INTERNATIONAL STANDARD

ISO 7314

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Aerospace — Fluid systems — Hose assembly, metal

Aéronautique et espace — Systèmes de fluides — Tuyauteries flexibles métalliques

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Contents

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

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Aerospace — Fluid systems — Hose assembly, metal

1 Scope

This International Standard gives specifications for medium pressure, high temperature, flexible metal hose assemblies suitable for continuous operation in liquid and pneumatic systems from − 55 °C to + 400 °C, with short duration excursions up to + 650 °C.

The hose assemblies covered by this International Standard are intended for use in aerospace applications to convey air and gases in pneumatic systems, bleed air systems, heating and ventilating systems, and instrument air systems when used at pressures and temperatures within the limits laid down in tables 1 and 2. Flow velocity in these assemblies shall not exceed 54 m/s; higher velocities will require special vibration-dampening devices.

Hose assemblies supplied to the specifications laid down in this International Standard may be of two types:

Type 1: Convoluted inner tube — welded, of moderate weight and moderate flexibility.

Type 2: Convoluted inner tube — seamless or butt-welded and redrawn, of low weight and high flexibility.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 8153 : —[1], *Aerospace — Fluid systems and components — Terminology — Hose assemblies.*

ISO 8625 : —[1], *Aerospace — Fluid systems — Vocabulary.*

3 Definitions

For the purposes of this International Standard, the definitions given in ISO 8153 and ISO 8625 apply.

1) To be published.

4 Requirements

4.1 Qualification

Any hose assembly supplied to the specifications laid down in this International Standard shall be a product identical in hose construction and end-fitting attachment method to specimens which have been tested and which have passed the qualification tests specified in clause 5.

Qualified hose assemblies of type 2 construction may be automatically substituted for type 1 hoses, but type 1 hoses may not be substituted for type 2 hoses unless customer approval is given.

4.2 Materials

The hose assembly materials shall be uniform in quality, free from defects and suitable for use in continuous ambient and/or fluid temperatures ranging from − 55 °C to 400 °C with short fluid temperature excursions up to 650 °C. The materials shall be consistent with good manufacturing practices and shall conform with the applicable specifications and the requirements specified in this International Standard.

4.3 Design and construction

The hose assembly shall consist of a convoluted, stabilized, corrosion-resistant steel, pressure-carrying tube, suitable for the intended use, and uniform in size and wall thickness. The hose assembly shall be reinforced with stabilized corrosion-resistant steel braided wire and shall have stabilized corrosion-resistant steel end fittings and nuts. End fittings shall be attached to the hose by welding. The end fitting outlet design shall mate with applicable end fittings.

4.3.1 End fittings

The hose-to-fitting joint shall be welded in a suitable manner meeting the requirements specified in this International Standard. It is recommended that fitting joints be kept to a minimum to reduce potential leakage paths. The mass of type 2 fittings shall not exceed the values given in table 4. Type 1 fitting masses shall be as given on the approved drawing.

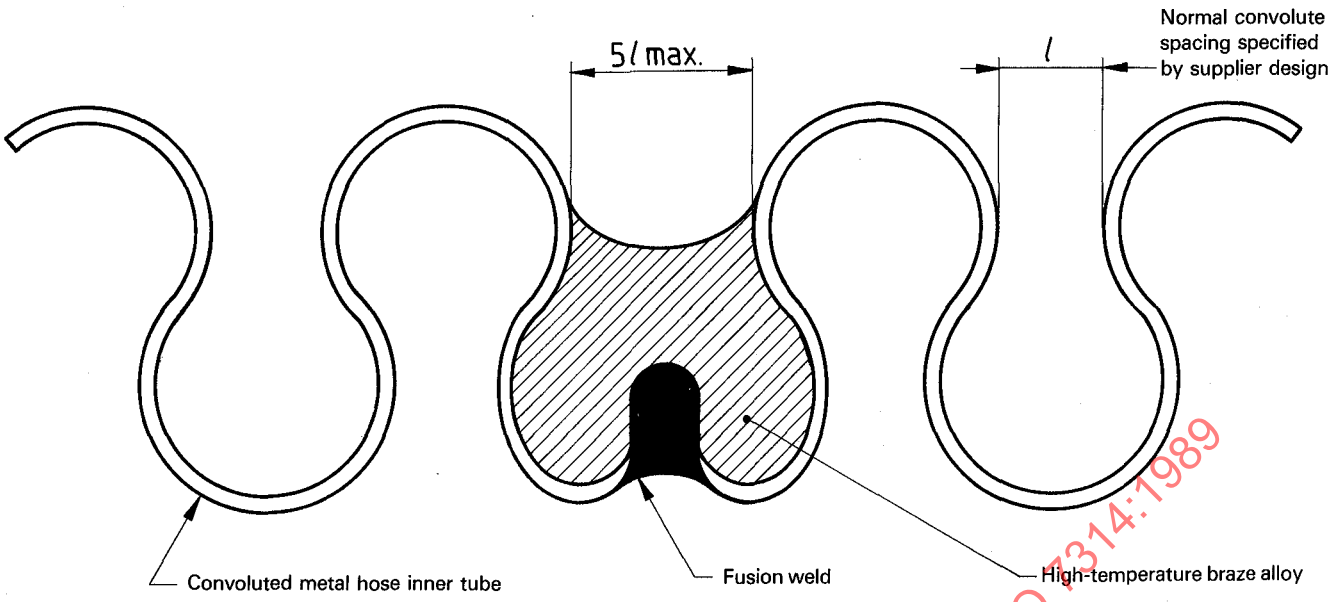

Figure 1 — Inner tube splice configuration

Table 1 — Dimensions and performance requirements for hose assemblies

Hose nominal size DN	Hose		Fitting	Operating pressure at 20 °C[2] max.		Proof pressure at 20 °C[2] min.		Burst pressure at 20 °C[2] min.	
	Inside diameter min.	Outside diameter max.	Bore[1] min.						
	mm	mm	mm	kPa	(bar)	kPa	(bar)	kPa	(bar)
03	2	6	2	13 750	(138)	20 650	(207)	55 150	(552)
04	3	7	2,5	13 750	(138)	20 650	(207)	55 150	(552)
05	4	9,9	3	13 750	(138)	20 650	(207)	55 150	(552)
06	5,5	13	3,5	13 750	(138)	20 650	(207)	55 150	(552)
08	7	13,5	5	12 000	(120)	18 000	(180)	48 000	(480)
10	8,5	16,5	6,4	11 000	(110)	16 500	(165)	44 000	(440)
12	11	20,5	9,1	9 600	(96)	14 500	(145)	38 600	(386)
16	14	24	11,6	8 300	(83)	12 400	(124)	33 000	(330)
20	17,5	29	14,4	7 200	(72)	10 700	(107)	29 000	(290)
25	23	36	19,3	5 500	(55)	8 300	(83)	22 000	(220)
32	30	44	23,4	3 800	(38)	5 700	(57)	15 200	(152)
40	36	53	32	3 000	(30)	4 500	(45)	12 000	(120)
50	48	65	42	2 400	(24)	3 600	(36)	9 600	(96)
63	60	78	55	1 800	(18)	2 700	(27)	7 200	(72)

1) Minimum inside diameter through the elbow bend area may be 0,8 mm less than the value given due to ovality.

2) For pressure requirements at elevated temperature, multiply the value by the factor given in table 2.

Table 2 — Factor for correcting pressure requirements at elevated temperatures (see table 1)

Material	Austenitic chrome/nickel steel stabilized for carbide precipitation													
Operating temperature, °C	20	50	100	150	200	250	300	350	400	450	500	550	600	650
Correction factor	1	0,91	0,84	0,78	0,73	0,69	0,65	0,62	0,6	0,58	0,57	0,57	0,56	0,55

4.3.2 Hose

4.3.2.1 Inner tube construction

In the case of type 1 hoses, the inner tube shall be an annular or helical, convoluted flexible tube made from welded stabilized austenitic stainless steel.

In the case of type 2 hoses, the inner tube shall be an annular, convoluted flexible tube of seamless or butt-welded and redrawn construction using stabilized austenitic stainless steel.

For either type, the inner tube shall be uniform in size and quality, and free from pitting and other defects.

There shall be no inner tube splices on hose assemblies shorter than or equal to 1 m in length. One splice is allowed for each additional metre of hose assembly length. Splices are undesirable, but, if required, shall be low-profile welds in accordance with 4.3.3 and figure 1. After welding, the convolutes shall be closed as shown in figure 1.

4.3.2.2 Reinforcement

The reinforcement shall be a suitable braided construction using stabilized austenitic stainless steel wire in such a manner as to meet the requirements specified in this International Standard. There shall be no splices, missing loops, kinks or broken wires in the braid wire reinforcement.

4.3.3 Welds

All welds shall be fusion welds suitable for the intended use. Filler wire, if required, shall be compatible with the weld material used. Equivalent supplier or other comparable welding specifications may be substituted subject to prior approval by the purchaser.

4.3.4 Heat treatment

If stress-relieving of austenitic stainless steel welds is required to meet corrosion and embrittlement resistance, the joints shall be stress-relieved at 895 °C ± 15 °C for 2 h ± 0,25 h.

4.4 Dimensions, masses and ratings

4.4.1 Hose diameter

The inside diameter of the convoluted hose and the outside diameter of the braid covering shall be as given in table 1.

4.4.2 Bend radius

The requirements for the minimum bend radius of hoses shall be as given in table 3. The bend radius shall be measured to the centreline of the hose.

4.4.3 Assembly length

Hose assembly lengths shall be as specified on the applicable product standard or drawing.

4.4.4 Masses

Maximum masses of type 2 hose assemblies, with standard 37° or 24° fittings, shall be as given in table 4. Maximum masses for type 1 hose assemblies and for type 2 hose assemblies with other fittings shall be stipulated on the supplier's drawing when presented to the purchaser for approval.

4.5 Performance

The hose assembly minimum bend radius and operating, proof and burst pressure ratings, as given in tables 1 and 3, shall be verified by proving that the performance requirements of 4.5.1 to 4.5.8 are met or exceeded, through qualification testing as specified in clause 5. Compliance with performance requirements shall be maintained by adherence to the quality assurance provisions specified in clause 5.

4.5.1 Examination of product

Each assembly shall conform dimensionally and materially to the applicable product standard or drawing and to all requirements of this International Standard when examined in accordance with 5.6.1.

4.5.2 Proof pressure test

The hose assembly shall withstand the applicable proof pressure, specified in table 1, at room temperature (i.e. at 20 °C), without leakage or evidence of permanent deformation or malfunction, that would affect hose assembly installation, removal or use when tested in accordance with 5.6.2.

4.5.3 Corrosion test

The hose assembly shall be capable of withstanding the proof pressure requirements specified in 4.5.2 after 50 immersion cycles in a 3,5 % (m/m) sodium chloride (NaCl) solution in accordance with 5.6.3.

4.5.4 Vibration test

The hose assembly shall have no broken braid wire and shall be capable of withstanding, without leakage, the proof pressure requirements specified in 4.5.2, after vibration testing in accordance with 5.6.4.

4.5.5 Flexure/pressure cycling endurance test

The hose assembly shall have no broken braid wire and shall be capable of withstanding the proof pressure requirements specified in 4.5.2, after 50 000 combination flexure/pressure cycles in accordance with 5.6.5.

4.5.6 Repeated torque test

The hose assembly end fitting shall be capable of sealing and withstanding the proof pressure requirements specified in 4.5.2, after 15 installations on a mating fitting in accordance with 5.6.6. The fitting nut shall be free enough to permit turning on the elbow or insertion by hand.

4.5.7 Cold test

The hose assembly shall show no evidence of leakage when tested in accordance with 5.6.7.

4.5.8 Thermal shock test

The hose assembly shall show no evidence of leakage when tested in accordance with 5.6.8.

4.5.9 Burst pressure test

The hose assembly shall not rupture and shall show no sign of leakage at any pressure up to the burst pressure specified in table 1, when tested in accordance with 5.6.9.

4.5.10 Strauss test (stress corrosion)

There shall be no evidence of fissures, or intergranular or transgranular corrosion of the weld specimen when tested in accordance with 5.6.10.

4.6 Part numbering of interchangeable parts

All parts having the same manufacturer's part number shall be functionally and dimensionally interchangeable.

Table 3 — Minimum centreline bend radius

Dimensions in millimetres

Hose nominal size DN	Minimum bend radius			
	Type 1 hose assembly		Type 2 hose assembly	
	Static	Dynamic	Static[1]	Dynamic
03	100	200	—	—
04	100	200	—	—
05	100	200	50	100
06	100	200	50	100
08	125	250	65	130
10	150	300	75	150
12	175	350	100	200
16	200	400	115	230
20	235	470	125	250
25	310	620	150	300
32	370	740	175	350
40	450	900	225	450
50	550	1 100	275	550
63	700	1 400	350	700

1) No flexure in service.

Table 4 — Masses for type 2 hose assemblies with standard 37° or 24° fittings

Hose nominal size DN	Maximum masses			
	Hose	Standard end fittings		
		Straight	45° elbow	90° elbow
	g/cm	g		
05	1,5	20	20	20
06	2	23	23	23
08	2,5	27	29	29
10	3	32	36	36
12	4,2	55	59	64
16	5,3	82	91	100
20	6,5	163	177	186
25	9	218	259	291
32	12	358	413	449
40	19	486	507	552
50	24	768	810	845
63	35	—	—	—

4.7 Product identification

The hose assemblies shall be marked for identification in accordance with the requirements of 4.7.1 and 4.7.2.

4.7.1 Fittings

The manufacturer's name or trademark shall be permanently marked on all end fittings.

4.7.2 Assemblies

Each assembly shall bear permanent identification markings that include, as a minimum, the following details:

a) the manufacturer's name, trademark or code number;

b) the complete manufacturer's part number;

c) the complete specification control number;

d) the pressure test symbol "PT";

e) the date of hose assembly manufacture (month and year), or serial number (if any);

f) for qualification samples, the words "NOT FOR REUSE" and the test specimen number.

4.8 Workmanship

The hose assembly, including all parts, shall be constructed and finished in a thoroughly workmanlike manner. All surfaces shall be free from burrs.

4.8.1 Dimensions and tolerances

All dimensions and tolerances, as specified on the applicable product drawings and specifications, shall be complied with.

4.8.2 Cleaning

The hose assemblies shall be cleaned according to the general commercial practice of the manufacturer to remove oil, grease, dirt or any other foreign material, both internal or external to the hose, unless otherwise specified on the product standard or drawing.

5 Quality assurance provisions

5.1 Supplier's responsibility

The supplier is responsible for the performance of all quality assurance provisions as specified in this International Standard. Accurate records of the testing shall be kept by the supplier and shall be available, on request, to the purchaser for inspection. The supplier's test data, subject to the approval of the purchaser, shall be considered adequate for product qualification.

5.1.1 Rejection and retest

Rejected hose or hose assemblies shall not be submitted for reinspection without full particulars being supplied concerning previous rejection and measures taken to overcome the defects.

5.1.2 Defects on items already accepted

If the investigation of the rejection indicates that the defect(s) causing the rejection may exist in hose assemblies previously supplied to the purchaser, the contractor shall advise the purchaser of this condition, the method for identifying these parts and the corrective action or disposition of the defective parts.

5.2 User's responsibility

The user shall establish adequate inspection procedures to ensure that all requirements of this International Standard are met. Emphasis shall be placed on the following aspects:

a) compliance with configuration and end fitting;

b) length;

c) markings;

d) pressure test performance.

5.3 Classification of inspections

The examination and testing of these hose assemblies shall be classified as:

a) qualification inspections (see 5.4);

b) quality conformance inspections (see 5.5).

5.4 Qualification inspections

The qualification inspections outlined in this International Standard are intended to qualify a manufacturer's hose construction and end fitting attachment method only.

The configuration of the outlet parts shall be as described on the product standard or drawing. A number shall be assigned for each attachment method and hose construction used for qualification. The attachment method and hose shall be fully described in the test report by design standard drawings. All other end connections shall also be considered qualified, provided that the hose and hose attachment method have not been altered.

5.4.1 Test specimens

Nine flexible metal hose assemblies of each size shall be used for qualifying performance of the manufacturer's product. They shall be standard hose assemblies, as defined in table 5, according to the manufacturer's assembly drawing(s).

Specimens Nos. 1 to 4 shall be of length l_1 and Nos. 5 to 9 of length l_2, specified in table 7.

5.4.2 Test schedule and sequence

The test specimens shall be subjected to qualification tests in the order indicated in table 6.

Table 5 — Test specimen configurations

Test specimen No.	End fitting configuration	Hose assembly length
1 2	Straight-to-straight	Actual gauge point to gauge point length equal to l_1 (see table 7)
3 4	45° elbow to 90° elbow	305 mm long with elbows in line
5 6 7 8 9	Straight-to-straight	Actual gauge point to gauge point length equal to l_2 (see table 7)

Table 6 — Test schedule and sequence for qualification testing (order of tests to be read from left to right)

Test specimen No.	Examination of product (see 5.6.1)	Proof pressure test (see 5.6.2)	Corrosion test (see 5.6.3)	Proof pressure test	Vibration test (see 5.6.4)	Proof pressure test	Flexure/pressure cycling endurance test (see 5.6.5)	Repeated torque test (see 5.6.6)	Cold test (see 5.6.7)	Thermal shock test (see 5.6.8)	Proof pressure test	Burst pressure test (see 5.6.9)	Strauss test (see 5.6.10)
1	×	×			×	×		×			×	×[1]	
2	×	×			×	×						×[1]	
3	×	×						×			×	×	×
4	×	×						×			×	×	×
5	×	×	×	×	×[2]	×					×	×[1]	
6	×	×	×	×			×				×	×[1]	
7	×	×					×				×	×[1]	
8	×	×							×	×	×	×[1]	
9	×	×							×	×	×	×[1]	

1) The assemblies need not meet minimum requirements, but all test data should be accurately recorded and included in the test report.

2) For nominal sizes up to DN 16 only.

5.5 Quality conformance inspections

Quality conformance inspections shall consist of the following tests:

a) individual tests (100 % inspection) (see 5.5.1);

b) sampling tests (see 5.5.2);

c) periodic control tests (see 5.5.3).

5.5.1 Individual tests (functional tests)

Each hose assembly shall be subjected to the following:

a) an examination of the product, performed in accordance with 5.6.1;

b) the proof pressure test, performed in accordance with 5.6.2.

5.5.2 Sampling tests

A hose assembly, selected at random from a production run when the supplier has manufactured a cumulative total of no more than 6 000 hose assemblies made to the specifications of this International Standard, shall be subjected to the following tests:

a) the proof pressure test, performed in accordance with 5.6.2;

b) the burst pressure test, performed in accordance with 5.6.9;

c) the Strauss test, performed in accordance with 5.6.10.

5.5.3 Periodic control tests

The flexure/pressure test as laid down in table 6 shall be performed in accordance with 5.6.5, except that the test shall be carried out at room temperature on two hose assemblies when a supplier has manufactured a cumulative total of no more than 9 000 hose assemblies made to the specifications of this International Standard.

5.6 Test methods

5.6.1 Examination of product

Inspect the hose assemblies visually and dimensionally to determine compliance with the applicable hose assembly standard and examine them for compliance with the requirements of clause 4.

5.6.2 Proof pressure test

Lay the hose horizontally on a flat surface so that one end is free to move.

Submit the hose assemblies to a proof pressure test under water at room temperature by applying the appropriate pressures specified in table 1 with air or nitrogen being used as the test medium. Maintain pressure for 5 min. After testing, thoroughly dry all hose assemblies. For individual tests (functional tests) only, maintain the pressure for 1 min. Water may be used as the test medium if specifically required by the control authority; in this case the hose assembly is not under water.

5.6.3 Corrosion test

Test specimens Nos. 5 and 6, as indicated in table 6, shall be subjected to a corrosion test.

5.6.3.1 Pressurize the hose assembly to the operating pressure specified in table 1 and maintain this pressure for the steps described in 5.6.3.2 to 5.6.3.4.

5.6.3.2 Immerse the hose assembly in a 3,5 % (m/m) sodium chloride (NaCl) solution at 20 °C ± 5 °C for 8 min to 10 min.

5.6.3.3 Air dry for the remainder of 1 h.

5.6.3.4 Repeat the steps described in 5.6.3.2 and 5.6.3.3 for a total of 50 times.

5.6.3.5 Proof test the hose assemblies in accordance with 5.6.3.

5.6.3.6 Without removing salt or cleaning the hose, continue testing by following the sequence laid down in table 6.

5.6.4 Vibration test

5.6.4.1 Test specimens Nos. 1, 2 and 5, as indicated in table 6, shall be subjected to the vibration test.

Mount the test specimens Nos. 1 and 2 as shown in figure 2a) and specimen No. 5 as shown in figure 2b). Pressurize the specimens to the maximum operating pressure at a temperature of 400 °C (see tables 1 and 2), with air or nitrogen being used as the test medium. Stabilize the hose temperature at 400 °C ± 15 °C. Fix one end of the specimen and vibrate the other end.

5.6.4.2 Vibration shall be induced in three mutually perpendicular axes, one axis at a time, as follows:

a) one axis parallel to the plane of the specimen and the centreline of the free end fitting;

b) one axis parallel to the plane of the specimen and the centreline of the fixed end fitting;

c) one axis perpendicular to the plane of the specimen.

The vibration testing consists of the following three operations:

a) resonance search;

b) resonant dwell;

c) sinusoidal cycling.

Testing shall be conducted in the order indicated. The required vibration test envelope is as follows:

5 Hz to 30 Hz ± 0,38 mm

30 Hz to 53 Hz ± 1,5g

53 Hz to 100 Hz ± 0,13 mm

100 Hz to 350 Hz ± 5g

350 Hz to 490 Hz ± 0,01 mm

490 Hz to 1 000 Hz ± 10g

5.6.4.3 The test shall be performed in accordance with the detail test requirements specified in the applicable industry standards, with the following exceptions:

a) Frequency scan rates during resonance search shall be 2 octaves/min or slower.

b) Several accelerometers shall be installed at appropriate locations on the test item to measure resonances during resonance search conditions. If this is not possible (for example due to accelerometer mass effects), a vibration-shaker synchronized strobe light shall be used to select specimen responses.

c) The test specimen shall be vibrated during resonant dwell for 1×10^6 cycles or 8 h, whichever occurs first, at each resonance in a given axis. If more than four resonances are encountered along any one axis, the four most severe resonances shall be chosen for the dwell test.

d) When resonance dwell testing cannot be conducted in a particular axis due to lack of resonance, a sinusoidal cycling test shall be conducted for a total of 8 h at a cycling rate proportional to frequency and at a level 1,15 times the applicable test envelope.

e) The sinusoidal cycling test shall be conducted between the frequency limits 5 Hz to 1 000 Hz back to 5 Hz at the vibration test envelope levels for a test duration of 1,5 h per axis. Cycling time (5 Hz to 1 000 Hz back to 5 Hz) shall be 15 min.

f) Vibration test envelope tolerances shall be as follows:

— acceleration and displacement amplitude: ± 10 %

— frequency: ± 5 %

g) Motion of the vibrator table shall be sinusoidal motion with not more than 10 % distortion.

When the vibration test has been completed, subject each specimen to the proof pressure test specified in 5.6.2.

5.6.5 Flexure/pressure cycling endurance test

5.6.5.1 Mount test specimens Nos. 6 and 7, as indicated in table 6, for flexure/pressure cycling as shown in figure 3. One end shall be fixed; the other end shall be movable and shall be capable of reciprocating motion along the hose axis.

5.6.5.2 Subject the movable end to the test at the rate of 50 cycles/min to 70 cycles/min for a total of 50 000 flexure cycles. One flexure cycle shall be defined as the movement from one extreme, as shown in figure 3, to the other and back to the starting position. Simultaneously with hose flexure, subject the hose to cyclical internal hose pressure at the rate of 20 cycles/min to 22 cycles/min ranging from 50 % (or less) to 100 % of the applicable operating pressure, as specified in table 1.

The test shall be carried out at room temperature and the fluid medium may be water or hydraulic fluid.

5.6.5.3 When the 50 000 flexure cycles have been completed, subject all three specimens to the proof pressure test specified in 5.6.2. After proof pressure testing, subject all specimens to the burst pressure test specified in 5.6.9.

5.6.6 Repeated torque test

Six end fittings, as defined by the purchaser, shall be installed on test specimens Nos. 1, 3, and 4, as indicated in table 6, and shall be subjected to the repeated torque test.

5.6.6.1 Lubrication

Lubricate all adaptor-to-hose fitting threads and contact surfaces with oil prior to application of torque.

5.6.6.2 Application of torque

Assemble the hose fittings to be qualified on a mating fitting of the same material classification and having an end configuration in accordance with drawings, as applicable. Tighten the coupling nut to the appropriate maximum installation torque value for each size and material, and then loosen. Repeat this sequence 15 times.

The hose nipple should be restrained while applying torque to the components to prevent galling of the sealing surfaces. It is recommended that a torque handle be used. Installation torque values shall be given on the supplier's print or other supporting documentation.

5.6.6.3 Functional acceptance test

After application of torque, as specified in 5.6.6.2, and removal from the fitting, the coupling nut shall be free enough to permit turning on the hose nipple by hand. In addition, it should be capable of holding proof pressure for 5 min without leakage. (Test medium used shall be consistent with the applicable intended use.)

5.6.7 Cold test

Test specimens Nos. 8 and 9, as indicated in table 6, shall be subjected to the cold test.

Place the hose, open-ended, in a refrigerated room and let the temperature stabilize at -55 °C for 1 h. Then wind the hose alternately 10 times in one direction and 10 times in the other around a mandrel with a diameter equal to twice the bend radius given in table 3, minus the outside diameter of the hose to be tested.

5.6.8 Thermal shock test

Test specimens Nos. 8 and 9, as indicated in table 6, shall be subjected to the thermal shock test.

Place the hose, open-ended, in an oven the temperature of which is maintained at $+650$ °C $\pm$ 20 °c for 15 min. Then withdraw the hose from the oven and plunge it into a watertank at ambient temperature. Repeat the operation a further four times.

5.6.9 Burst pressure test

All test specimens shall be subjected to an internal pressure burst test. The test shall be conducted at room temperature (20 °C $^{+12}_{-5}$ °C) and water or hydraulic fluid may be used as the test medium. Extend the specimen straight with one end connected to a pressure source and the other end free to move. Increase the pressure in 680 kPa increments starting with an initial pressure of 3 400 kPa below the rated burst pressure for the hose assembly. Allow for a minimum of 1 min between each subsequent pressure increase. Record the pressure at which the hose ruptures.

Failure of test specimens Nos. 1, 2, 5, 6, 7, 8 and 9 to comply with the requirements laid down in 4.5.7 shall not be cause for rejection. Test specimens Nos. 3 and 4 shall comply with the requirements of 4.5.7.

5.6.10 Strauss test

A test for intergranular attack in the weld zone (weld plus heat affected area) of the stainless steel tube on each end of test specimens Nos. 3 and 4, as indicated in table 4, shall be conducted in accordance with industry standards.

6 Preparation for delivery

6.1 Closures

High-density plastic (polypropylene) closures shall be used to the maximum extent possible. Anodized aluminium caps and plugs shall be used if the above-mentioned high-density plastic is not available.

6.2 Packaging

Packaging shall be as necessary to ensure delivery of assemblies in a clean and undamaged condition.