

AS 1869.0:2023



STANDARDS
Australia



Hose and hose assemblies for liquefied petroleum gases (LP Gas), natural gas and town gas

Part 0: General requirements



AS 1869.0:2023

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- Gas Energy Australia
- Gas Technical Regulators Committee
- Master Plumbers Australia and New Zealand
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Part 0: General requirements

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Preface

This Standard was prepared by the Australian members of the Joint Standards Australia/Standards New Zealand Committee AG-013, Components used for Gas Appliances and Equipment, to supersede in part AS/NZS 1869:2012, *Hose and hose assemblies for liquefied petroleum gases (LP Gas), natural gas and town gas*.

After consultation with stakeholders in both countries, Standards Australia and Standards New Zealand decided to develop this document as an Australian Standard rather than an Australian/New Zealand Standard.

The objective of this document is to provide general requirements to ensure performance, safety, durability and fitness for purpose of hose and hose assemblies in the gas industry.

AS/NZS 1869:2012 has been revised and divided into three parts. AS 1869.0 covers general requirements for hose and hose assemblies, AS 1869.1 covers requirements specific to non-metallic liners and AS 1869.2 covers requirements specific to metallic liners (see [Appendix E](#) for a comparison guide).

Other major changes from the 2012 edition are as follows:

- (a) Existing allowable levels of extractable matter have been confirmed for each class of hose.
- (b) Appendix A covering purchasing guidelines has been removed as it is unlikely that purchasers would read this document.
- (c) Appendix X covering hoses designed to operate in excess of 2.6 MPa has been removed as it is outside the scope of this document.
- (d) Resistance to corrosion requirements have been added ([Clause 2.16](#)).
- (e) Resistance to ultraviolet degradation requirements have been added ([Clause 2.17](#)).

The terms “normative” and “informative” are used in Standards to define the application of the appendices to which they apply. A “normative” appendix is an integral part of a Standard, whereas an “informative” appendix is only for information and guidance.

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Australian Standard®

Hose and hose assemblies for liquefied petroleum gases (LP Gas), natural gas and town gas

Part 0: General requirements

Section 1 Scope and general

1.1 Scope

This document specifies general requirements and test methods for hose and hose assemblies for liquefied petroleum gases (LP Gas) (liquid and gaseous phases), natural gas, town gas manufactured from oil products, tempered LP Gas and simulated natural gas in transport, automotive, industrial and domestic applications. It provides for hose up to and including 100 mm inside designated size and 2.6 MPa maximum working pressure.

This document does not specify requirements for LP Gas hose for welding. Hoses for welding are covered by AS/NZS 1335.

NOTE 1 A guide to the user for continued in-service performance testing of hose assemblies is included in [Appendix D](#).

NOTE 2 This document should be read in conjunction with the other parts of the AS 1869 series.

NOTE 3 Performance requirements for semi-rigid connectors are set out in AS 4631.

1.2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document.

NOTE Documents referenced for informative purposes are listed in the Bibliography.

AS 1683.20, *Methods of test for elastomers, Method 20: Standard temperatures, humidities and times for conditioning and testing*

AS 1683.23, *Methods of test for elastomers, Method 23: Rubber—Vulcanized—Determination of resistance to liquids*

AS 1869.1, *Hose and hose assemblies for liquefied petroleum gases (LP Gas), natural gas and town gas, Part 1: Non-metallic liners*

AS 1869.2, *Hose and hose assemblies for liquefied petroleum gases (LP Gas), natural gas and town gas, Part 2: Metallic liners*

ISO 37, *Rubber, vulcanized or thermoplastic — Determination of tensile stress-strain properties*

ISO 48-2, *Rubber, vulcanized or thermoplastic — Determination of hardness — Part 2: Hardness between 10 IRHD and 100 IRHD*

ISO 1431-1, *Rubber, vulcanized or thermoplastic — Resistance to ozone cracking — Part 1: Static and dynamic strain testing*

ISO 23529, *Rubber — General procedures for preparing and conditioning test pieces for physical test methods*

1.3 Terms and definitions

For the purposes of this document, the terms and definitions given in AS/NZS 1596, AS/NZS 5601.1 and AS/NZS 5601.2 and the following apply.

1.3.1

accessible

access can be gained without hazard or undue difficulty for inspection, repair, testing, renewal or operational purposes

1.3.2

adhesion

strength of the bond between the layers of a multi-layer hose

1.3.3

braid angle

angle at which the plaits of a braided hose intersect

1.3.4

check valve

valve which closes to prevent reverse flow

1.3.5

cylinder

container for the storage and transport of compressed, dissolved and liquefied gases, of water capacity ranging from 0.1 kg to 3 000 kg

Note 1 to entry: Refer to AS 2030.1 for requirements for gas cylinders.

1.3.6

cylinder connector

assembly used to connect an LP Gas cylinder to downstream equipment

Note 1 to entry: Cylinder connections include the following:

- (a) CGA555 (Type 26).
- (b) Type 21 (POL).
- (c) Type 27.
- (d) Forklift connection.

Refer to AS 2473.1 and AS 2473.2 for specifications, and testing and marking requirements for these and other cylinder connections.

1.3.7

designated size

diameter of the hose within a set tolerance which the hose is commonly addressed by

Note 1 to entry: See [Table 1.3](#) for dimensions.

1.3.8

elastomeric liner

non-metallic material in contact with gas in either gas, liquid or vapour phase

1.3.9

excess-flow valve

valve that is normally open but closes automatically when a predetermined flow rate in a particular direction has been exceeded

1.3.10**hose assembly**

flexible tube or pipe complete with end couplings

1.3.11**manufacturer's specification****manufacturer's instruction****manufacturer's recommendation**

document supplied with the appliance or equipment that provides authoritative instructions on matters such as installation, commissioning, testing, maintenance and operation of the appliance or equipment

1.3.12**may**

indicates the presence of an option

1.3.13**nominal bore****NB**

see *designated size* ([1.3.7](#))

1.3.14**outdoor**

above ground, open-air situation with natural ventilation, where any leakage and products of combustion are rapidly dispersed by wind and natural convection

1.3.15**pigtail**

short length of small-bore pipe or a hose assembly (to allow flexibility) used for the high-pressure connection between an LP Gas cylinder and the cylinder regulator or cylinder manifold

1.3.16**quick-connect device**

two-part mating plug and socket assembly for connecting a gas appliance to a gas supply without the use of tools

Note 1 to entry: Quick-connect devices are sometimes referred to as "bayonet fittings".

Note 2 to entry: Refer to AS 4627 for requirements and test methods for quick-connect devices.

1.3.17**regulator**

device that automatically regulates the outlet pressure of gas passing through it to a predetermined limit

1.3.18**semi-rigid connector**

assembly, with permanently attached end fittings, of limited flexibility which may be constructed of annular pipe or lined for smooth bore applications

Note 1 to entry: Refer to AS 4631 for requirements and test methods for semi-rigid devices.

1.3.19**shall**

indicates that a statement is mandatory

1.3.20**should**

indicates a recommendation

1.3.21

supplementary protection

external material used to protect the hose and designed to be replaced during the life of the hose

Note 1 to entry: Material does not form an integral part of the hose assembly for example, connected permanently to the hose end fittings or is fixed to the hose cover.

1.4 Classification

Hose and hose assemblies are classified according to maximum working pressure, working temperature range and oil resistance as given in [Table 1.1](#).

NOTE Some classes of hose assembly are specific to identified applications and their use in alternative applications should be suitable for the chosen duty.

Table 1.1 — Classification

Class	Description	Maximum working pressure at 23 °C ± 2 °C	Working temperature range °C	Oil resistant lining and cover	Extractable testing to	Suitable for LP Gas liquid phase
A	Low pressure appliance hose	14 kPa	−20 to +65	—	AS 1869.1 Clause C.1	—
B	Low pressure high temperature appliance hose	14 kPa	−20 to +125	Y	AS 1869.1 Clause C.1	—
C	High pressure appliance and gas tool hose	2.6 MPa	−20 to +65	—	AS 1869.1 Clause C.1	—
D	High pressure high temperature appliance and gas tool hose	2.6 MPa	−20 to +125	Y	AS 1869.1 Clause C.1	—
E	High pressure hose — General use (up to designation 15 mm)	2.6 MPa	−50 to +65	—	AS 1869.1 Clause C.2	Yes
F	Flexible cylinder connectors (pigtailed)	2.6 MPa	−20 to +100	Y	AS 1869.1 Clause C.2	Yes
G	Automotive, including under bonnet	2.6 MPa	−20 to +125	Y	AS 1869.1 Clause C.2	Yes
H	Transfer hoses (above designation 15 mm)	2.6 MPa	−50 to +65	Y	AS 1869.1 Clause C.2	Yes
NOTE Classes E to H are not intended for use with hydrogen blended gasses.						

1.5 Materials and construction

1.5.1 General

Internal and external surfaces shall be uniform and concentric.

1.5.2 Materials

The internal surface of the hose shall be fabricated of material that is resistant to any of the gasses nominated in the scope of this document.

Any reinforcing or armouring wire shall be of corrosion-resistant material. Any earthing wire shall be corrosion resistant.

The hose shall be resistant to, or protected from, ultraviolet degradation.

1.5.3 Gas permeation

Hose shall permit the free release of any permeating gas during service to prevent blistering or separation of components due to any penetration of gas through the lining.

NOTE 1 Pricking through the cover at suitable intervals along its length may be an acceptable procedure.

Couplings used on hose assemblies shall be designed, constructed and fitted so that an assembly conforms to the minimum burst pressure specified in [Clause 2.3.2](#) and withstands the minimum tensile force specified in [Clause 2.15](#) without showing any sign of failure or leakage.

NOTE 2 Couplings should be properly fitted so as not to damage the reinforcement or other vital parts of the hose.

1.5.4 Designated size, tolerance and bend radius

For non-metallic inner tube, the actual internal diameter shall be within the tolerance for the designated size as specified in [Table 1.2](#). For metallic inner tube, the tolerance for the internal diameter shall not be less than 98 % of the designated size.

Table 1.2 — Designated size and tolerance

Designated size range	Tolerance mm
≤ 5	±0.5
> 5 to 20	±0.75
> 20 to 31.5	±1.25
> 31.5 to 63	±1.50
> 63 to 100	±2.00

Table 1.3 — Designated size and dynamic bend radius

Designated size	Dynamic bend radius mm
≤ 6 (1/4)	125
8 (5/16)	125
10 (3/8)	160
12 (1/2)	160
15 (5/8)	230
20 (3/4)	240
25 (1)	300
32 (1 ¼)	384
40 (1 ½)	480
50 (2)	600
65 (2 ½)	780
80 (3)	960
100 (4)	1 200
NOTE 1 Designated size is the commonly referred to size of the tube and not an exact measurement.	
NOTE 2 Figures in brackets are equivalent imperial inch.	
NOTE 3 Where the nominal bore of the hose is not listed, rounding to the nearest designated size is permitted.	

1.6 Marking

1.6.1 Detail of marking

Each manufactured hose assembly shall be permanently and clearly marked with the following information:

- (a) Class (see [Clause 1.4](#)) and maximum working pressure.
- (b) Year of manufacture.
- (c) The words “Electrically continuous”, where conformant to [Clause 2.7](#).
- (d) Designated size of the hose, in millimetres.
- (e) Name or identification of the manufacturer or assembler.
- (f) Designation of the hose.

EXAMPLE Marking for a 20 mm Class A hose made by “Smith Hoses” in 2022 could be: AS 1869.1-CLA-WP 14 kPa—2022 20 mm—Smith Hoses.

NOTE 1 Other marking requirements (e.g. identification of certification body and certificate number) may be required by certain authorities applicable to a product that falls within the scope of this document. Manufacturers, importers or distributors (as appropriate) should check other such requirements.

For hose, marking shall be continuous on the hose, where practicable, at intervals not greater than 600 mm. If continuous marking is not practicable due to the hose construction, an inscribed ferrule, tag or sleeve shall be securely fixed to each end of the hose length.

For Classes E and H where the hose assembly is less than 600 mm long and has a unique identifier related to a test certificate, clear marking of Items (a) and (b) shall be present as a minimum. The test certificate shall be provided which includes Items (a) to (f).

NOTE 2 The certificate should be kept on file for the expected life of the hose.

NOTE 3 An allowance has been made for the marking of Class E and Class H hoses, typically used for LP Gas transfer applications, for uniquely identified hoses less than 600 mm in length. In these applications, the end user can reasonably be expected to operate asset management systems to track some information within their system tied to the hose assembly by the unique identifier. Permanent marking by engraving or embossing of all information has proven difficult on these smaller hose lengths due to abrasive and other damage expected during their operational life.

1.6.2 Assembler is different from hose manufacturer

For hose assemblies where the assembler is different from the hose manufacturer, the assembler's name or identification shall be included in the marking.

1.6.3 Tags and labels

For hose assemblies, Items (a) to (f) in [Clause 1.6.1](#) may also be included on a permanently fixed tag or sleeve. The durability and legibility of the marking shall be in accordance with [Clause 2.18](#).

1.6.4 Instructions

Instructions shall be available in the English language and include at least the following:

- (a) Thread size and type.
- (b) Minimum bend radius.
- (c) Any special factors (e.g. suitable for food service or marine applications).
- (d) Australian contact details of the manufacturer or distributor.

The installation instructions shall include references to the requirements of the AS/NZS 5601 series of Standards or AS/NZS 1596 where applicable.

Where it is not practical to include these instructions, advice shall be included that the instructions are available from the manufacturer's website, which shall be marked on the product label.

1.7 Hose assemblies

1.7.1 Couplings for end fittings

Couplings shall be of fire-resistant and corrosion-resistant material, preferably of brass or steel. Design of the couplings shall be such that the assembly can be secured at one end without the necessity of turning the hose relative to its mating piece and without the use of additional fittings.

The inlet connection shall be fully compatible with the gas supply connection and provide a reliable gas tight seal without the use of additional fittings.

NOTE Other aspects of the design should be agreed between purchaser and supplier.

1.7.2 Complete assemblies — Hoses including couplings and excluding pigtails

The hose shall be secured to end fittings by means of swaging, crimping or the use of other suitable permanently fitted clips. Reusable worm drive clamps or screw clamps shall not be used. Couplings shall be properly fitted so as not to damage the reinforcement or other vital parts of the hose.

Reusable fittings may be used for automotive applications and gas transfer hoses only (Classes E, G or H).

Any change to reusable fittings shall be in accordance with the original manufacturer's instructions.

NOTE The use of a sacrificial sleeve is accepted only if it does not form an integral part of the hose assembly via permanent connection to the hose end fittings or is permanently fixed to the hose cover.

1.7.3 Class F hose assemblies — Pigtails for LP Gas in vapour phase

Hose assemblies intended for use as vapour withdrawal cylinder connectors (vapour pigtails) shall feature the following:

- (a) End fittings permanently secured by means of swaging, crimping or the use of other suitable permanently fitted clips. Reusable worm drive clamps or screw clamps shall not be used. Couplings shall be properly fitted so as not to damage the reinforcement or other vital parts of the hose.

- (b) Inlet couplings compatible with the cylinder valves for which they are intended. Additional adapters shall not be used.

NOTE 1 These couplings may include an integral non-return valve to minimize the release of LP Gas vapours or liquid when disconnecting.

- (c) Outlet couplings compatible with the connection for which they are intended without the use of additional adaption fittings.

- (d) An excess flow valve to limit LP Gas release in the event of hose failure.

NOTE 2 When selecting assemblies with excess flow, account should be taken of the demand flow rate against the design shut-off rate.

- (e) Shall have a maximum length no greater than that permitted for the application and shall not exceed 1.5 m.

NOTE 3 The maximum allowable length for installation is determined by AS/NZS 1596 and AS/NZS 5601.2.

1.7.4 Class F hose assemblies — Pigtails for LP Gas in liquid phase

Hose assemblies intended for use as liquid withdrawal cylinder connectors (liquid pigtails) shall feature the following:

- (a) End fittings permanently secured by means of swaging, crimping or the use of other suitable permanently fitted clips. Reusable worm drive clamps or screw clamps shall not be used. Couplings shall be properly fitted so as not to damage the reinforcement or other vital parts of the hose.

- (b) Inlet couplings compatible with the cylinder valves for which they are intended. The use of additional adapters is not permitted.

- (c) Outlet couplings compatible with the connection for which they are intended without the use of additional adaptors.

- (d) Protection against uncontrolled release of medium in the event of hose or assembly failure.

- (e) Protection against release of the medium when disconnecting from the cylinder valve.

- (f) Unrestricted two-way flow to allow expansion volume to return to cylinder. Non-return or check valves shall not be used for liquid applications.

- (g) Shall have a maximum length no greater than that permitted for the application and shall not exceed 1.5 m.

NOTE The maximum allowable length for installation is determined by AS/NZS 1596.

1.7.5 Testing of hose without end fittings

Hose intended for use with gas may be tested for conformance with the requirements of [Clauses 2.1 to 2.14](#) and [2.16 to 2.19](#).

Section 2 Performance requirements

2.1 General

Performance requirements common to both non-metallic and metallic liners are contained in this document.

Performance requirements specific to non-metallic or metallic liners are contained in AS 1869.1 and AS 1869.2 respectively.

NOTE See [Appendix C](#) for the relevant test methods and [Appendix A](#) for illustrations of the test apparatus.

2.2 Resistance to gas

Resistance to gas is specific to non-metallic tube and liners, and shall be in accordance with AS 1869.1:2023 as follows:

- (a) Clause 2.2 for general requirements.
- (b) Clause C.1 for a method for determining resistance of lining to gas for Classes A, B, C and D.
- (c) Clause C.2 for a method for determining resistance of lining to gas for Classes E, F, G and H.
- (d) Clause C.3 for a method for determining resistance of hose assembly to gas.

NOTE A guide to the reduction of extractable materials from hose with non-metallic tubes or liners is included in AS 1869.1:2023 Appendix F.

2.3 Hydrostatic pressure

2.3.1 Proof pressure

When tested in accordance with [Clause C.10](#), hose or hose assemblies shall show no sign of leakage or any other indication of failure at the following pressures:

- (a) For Classes A and B — 28 kPa.
- (b) For Classes C, D, E, F, G and H — 5.2 MPa.

Non-metallic lined hose for Classes F and G samples shall first undergo testing in accordance with AS 1869.1:2023 Clause C.2 prior to this test and the same hose sample being used.

There shall be no leakage or evidence of failure. Leakage at the end fitting, fitting blow-off or rupture of the hose adjacent to the fitting shall be taken as failures in the performance of the assembly.

2.3.2 Burst pressure

When tested in accordance with [Clause C.10](#), hose or hose assemblies shall not burst below the following pressures:

- (a) For Classes A and B — 56 kPa.
- (b) For Classes C, D, E, F, G and H — 10.4 MPa.

Non-metallic lined hose for Class F and Class G samples shall first undergo testing in accordance with AS 1869.1:2023 Clause C.2 prior to this test and the same hose sample being used.

Leakage at the end fitting, fitting blow-off or rupture of the hose adjacent to the fitting shall be taken as failures in the performance of the assembly.

2.3.3 Change in dimensions

2.3.4 Length

When tested in accordance with [Clause C.10](#) at the relevant proof pressure, hose shall not change in length by more than 8 %.

2.3.5 Diameter

When tested in accordance with [Clause C.10](#) at the relevant proof pressure, hose shall not change in diameter by more than 8 %.

2.4 Resistance to oil

2.4.1 Cover

When tested in accordance with [Clause C.19](#) in Oil No. 3 as specified in AS 1683.23 at 125 °C for 70 h, covers of Classes B, D, F, G and H hose shall not suffer a change in volume in excess of 80 %.

2.4.2 Non-metallic liner

When tested in accordance with [Clause C.19](#) in Oil No. 3 as specified in AS 1683.23 at 100 °C for 70 h, non-metallic linings of Classes B, D, F, G and H hose shall not suffer percentage changes in volume, tensile strength and elongation in excess of 40 %.

The tensile strength and elongation, before and after immersion, shall be measured in accordance with AS 1869.1:2023 Clause C.17.

2.5 Resistance to ozone

When tested in accordance with [Clause C.11](#), the cover and rubber hose shall not split or crack.

2.6 Resistance to flexing and mechanical loads

2.6.1 Hose not exceeding 20 mm

When hose assemblies incorporating hose of designated size not exceeding 20 mm are subjected to one of the tests specified in [Clause C.4](#), there shall be no visible signs of leakage of the hose assembly and no visible signs of fracture, cracks or leakage in the hose lining or cover.

2.6.2 Hose exceeding 20 mm

When hose of designated size exceeding 20 mm is subjected to one of the tests specified in [Clause C.4](#), the hose shall show no visible signs of fracture, cracks or leakage.

2.7 Electrical properties

2.7.1 Electrical continuity

Where electrically continuous hose is specified, unless the hose contains a body wire, it shall be made electrically continuous by a corrosion-resistant, flexible conductor. The conductor shall be spirally installed so that it is not over-tensioned by kinking or flexing the hose and fixed to the end connections by soldering, brazing, welding, peening or other mechanical methods. Body wires, intended to be the electrically conducting medium, shall be similarly attached to end connections.

2.7.2 Electrical resistance

Where electrically continuous hose is specified, hose assemblies shall be tested in accordance with [Clause C.12](#).

For hose assemblies constructed with materials other than stainless steel conductor, the resistance shall not be greater than 0.3 Ω /m.

For hose assemblies constructed with stainless steel conductor, the resistance shall not be greater than 2.0 Ω /m.

2.7.3 Hose assembly resistance

Where electrical continuity is specified, when such a hose assembly is tested in accordance with [Clause C.13](#), the resistance of the conductors shall not be greater than the values specified in [Clause 2.7.2](#), plus an allowance of 0.1 Ω for each flange or coupling.

2.7.4 Retention of electrical properties

Where electrical continuity is specified, after such a hose assembly is subjected to one of the treatments specified in [Clause C.4](#), it shall retain the relevant properties specified in [Clause 2.7.2](#), with the test specimen in both the straight position and when bent in accordance with the dynamic bend radius in [Table 1.3](#).

2.8 Resistance to cold bending

When tested in accordance with [Clause C.14](#), except that the temperature of the cold chamber and the test temperature shall be $-20 \pm 0, -2$ °C for Classes A, B, C, D, F and G and $-50 \pm 0, -4$ °C for Classes E and H hose and the mandrel diameter shall be twice the dynamic bend radius shown in [Table 1.3](#), the hose shall not show visible signs of cover cracks, leakage or other defects.

2.9 Minimum flow capacity and resistance to kinking

2.9.1 Pressure drop

This clause applies to Classes A, B, C and D for designated sizes up to and including 25 mm.

The pressure drop of a gas hose with a length between end fittings of 1 m shall not exceed 50 Pa at standard conditions and air flow rates as given in [Table 2.1](#).

Conformance shall be assessed by testing in accordance with [Clause C.5](#).

Table 2.1 — Air flow rate

Designated size	Air flow rate m ³ /h
≤ 8	0.25
10	0.57
12	1.00
15	1.20
20	2.30
25	4.70

2.9.2 Pressure drop due to kinking

When the hose or hose assembly is looped and has a mass nominated in [Table 2.2](#) suspended from the free end, the pressure drop through the hose or hose assembly shall not be more than 60 Pa above the pressure drop determined for the same sample following assessment for [Clause 2.9.1](#).

When the hose or hose assembly is unloaded and straightened, the pressure drop through the hose or hose assembly shall not be more than 10 Pa above the pressure drop determined in [Clause 2.9.1](#).

Conformance shall be assessed by testing in accordance with [Clause C.5](#).

Table 2.2 — Weighted mass

Designated size	Weighted mass kg
≤ 12	3.5
> 12	5.0

2.10 Resistance to crushing

Resistance to crushing shall be in accordance with the requirements in AS 1869.1:2023 Clause 2.10 for non-metallic liners when tested in accordance with Clause C.6 of that document or the requirements in AS 1869.2:2023 Clause 2.10 for metallic liners when tested in accordance with Clause C.6 of that document.

2.11 Permeability

When hoses are tested in accordance with [Clause C.7](#), the hose shall not exhibit permeability greater than 25 mL/m/h.

2.12 Flame propagation characteristics of hose

When hose is tested in accordance with [Clause C.8](#), any flame propagation distance, after 47 s from the time of initial flame application, shall be less than 50 mm each side of the centre point. The flame shall not penetrate the hose wall.

NOTE This assessment does not indicate the fire hazard of the hose under actual fire conditions and consequently should not be applied to the assessment of fire hazard without taking into account additional supportive information.

2.13 Adhesion

Adhesion shall be in accordance with the requirements in AS 1869.1:2023 Clause 2.13 for non-metallic liners. The test for adhesion is set out in [Clause C.15](#) of this document.

2.14 Accelerated ageing

Ageing shall be in accordance with the requirements in AS 1869.1:2023 Clause 2.14 for non-metallic liners when tested in accordance with Clause C.16 of that document.

2.15 Hose and coupling compatibility

When a hose assembly is tested in accordance with [Clause C.18](#) there shall be no movement or separation between the hose and coupling at less than the tensile force value shown in [Table 2.3](#) for the size of hose as appropriate.

When further tested in accordance with Clause C.10, there shall be no sign of leakage or other observed defect at less than the proof pressure specified in [Clause 2.3.1](#) for the appropriate class of hose.

Table 2.3 — Tensile force relative to designated size of hose

Designated size mm	Minimum tensile force	
	Classes A and B	Classes C, D, E, F and G
≤ 12	400 N	650 N
15	1.3 kN	1.3 kN
20	1.8 kN	1.8 kN
25	2.0 kN	2.0 kN
32	2.5 kN	2.5 kN
40	3.0 kN	3.0 kN
50	4.0 kN	4.0 kN
65	5.5 kN	5.5 kN
80	7.0 kN	7.0 kN
100	13.0 kN	13.0 kN

NOTE: See [Clause 1.5.4](#) for tolerances of designated sizes.

2.16 Resistance to corrosion

For all classes except Classes E and H when tested in accordance with [Clause C.20](#), hose assemblies shall not show any structural defect including frayed strands when inspected.

End connectors shall be structurally sound and fitment to the hose shall be gastight.

If requested for specific applications, Classes E and H may be tested for corrosion resistance.

2.17 Resistance to ultraviolet degradation

Synthetic braiding materials and non-metallic tube shall be resistant to ultraviolet light degradation. When tested in accordance with [Clause C.21](#), the flexible hose assemblies shall show no signs of cracks or other failure.

2.18 Durability of marking

Markings shall remain legible, durable and permanently attached throughout the life of the hose or hose assembly.

Conformance shall be assessed by testing in accordance with [Clause C.22](#).

2.19 Details of sample specification

Samples to be evaluated for product conformity purposes should be supplied with specifications that contain the information given in [Appendix B](#).

Appendix A (informative)

Illustrations of testing apparatus

Figures A.1 to A.14 illustrate the apparatus to be used in the tests listed in Appendix C.

Dimensions in millimetres

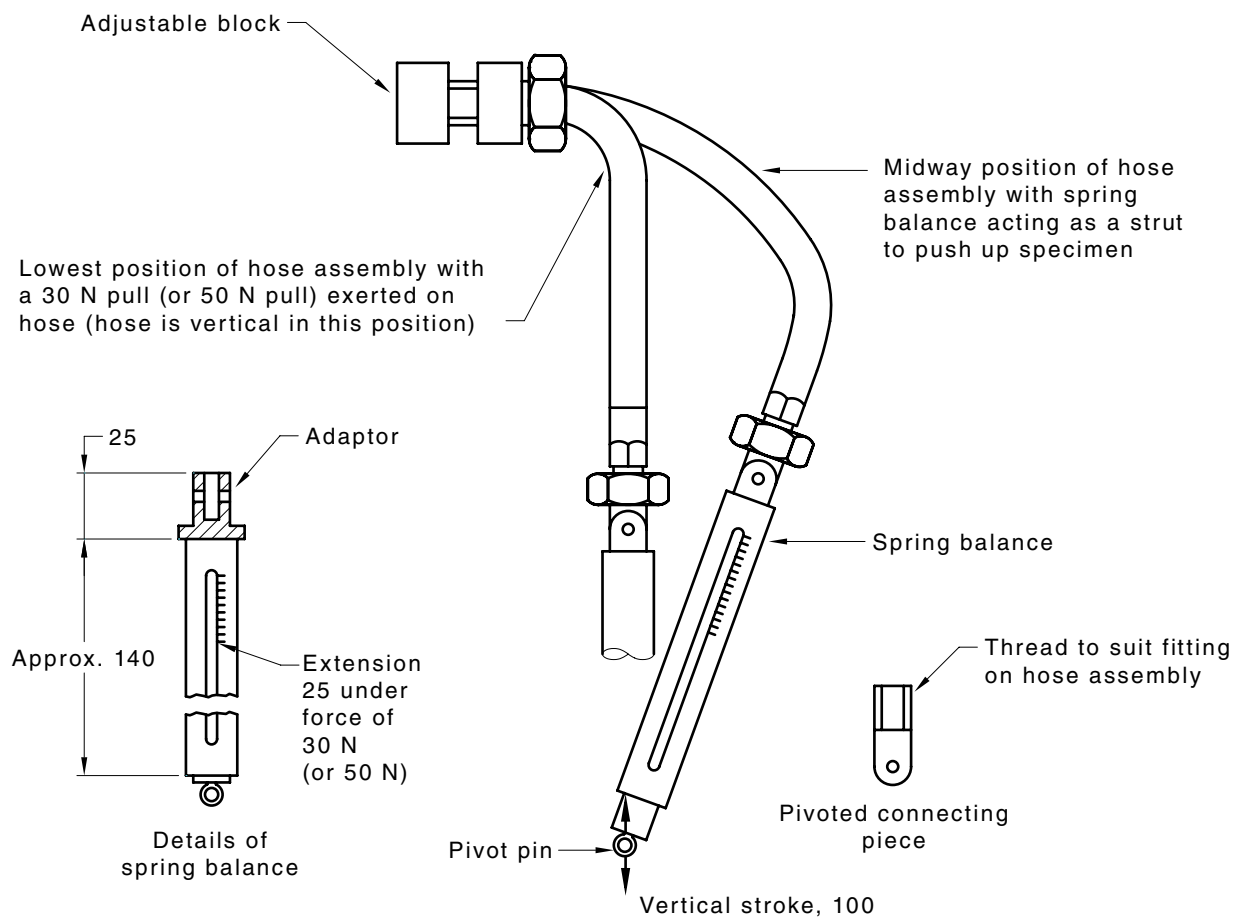


Figure A.1 — Typical flexing test apparatus for hose assembly with hose not exceeding 20 mm designated size

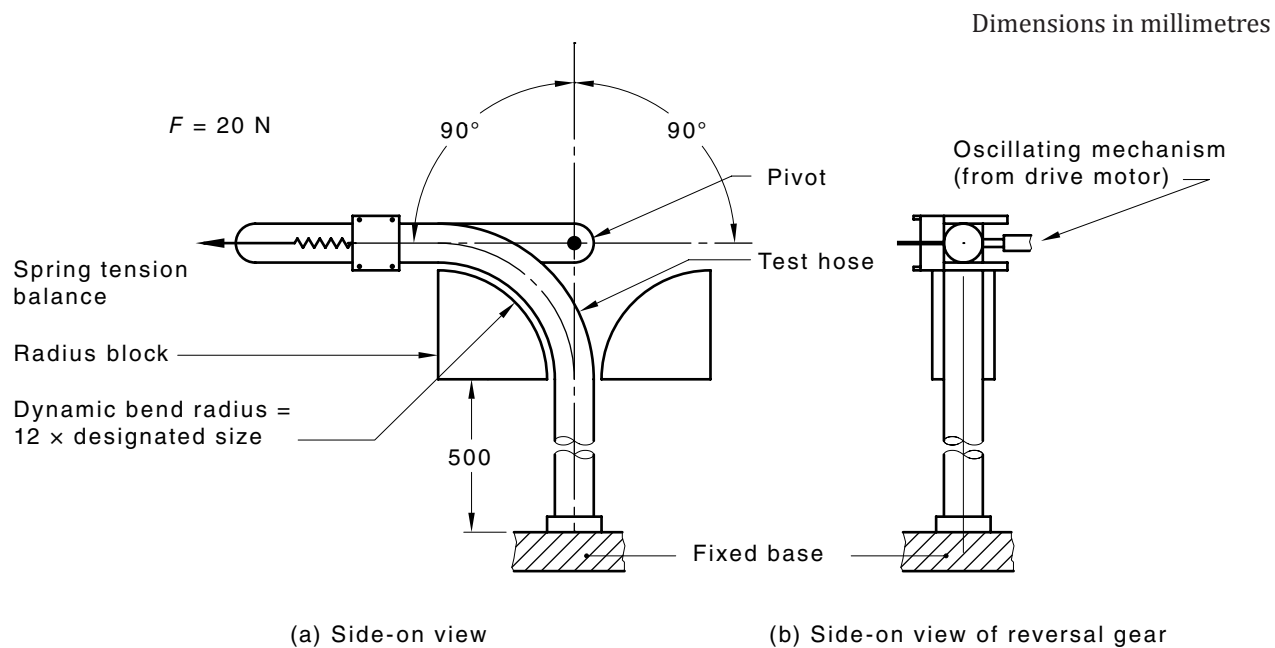


Figure A.2 — Flexing test apparatus for hose exceeding 20 mm designated size

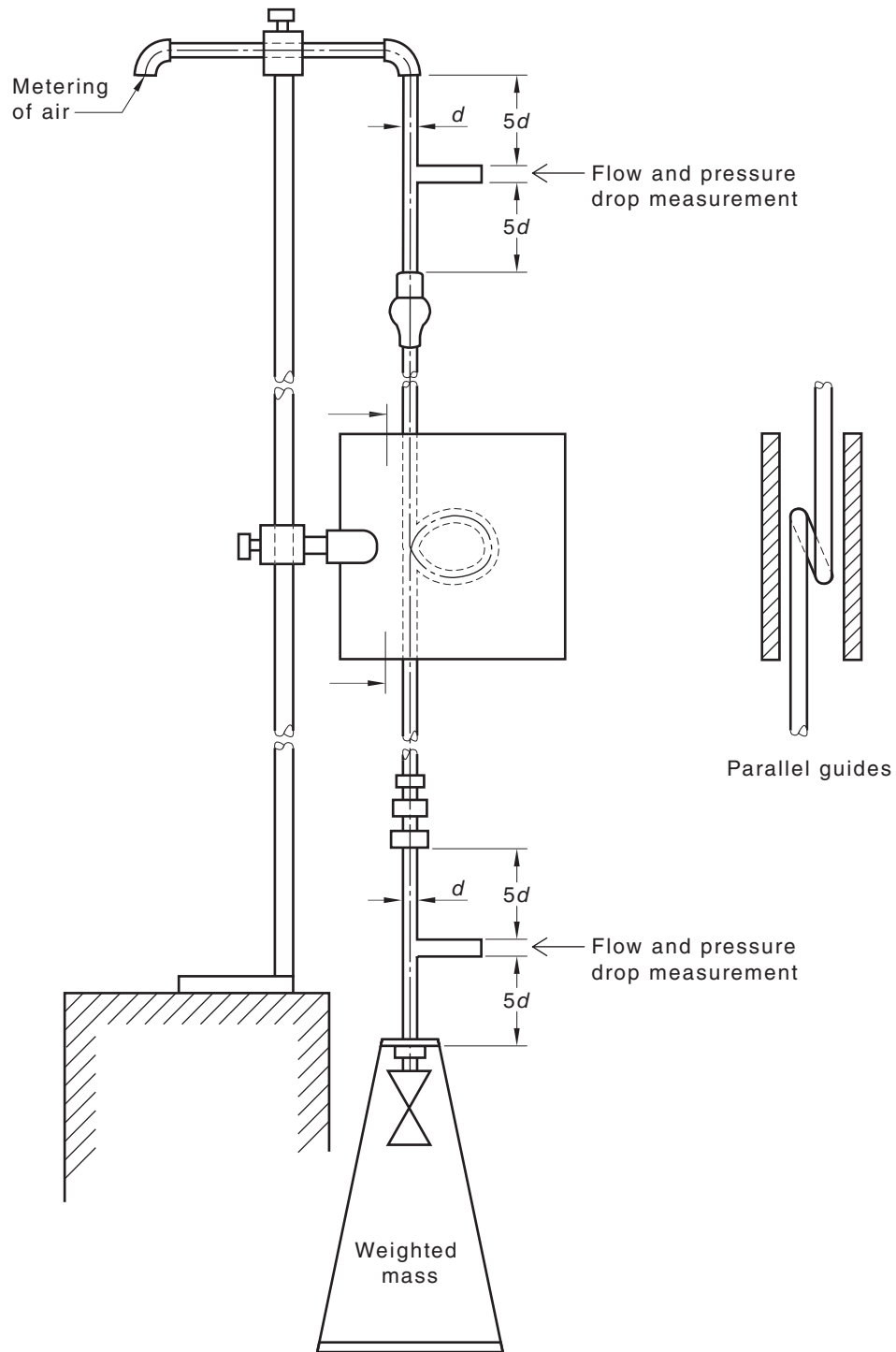


Figure A.3 — Kinking test for hose or hose assembly

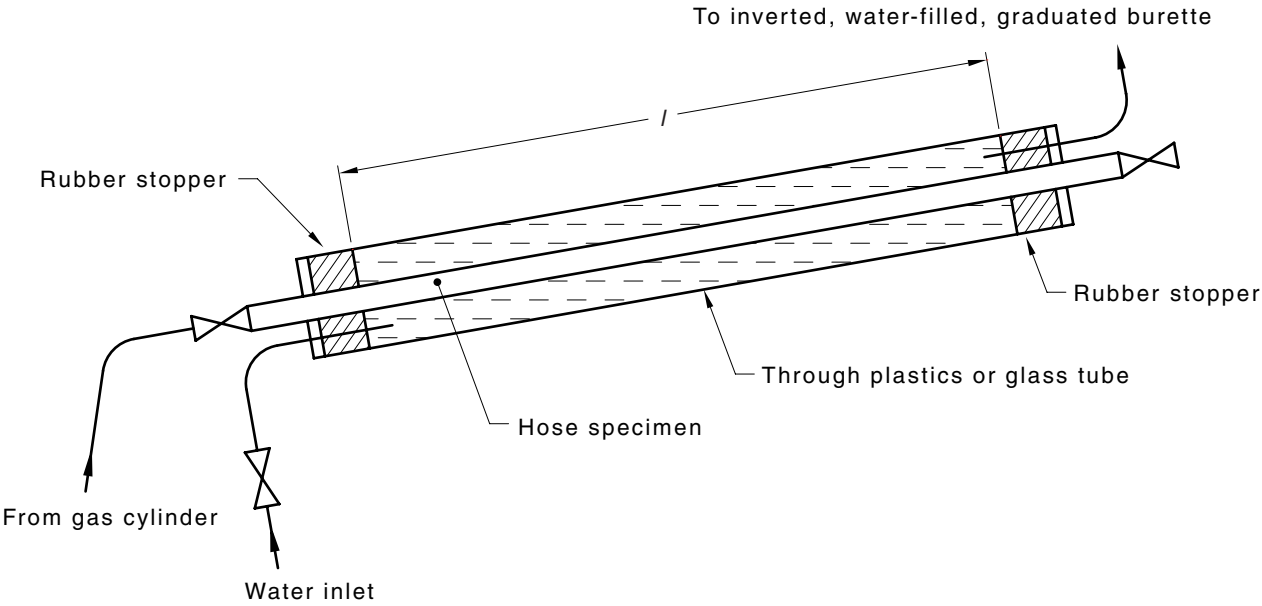


Figure A.4 — Typical test arrangement for determining permeability of hose

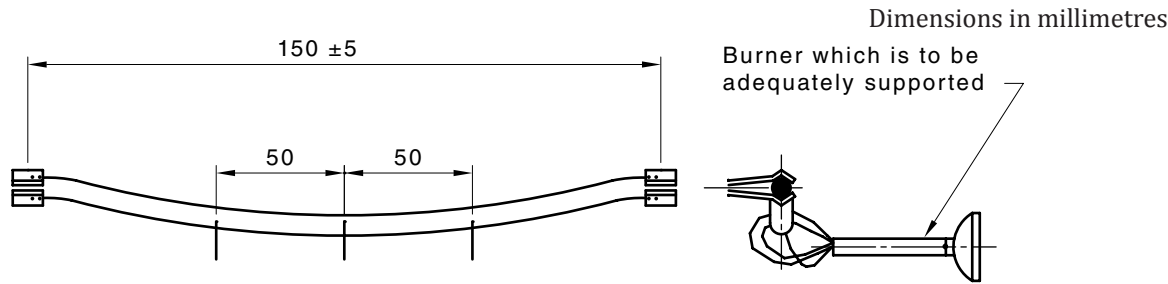


Figure A.5 — Application of flame to test specimen

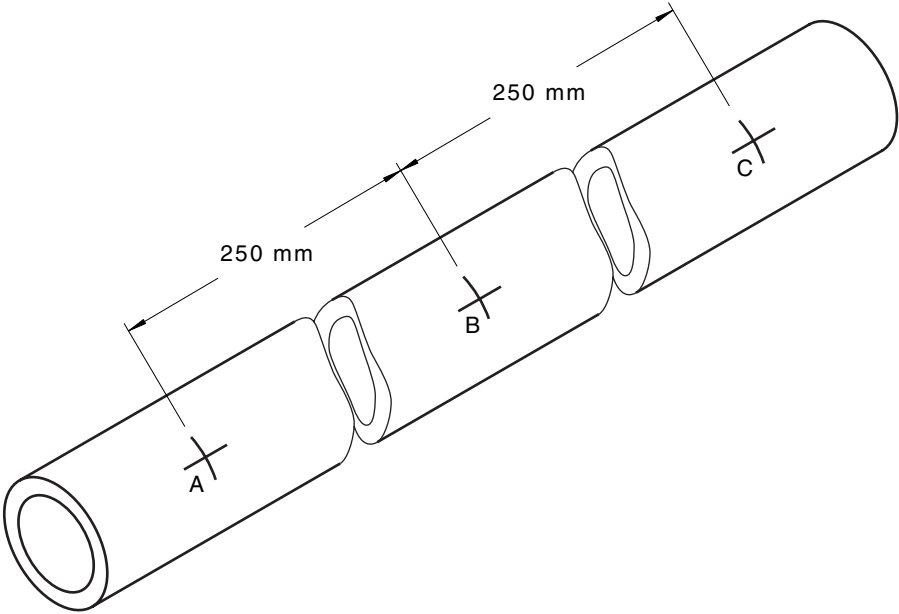
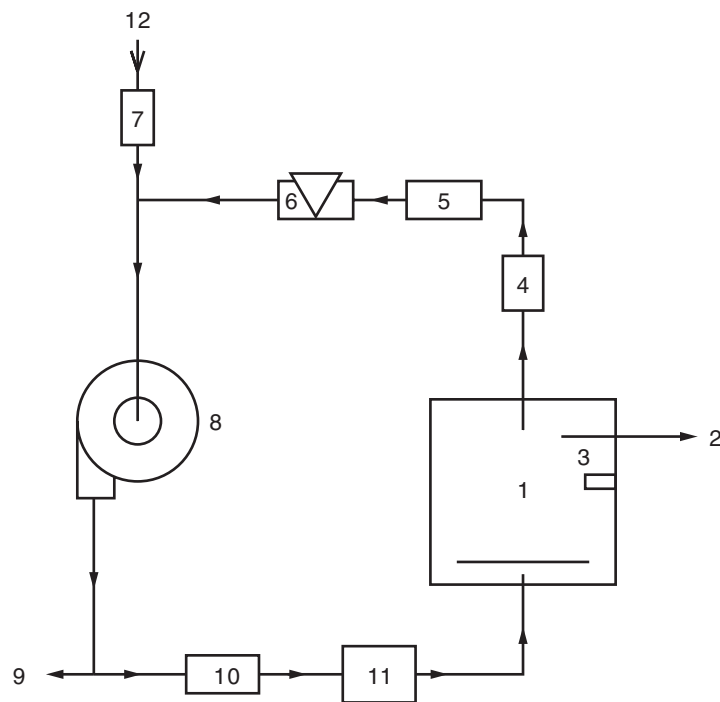


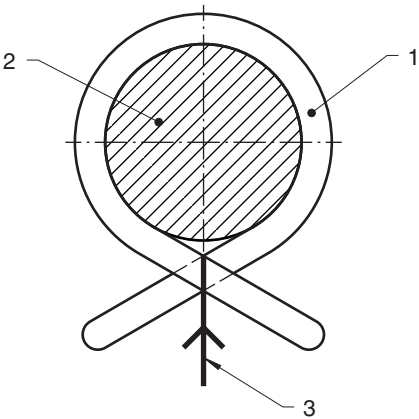
Figure A.6 — Measurement of dimensional stability

**Key**

1	Test chamber	7	Air filter
2	To ozone concentration measurement device	8	Circulation fan
3	Temperature indicator	9	Air outlet
4	Purifying column	10	Heat exchanger
5	Flowmeter	11	Ozonizer
6	Regulator	12	Air inlet

[SOURCE: ISO 1431-1:2012 Figure 1 © ISO, reproduced with permission]

Figure A.7 — Example of a test apparatus



Key

- 1 Test piece
- 2 Cylinder
- 3 E.g. wire or cord to hold ends of test piece together

[SOURCE: ISO 7326:2016 Figure 3 © ISO, reproduced with permission]

Figure A.8 — Test piece wound on cylinder

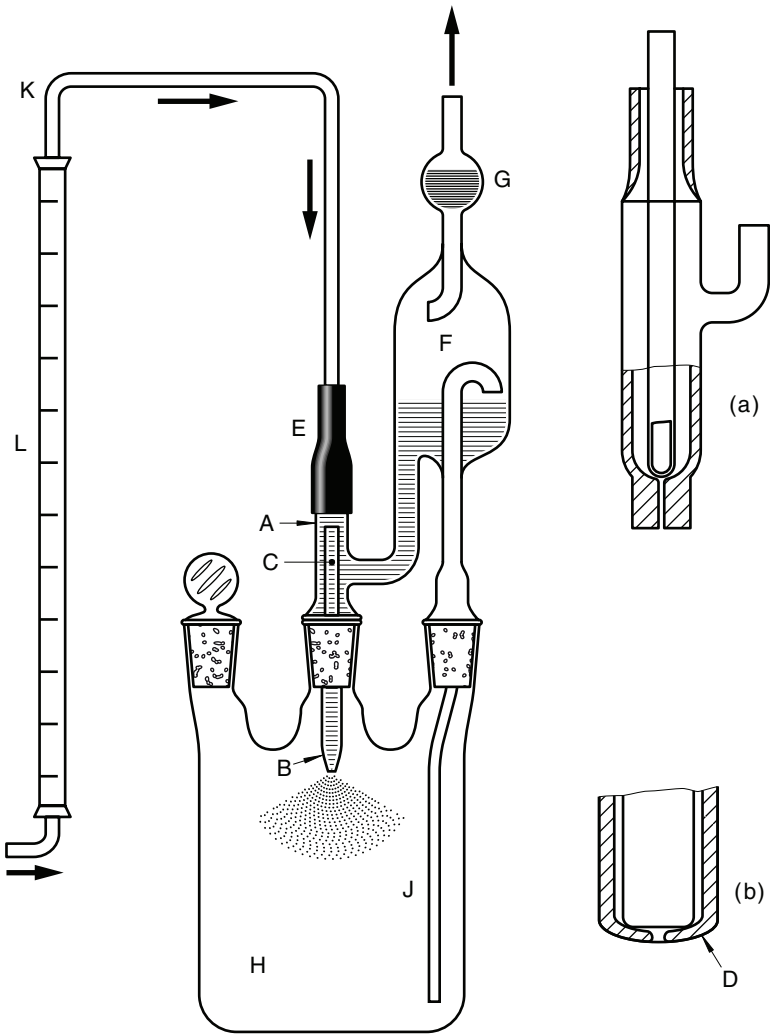


Figure A.9 — Ozone absorbing device (spray-jet)