
INTERNATIONAL STANDARD



1436

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Wire reinforced, rubber covered hydraulic hose

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FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up 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.

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.

International Standard ISO 1436 was drawn up by Technical Committee ISO/TC 45, *Rubber and rubber products*.

It was approved in August 1970 by the Member Bodies of the following countries :

Australia	Greece	Portugal
Austria	India	South Africa, Rep. of
Belgium	Ireland	Spain
Canada	Israel	Sweden
Ceylon	Italy	Switzerland
Czechoslovakia	Netherlands	United Kingdom
Egypt, Arab Rep. of	New Zealand	U.S.A.
France	Poland	U.S.S.R.

No Member Body expressed disapproval of the document.

Wire reinforced, rubber covered hydraulic hose

1 SCOPE AND FIELD OF APPLICATION

1.1 This International Standard specifies requirements for embedded wire hose of internal diameter from 5 to 51 mm, for use with common hydraulic fluids, such as mineral oils, soluble oils, oil and water emulsions, aqueous glycol solution, and water, at temperatures ranging from - 40 °C to + 100 °C.

The hose is not suitable for use with castor oil-based and ester-based fluids.

1.2 An appendix is included, giving dimensional details of widely used hoses.

1.3 This International Standard does not include requirements for end fittings or the finished assembly of hose and fittings. It is limited to the requirements for the hose only.

2 REFERENCES

ISO/R 1307, *Rubber hose — Bore sizes, test pressures and tolerances on length.*

ISO/R 1402, *Hydrostatic testing of rubber hose.*

3 MATERIALS AND CONSTRUCTION

3.1 The hose shall consist of a seamless oil- and water-resistant synthetic rubber tube, one or more layers of high tensile steel wire, and oil- and weather-resistant synthetic rubber cover. The cover may be fastened to the hose by means of a cotton layer, or other suitable material.

3.2 The hose shall be concentric in accordance with the following specification :

The measurements of the wall thickness at different points shall not differ by more than the following values :

- up to and including 6.3 mm nominal bore : 0.8 mm
- over 6.3 up to and including 22 mm nominal bore : 1.0 mm
- over 22 mm nominal bore : 1.3 mm

4 DIMENSIONS

The bore shall meet the requirements of Table 1.

TABLE 1
Dimensions in millimetres

Nominal bore	Permitted range	
	minimum	maximum
5	4.5	5.4
6.3	6.1	6.9
8	7.7	8.5
10	9.3	10.1
12.5	12.3	13.5
16	15.4	16.7
19	18.6	19.8
22	21.8	23.0
25	25.0	26.4
31.5	31.3	33.0
38	37.7	39.3
51	50.4	52.0

NOTE — ISO/R 1307 has not been followed for nominal bore or permitted range, as this standard follows dimensions specified by the Society of Automotive Engineers (USA), which are in wide use in numerous countries throughout the world.

5 PRESSURE REQUIREMENTS

5.1 The design working pressure of hose shall comply with the requirements of Table 2.

TABLE 2

Nominal bore	Design working pressure	
	Type 1	Type 2
mm	MN/m ²	MN/m ²
5	21.0	35.0
6.3	20.0	35.0
8	17.5	30.0
10	16.0	28.0
12.5	14.0	25.0
16	10.5	20.0
19	9.0	16.0
22	8.0	14.0
25	7.0	14.0
31.5	4.4	11.0
38	3.5	9.0
51	2.6	8.0

5.2 The hose shall withstand without damage a proof test pressure of twice the design working pressure, maintained by the method described in ISO/R 1402.

NOTE — The design working pressures in Table 2 are based on a bursting safety factor of 4.

6 MINIMUM BEND RADIUS AND CHANGE IN LENGTH AT DESIGN WORKING PRESSURE

6.1 The hose shall be capable of performing at design working pressure when curved to a radius no smaller than that given in Table 3. Should any portion of the hose be curved to a radius smaller than the specified bend radius, performance capability of the hose is reduced.

6.2 The change in length of hose at the design working pressure shall be not greater than specified in Table 3.

TABLE 3

Nominal bore	Bend radius	Change in length
mm	mm	%
5	90	+ 0 - 6
6.3	100	+ 0 - 6
8	115	+ 2 - 4
10	130	+ 2 - 4
12.5	180	+ 2 - 4
16	205	+ 2 - 4
19	240	+ 2 - 4
22	280	+ 2 - 4
25	300	+ 2 - 4
31.5	420	+ 2 - 4
38	500	+ 2 - 4
51	630	+ 2 - 4

7 TOLERANCE ON LENGTH

7.1 The hose shall be supplied in lengths as specified by the purchaser, subject to a tolerance on the specified lengths of ± 1 % or ± 3 mm, whichever is the greater.

7.2 When no specific lengths have been ordered, the percentages of different lengths in any given delivery shall be as follows :

- over 13 m : not less than 65 %
- 7.5 to 13 m : not more than 35 %
- 1 m to 7.5 m : not more than 10 %

No length shall be less than 1 m.

8 IMPULSE TEST REQUIREMENTS

Four unaged samples of hose with end fittings shall be tested as follows :

8.1 Means shall be provided for applying a pulsating pressure internally to a hose assembly at a rate of between 30 and 100 cycles per minute. Each cycle shall comply with the requirements of the pressure impulse cycle (see Figure 1) as appropriate.

Type 1 hose, when tested at 125 % of the working pressure for hoses of nominal bore 25 mm and smaller, and 100 % of the working pressure for nominal bore 31.5 mm and above, at a temperature of 93 ± 5 °C using circulating petroleum-based test fluid, shall withstand a minimum of 150 000 impulse cycles.

Type 2 hose, when tested at 133 % of the working pressure, subject to a maximum of 35 MN/m², at a temperature of 93 ± 5 °C using circulating petroleum-based test fluid, shall withstand a minimum of 200 000 impulse cycles.

There shall be no leakage or other malfunction.

Any failures adjacent to the end fittings shall be disregarded and repeat tests carried out. Failure due to coupling blow-off or rupture adjacent to the fittings (within 25 mm) shall not be interpreted as a true hose burst but as failure due to the fitting attachment and shall be recorded as such.

8.2 The oil used in the test shall be a suitable petroleum-based hydraulic fluid as arranged between manufacturer and user.

8.3 The free length of hose under test shall be 3.5 times the minimum bend radius, subject to the tolerance given in 7.1, for hose up to and including 22 mm, and not less than 0.4 m for larger sizes.

8.4 The test pieces shall be connected to the apparatus and, in the case of hoses up to and including 22 mm nominal bore, they shall be bent through 180° so that the fittings are parallel and the distance between the two ends of the hose at the fittings is twice the minimum radius, + 5 % - 0 as shown in Figure 2. Hose over 22 mm nominal bore shall be left in a straight condition.

9 COLD FLEXIBILITY REQUIREMENTS

Hose and/or hose assemblies shall be subjected to a temperature of - 40 °C for 24 h. After this time and while

still at -40°C , the specimens shall be flexed in a period of 8 to 12 s over a mandrel having a diameter equal to twice the minimum bend radius specified in Table 3. Hose up to and including 22 mm in diameter shall be bent through 180° over the mandrel and hose over 22 mm in diameter shall be bent through 90° over the mandrel.

After flexing, the sample shall be allowed to warm to room

temperature and shall be visually examined for cover cracks and subjected to the proof test. There shall be no cover cracks or leakage.

10 MARKING

The hoses shall be marked with information as agreed between the purchaser and the manufacturer.

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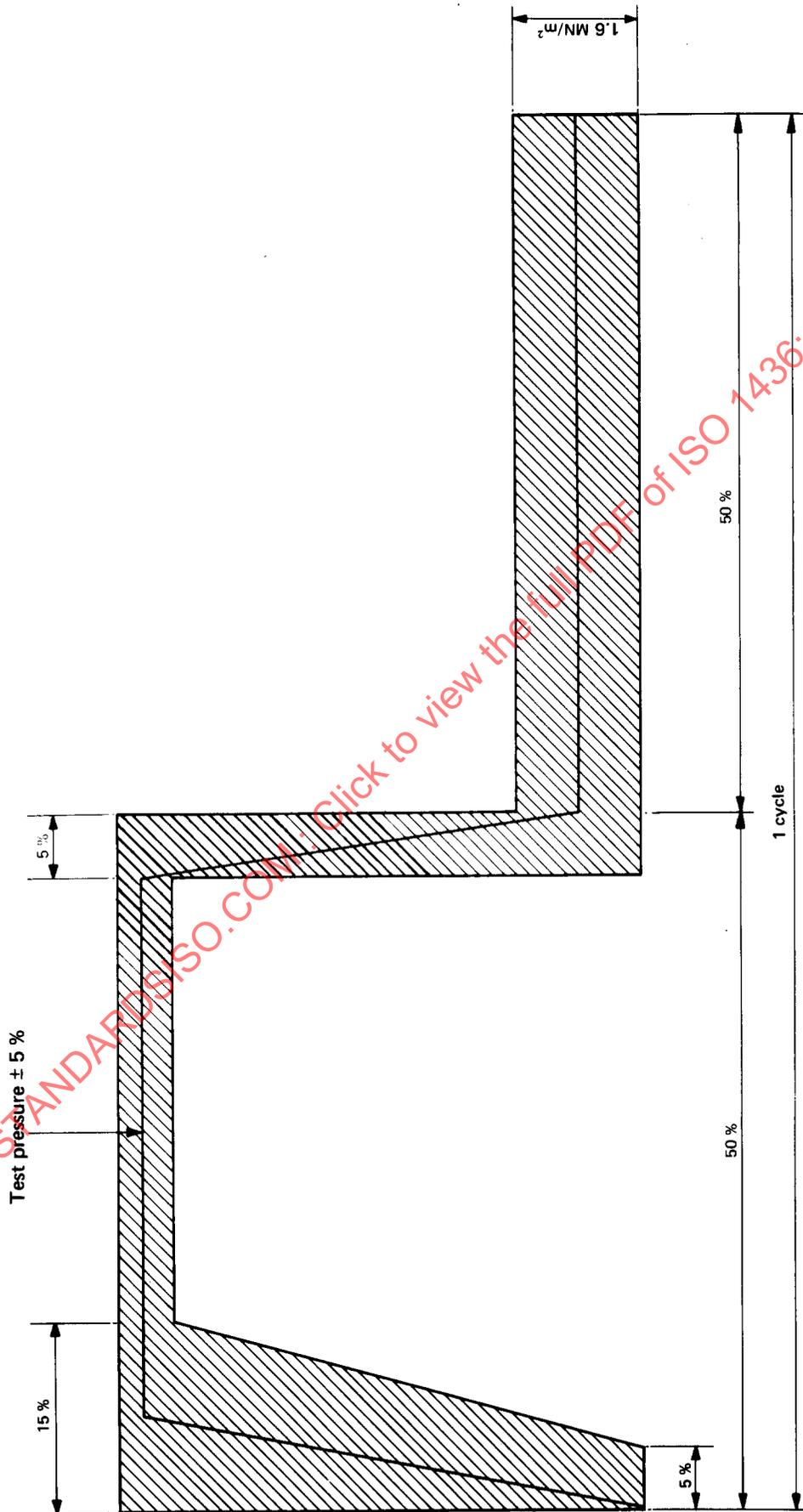


FIGURE 1 — Pressure impulse cycles for hose test