INTERNATIONAL STANDARD

ISO 3861

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Rubber hoses for sand and grit blasting — Specification

Tuyaux en caoutchouc pour sablage et grenaillage — Spécifications

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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 3861 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 1, *Hoses (rubber and plastics)*.

This third edition cancels and replaces the second edition (ISO 3861:1995), which has been technically revised.

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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.

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1 Scope

This International Standard specifies the requirements for rubber hoses for wet and dry sand and grit blasting, suitable for use up to a maximum working pressure of 6,3 bar and over an operating temperature range of −25 °C to +70 °C.

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 4649:2002, *Rubber, vulcanized or thermoplastic — Determination of abrasion resistance using a rotating cylindrical drum device*

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 8031, *Rubber and plastics hoses and hose assemblies — Determination of electrical resistance*

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

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

3 Terms and definitions

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

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4 Classification

Hoses are designated as one of the following grades depending on their electrical properties:

a) Electrically bonded — Designated and marked “M” grade.

b) Electrically conductive, using a conductive rubber layer — Designated and marked “Ω” grade.

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.

Depending on the grade, the construction may contain a conductive rubber layer or a bonding wire or wires consisting of at least nine strands of a metal having a high resistance to fatigue. 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 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.

Table 1 — Internal diameters and tolerances

Internal diameter mm	Tolerance mm
12,5	± 0,75
16	± 0,75
19	± 0,75
20	± 0,75
25	± 1,25
31,5	± 1,25
38	± 1,50
40	± 1,50
45	± 1,50
50	± 1,50
51	± 1,50

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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.

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 rubber lining shall be 5,0 mm and that of the cover 1,0 mm.

7 Physical properties

7.1 Rubber compounds

When tested 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 thick for the tensile/elongation tests and thicker for the abrasion test. These shall be vulcanized to the same state of cure as production hoses.

Table 2 — Physical properties of thermoplastic materials

Property	Requirements		Test method
	Lining	Cover	
Minimum tensile strength	14,0 MPa	10,0 MPa	ISO 37 (dumb-bell test piece)
Minimum elongation at break	400 %	300 %	ISO 37 (dumb-bell test piece)
Resistance to ageing:			ISO 188:1998 (3 days at 70 °C ± 1 °C), air-oven method; ISO 37 (dumb-bell test piece)
Change in tensile strength from original value (max.)	± 25 %	± 25 %	
Change in elongation at break from original value (max.)	between +10 % and −30 %	between +10 % and −30 %	
Abrasion resistance (maximum loss)	140 mm^3	N/A	ISO 4649:2002, method A

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7.2 Finished hoses

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

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Table 3 — Physical properties of finished hoses

Property	Requirements	Test method
Proof pressure	12,5 bar	ISO 1402
Change in length at proof pressure	± 8 %	ISO 1402
Change in diameter at proof pressure	± 10 %	ISO 1402
Twist at proof pressure	20 °/m (max.)	ISO 1402
Minimum burst pressure	25 bar	ISO 1402
Adhesion between components	2,0 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	T/D 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
Electrical resistance (max.)	"M" grade: 10^2 Ω/length "Ω" grade: 10^6 Ω/length	ISO 8031

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 grade ("M" or "Ω");

d) the internal diameter, in millimetres;

e) the maximum working pressure, in bars;

f) the quarter and year of manufacture.

EXAMPLE MAN/ISO 3861:2005/Grade "M"/25/6,3 bar/1Q05

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