

ประกาศกระทรวงอุตสาหกรรม

ฉบับที่ ๔๗๖๖ (พ.ศ. ๒๕๕๙)

ออกตามความในพระราชบัญญัติมาตรฐานผลิตภัณฑ์อุตสาหกรรม

พ.ศ. ๒๕๑๑

เรื่อง กำหนดมาตรฐานผลิตภัณฑ์อุตสาหกรรม

ท่อยางเสริมแรงด้วยสิ่งทอใช้ส่งน้ำ - ข้อกำหนด

อาศัยอำนาจตามความในมาตรา ๑๕ แห่งพระราชบัญญัติมาตรฐานผลิตภัณฑ์อุตสาหกรรม พ.ศ. ๒๕๑๑ ซึ่งแก้ไขเพิ่มเติมโดยพระราชบัญญัติมาตรฐานผลิตภัณฑ์อุตสาหกรรม (ฉบับที่ ๗) พ.ศ. ๒๕๕๘ รัฐมนตรีว่าการกระทรวงอุตสาหกรรมออกประกาศกำหนดมาตรฐานผลิตภัณฑ์อุตสาหกรรม ท่อยางเสริมแรงด้วยสิ่งทอใช้ส่งน้ำ - ข้อกำหนด มาตรฐานเลขที่ มอก. 2693 - 2558 ไว้ ดังมีรายละเอียด ต่อท้ายประกาศนี้

ทั้งนี้ ให้มีผลตั้งแต่วันที่ประกาศในราชกิจจานุเบกษาเป็นต้นไป

ประกาศ ณ วันที่ ๑๔ มกราคม พ.ศ. ๒๕๕๙

อรรชกา สีบุญเรือง

รัฐมนตรีว่าการกระทรวงอุตสาหกรรม

มาตรฐานผลิตภัณฑ์อุตสาหกรรม

ท่อยางเสริมแรงด้วยสิ่งทอใช้ส่งน้ำ – ข้อกำหนด

มาตรฐานผลิตภัณฑ์อุตสาหกรรมนี้ กำหนดขึ้นโดยรับ ISO 1403:2005 Rubber hoses, textile-reinforced, for general-purpose water application – Specification มาใช้โดยวิธีพิมพ์ซ้ำ (reprinting) ในระดับเหมือนกันทุกประการ (identical) โดยใช้ ISO ฉบับภาษาอังกฤษเป็นหลัก

มาตรฐานผลิตภัณฑ์อุตสาหกรรมนี้ กำหนดคุณลักษณะที่ต้องการของท่อยางเสริมแรงด้วยสิ่งทอ ใช้ส่งน้ำไว้เป็น 3 ประเภท ใช้กับอุณหภูมิ -25°C ถึง $+70^{\circ}\text{C}$ และความดันใช้งานสูงสุด 2.5 MPa (25 bar)

ท่อยางตามมาตรฐานผลิตภัณฑ์อุตสาหกรรมนี้ ไม่ประสงค์ใช้เป็นท่อส่งน้ำดื่ม ใช้ต่อเครื่องซักผ้า ใช้เป็นท่อดับเพลิง ใช้กับเครื่องจักรกลทางการเกษตรชนิดพิเศษ หรือใช้เป็นท่อที่ขูดตัวได้

ท่อยางตามมาตรฐานผลิตภัณฑ์อุตสาหกรรมนี้ อาจใช้ส่งสารเคมีแต่งสำหรับลดจุดเยือกแข็งของน้ำได้

รายละเอียดให้เป็นไปตาม ISO 1403:2005

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 1403 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 1, *Hoses (rubber and plastics)*.

This fourth edition cancels and replaces the third edition (ISO 1403:1995), which has been technically revised.

Rubber hoses, textile-reinforced, for general-purpose water applications — Specification

WARNING — Persons using this International Standard should be familiar with normal laboratory practice. This standard does not purport to address all the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate health and safety practices and to ensure compliance with any national regulatory conditions.

1 Scope

This International Standard specifies the requirements for three types of general-purpose textile-reinforced rubber water hose with an operating temperature range of $-25\text{ }^{\circ}\text{C}$ to $+70\text{ }^{\circ}\text{C}$ and a maximum working pressure of up to 25 bar ¹⁾.

These hoses are not intended to be used for conveyance of potable (drinking) water, for washing-machine inlets, as firefighting hoses, for special agricultural machines or as collapsible water hoses.

These hoses may be used with additives which lower the freezing point of water.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

ISO 188:1998, *Rubber, vulcanized or thermoplastic — Accelerated ageing and heat resistance tests*

ISO 1307, *Rubber and plastics hoses for general-purpose industrial applications — Bore diameters and tolerances, and tolerances on length*

ISO 1402, *Rubber and plastics hoses and hose assemblies — Hydrostatic testing*

ISO 1746:1998, *Rubber or plastics hoses and tubing — Bending tests*

ISO 4671, *Rubber and plastics hoses and hose assemblies — Methods of measurement of dimensions*

ISO 4672:1997, *Rubber and plastics hoses — Sub-ambient temperature flexibility tests*

ISO 7326:1991, *Rubber and plastics hoses — Assessment of ozone resistance under static conditions*

ISO 8033, *Rubber and plastics hoses — Determination of adhesion between components*

ISO 8330, *Rubber and plastics hoses and hose assemblies — Vocabulary*

1) 1 bar = 0,1 MPa

3 Terms and definitions

For the purposes of this document, the terms and definitions in ISO 8330 apply.

4 Classification

Hoses are designated as one of the following types depending on their pressure rating:

- Type 1:** Low pressure — Designed for a maximum working pressure of 6 bar.
- Type 2:** Medium pressure — Designed for a maximum working pressure of 10 bar.
- Type 3:** High pressure — Designed for a maximum working pressure of 25 bar.

5 Materials and construction

The hose shall consist of:

- a rubber lining;
- a reinforcement of natural or synthetic textile, applied by any suitable technique;
- a rubber cover.

The lining and cover shall be of uniform thickness, concentric to comply with the minimum thickness specified, and free from holes, porosity and other defects. The cover finish may be smooth, fluted or fabric-marked.

6 Dimensions

6.1 Internal diameters and tolerances

When measured in accordance with ISO 4671, the internal diameters and their tolerances shall conform to the values specified in Table 1.

6.2 Concentricity

When determined in accordance with ISO 4671, the concentricity, based on a total indicator reading between the internal diameter and the outside surface of the cover, shall be no greater than 1,0 mm for hoses of internal diameter up to and including 76 mm, and no greater than 1,5 mm for hoses of inside diameter greater than 76 mm.

6.3 Tolerance on length

When measured in accordance with ISO 4671, the tolerance on cut lengths shall be as specified in ISO 1307.

6.4 Minimum thickness of lining and cover

When measured in accordance with ISO 4671, the minimum thickness of the lining plus cover shall be 1,5 mm. If the cover is fluted, the depth of the flutes shall not be greater than 50 % of the cover thickness.

Table 1 — Internal diameters and tolerances

Internal diameter mm	Tolerance mm
10	± 0,75
12,5	± 0,75
16	± 0,75
19	± 0,75
25	± 1,25
32	± 1,25
38	± 1,50
50	± 1,50
63	± 1,50
76	± 1,50
100	± 2,00

7 Physical properties

7.1 Rubber compounds

When measured by the methods listed in Table 2, the physical properties of the compounds used for the lining and cover shall conform to the values specified in Table 2.

Tests shall be carried out either on samples taken from the hose or from separately vulcanized sheets 2 mm in thickness and vulcanized to the same cure state as production hoses.

Table 2 — Physical properties of rubber compounds

Property	Requirements		Test method
	Lining	Cover	
Minimum tensile strength	5,0 MPa (types 1 and 2) 7,0 MPa (type 3)	5,0 MPa (types 1 and 2) 7,0 MPa (type 3)	ISO 37 (dumb-bell test piece)
Minimum elongation at break	200 %	200 %	ISO 37 (dumb-bell test piece)
Resistance to ageing: Change in tensile strength from original value (max.) Change in elongation at break from original value (max.)	± 25 % ± 50 %	± 25 % ± 50 %	} ISO 188:1998 (3 days at 100 °C ± 1 °C), air-oven method; ISO 37 (dumb-bell test piece)

7.2 Finished hose

When measured by the methods listed in Table 3, the physical properties of finished hoses shall conform to the values specified in Table 3.

Table 3 — Physical properties of finished hoses

Property	Requirements	Test method
Proof pressure at 23 °C	9 bar (type 1) 15 bar (type 2) 50 bar (type 3)	ISO 1402
Change in length at proof pressure	± 7 %	ISO 1402
Minimum burst pressure	18 bar (type 1) 30 bar (type 2) 100 bar (type 3)	ISO 1402
Adhesion between components	1,5 kN/m (min.)	ISO 8033
Ozone resistance	No cracking observed under × 2 magnification	ISO 7326:1991, method 1 up to 25 mm ID method 2 or 3 for other sizes
Flexibility at 23 °C	<i>T/D</i> not less than 0,8	ISO 1746:1998, method A
Low-temperature flexibility	No cracks shall be detected and the hose shall pass the proof test specified above.	ISO 4672:1997, method B, at -25 °C ± 2 °C

8 Marking

The hose shall be continuously and durably marked with the following minimum information:

- a) the manufacturer's name or identification;
- b) the number and year of publication of this International Standard;
- c) the hose type number;
- d) the internal diameter, in millimetres;
- e) the maximum working pressure, in bars;
- f) the quarter and year of manufacture.

EXAMPLE MAN/ISO 1403:2005/Type 2/25/10 bar/1Q05