INTERNATIONAL STANDARD ISO 2929

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Rubber hose for fuel truck delivery

Tuyaux en caoutchouc pour camions-citernes

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FOREWORD

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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 2929 was drawn up by Technical Committee ISO/TC 45, *Rubber and rubber products*, and circulated to the Member Bodies in November 1972.

It has been approved by the Member Bodies of the following countries :

Australia	India	Spain
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The Member Body of the following country expressed disapproval of the document on technical grounds :

France

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Rubber hose for fuel truck delivery

0 INTRODUCTION

This International Standard has been prepared to provide the minimum acceptable requirements for satisfactory performance of rubber hose for the delivery of fuel from delivery trucks. It is appreciated that requirements for electrical resistance of this type of hose are necessary and they are to be the subject of further study. Recommendations for minimum bending radii and low temperature stiffness are also to be studied.

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies the requirements for two classes of rubber hose for the delivery of fuel from delivery trucks, as follows :

- Class A : non wire reinforced
- Class B : helix wire reinforced

Class B hose has superior resistance to crushing and is required to meet the requirements of 5.1.2.

These hoses are suitable for use in the temperature range − 30 °C to 55 °C but are not intended for aircraft fuelling purposes[1]. They are not suitable for use with volumetric measuring apparatus whose accuracy would be affected by the dilation of the hose.

Other types of hose constructed using an internal and external helical wire are commonly used for sizes 63, 80 and 100; these will be the subject of further study.

2 REFERENCES

ISO/R 36, *Determination of the adhesion strength of vulcanized rubbers to textile fabrics.*

ISO/R 37, *Determination of tensile stress-strain properties of vulcanized rubbers.*

ISO/R 471, *Standard atmospheres for the conditioning and testing of rubber test pieces.*

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

ISO 1402, *Rubber hose — Hydrostatic testing.*

ISO/R 1817, *Vulcanized rubbers — Methods of test for resistance to liquids.*

3 WORKING PRESSURE

The hose is suitable for maximum working pressures as given in table 1, which also states the corresponding test pressures and minimum bursting pressures.

TABLE 1 — **Pressure requirements**

Nominal bore	Maximum working pressure		Proof test pressure		Minimum burst pressure	
mm	MPa	(bar)	MPa	(bar)	MPa	(bar)
25	0,9	(9)	1,8	(18)	3,6	(36)
31,5	0,9	(9)	1,8	(18)	3,6	(36)
40	0,9	(9)	1,8	(18)	3,6	(36)
50	0,7	(7)	1,4	(14)	2,8	(28)
63	0,65	(6,5)	1,3	(13)	2,6	(26)
80	0,5	(5)	1,0	(10)	2,0	(20)
100	0,5	(5)	1,0	(10)	2,0	(20)

These requirements are generally in accordance with ISO 1307 for hose subject to irregular heavy service.

4 DIMENSIONS AND TOLERANCES

4.1 Bore

The bore of the hose shall comply with the requirements of table 2.

TABLE 2 — **Nominal bores**

Values in millimetres

Nominal bore	Tolerance
25	± 1,25
31,5	± 1,25
40	± 1,50
50	± 1,50
63	± 1,50
80	± 2,00
100	± 2,00

The requirements are in accordance with ISO 1307.

1) For aircraft fuelling purposes, see ISO 1825, *Rubber hoses for aircraft ground fuelling without static conducting wire.*

4.2 Length

The length of hose shall be as ordered with a tolerance of ± 1 %.

5 PHYSICAL REQUIREMENTS

5.1 Requirements assessed on lengths of hose

5.1.1 *Hydrostatic requirement*

When tested in accordance with ISO 1402, the hose shall maintain the test pressure stated in table 1 for 1 min and have a minimum bursting pressure as stated in table 1.

5.1.2 *Crush resistance — Class B only*

When tested by the method described in the annex, using the crushing force given in table 3, the diameter of the hose under the applied force shall not be less than 85 % of the original outside diameter and after release of the force the diameter shall return to not less than 95 % of the original outside diameter.

TABLE 3 — **Crushing force**

Nominal bore	Crushing force
mm	kN
25	0,9
31,5	0,95
40	1,0
50	1,1
63	1,45
80	1,45
100	1,45

5.2 Requirements assessed on test pieces cut from the hose

If possible, these test pieces shall be cut from the hose, but if this is not possible specially prepared test slabs shall be used.

5.2.1 *Tensile strength and elongation at break of rubber lining and cover*

The rubber used for the lining and cover of the hose shall, when tested in the manner described in ISO/R 37, have a tensile strength and elongation at break not less than the values given in table 4.

TABLE 4 — **Tensile strength and elongation at break**

Types A and B	Tensile strength	Elongation at break
	MPa	%
Lining	7,0	200
Cover	10,5	200

5.2.2 *Adhesion*

When tested in accordance with ISO/R 36, the minimum adhesion between rubber lining and reinforcement, between layers of reinforcement, and between reinforcement and cover shall be not less than 2,0 kN/m.

5.2.3 *Resistance to liquids*

When tested in accordance with ISO/R 1817, the cover and lining of the hose, after immersion in standard liquid C for $70\ ^{+2}_{0}$ h at one of the standard temperatures defined in ISO/R 471, shall comply with the requirements of table 5.

NOTE — In performing these tests care shall be taken to ensure that *only the lining and cover are exposed to the liquid and that there is* no possibility of seepage of oil through the cut end of the test piece.

TABLE 5 — **Requirements after immersion in test liquid**

	Cover	Lining
Change in tensile strength, % of original	40	40
Elongation at break, % min.	100	100
Adhesion, kN/m min.	1,2	1,2
Volume, % increase max.	100	60

6 MARKING

The marking, if required, shall be as agreed between manufacturer and user.

ANNEX

DETERMINATION OF CRUSH RESISTANCE

A.1 TEST PIECE

A 300 mm length of hose.

A.2 APPARATUS

A.2.1 Compression testing machine with a rate of traverse of 50 ± 5 mm/min and covering the force range up to 1,5 kN.

A.2.2 Two plates each at least 80 mm wide and capable of withstanding the applied forces without deformation.

A.3 PROCEDURE

Measure the diameter of the test piece. Place it between the two parallel plates mounted in the test machine in such a manner than 80 mm of the test piece is crushed. Apply the force stated in table 3. Obtain the resultant diameter of the test piece by measuring the distance between the metal plates with the steel rule. Remove the applied force and measure the minimum diameter of the hose at the centre of the compressed area.

A.4 CALCULATION

Diameter under pressure, as percentage of original diameter

$$= \frac{D_1}{D_0} \times 100$$

Diameter after release of pressure, as a percentage of original diameter

$$= \frac{D_2}{D_0} \times 100$$

where

D_0 is the original diameter;

D_1 is the diameter under the specified force;

D_2 is the diameter after removal of the specified force.