblies shall be connected to a source of pressure with one end free to move and proof pressure tested at a value equal to two times the nominal system operating pressure for a minimum period of five minutes. Rate of pressure rise shall be 150,000 kPa ±37,500 kPa (1500 Bar ±375 Bar) per minute. The test shall be conducted at room temperature.

4.6.2 GASEOUS PRESSURE TEST

Test fittings shall be solvent cleaned and air dried prior to test, assembled without the use of a separate lubricant or compound on the thread or in the seal area (unless they have a solid film lubrication) and tightened to the specified torques. They shall then be pressurized with nitrogen to the specified system pressure and this pressure maintained for five minutes while the specimens are immersed in water or other suitable fluid. Specimens may be pressure tested at room temperature.



GASEOUS LEAKAGE TEST

Figure 2

4.6.3 IMPULSE TEST

Assemblies shall be impulse tested in accordance with ISO/DIS 6772. type I specimens shall be tested at room temperature, Types II, III at the temperatures and sequence as specified in ISO/DIS 6772.

4.6.4 BURST PRESSURE TEST

The test assembly shall be connected to a source of pressure with one end free to move. The pressure shall be increased at a rate of 150,000 kPa ±37,500 kPa per minute until the assembly bursts, leaks or reaches the specified burst pressure. It is not essential that the assembly actually be pressurized to burst. Specimens shall be tested at room temperature.

4.6.5 FLEXURE TEST

Unless otherwise specified by the purchaser, the test shall be conducted in accordance with ISO/DIS 7525.