
International Standard



4344

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Steel wire ropes for lifts

Câbles en acier pour ascenseurs

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Descriptors: steel products, wire rope, lifts, goods lifts, physical properties, mechanical properties, dimensions, specifications.

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (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 authorized 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 4344 was developed by Technical Committee ISO/TC 105, *Steel wire ropes*, and was circulated to the member bodies in January 1983.

It has been approved by the member bodies of the following countries:

Australia
Austria
Brazil
Canada
China
Czechoslovakia

India
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Italy
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Spain
Sweden
Thailand
United Kingdom
USA
USSR

The member bodies of the following countries expressed disapproval of the document on technical grounds:

Belgium
Germany, F.R.
Switzerland

Steel wire ropes for lifts

1 Scope and field of application

This International Standard specifies the characteristics of steel wire ropes used for suspension purposes with passenger-carrying lifts or goods lifts, moving between vertical guides or guides inclined to an angle not exceeding 15° to the vertical.

Builder's hoists, mine hoists, temporary hoists not running between permanent guides, whether passenger-carrying or not, are not included.

The constructions, diameters and tensile strengths recognized for lift ropes are those specified. However, other constructions, diameters and tensile strengths may be used by agreement between supplier and purchaser in accordance with national safety requirements.

2 References

ISO 2408, *Steel wire ropes for general purposes — Characteristics.*

ISO 3108, *Steel wire ropes for general purposes — Determination of actual breaking load.*

ISO 3178, *Steel wire ropes for general purposes — Terms of acceptance.*

ISO 4101, *Drawn steel wire for elevator ropes — Specification.*

ISO 4345, *Steel wire ropes — Fibre main cores — Specifications.*

ISO 4346, *Steel wire ropes for general purposes — Lubricants — Basic requirements.*

3 Types of construction and diameter ranges

The types of construction and diameters are as follows:

Construction	Nominal diameters, mm
6 × 19 ¹⁾ equal (parallel) lay	6 - 8 - 10 - 11 - 13 - 16 - 19 - 22
8 × 19 ¹⁾ equal (parallel) lay	8 - 10 - 11 - 13 - 16 - 19 - 22

4 Materials

4.1 Rope wire

The wire used for the manufacture of these ropes shall comply with ISO 4101.

The tensile grade for single tensile ropes shall be either 1 570 N/mm² or 1 770 N/mm²²⁾

The tensile grade for dual tensile ropes³⁾ shall be:

- outers 1 370 N/mm²
- inners 1 770 N/mm²

Unless otherwise specified the rope shall be of bright wire. If, exceptionally, ropes with other finishes are required, the finish shall be agreed between supplier and purchaser.

4.2 Main cores

Main cores shall normally be of fibre and shall comply with ISO 4345.

4.2.1 Natural fibre cores shall be made from new hard fibre, Sisal or Manila.

1) 8 to 12 outer wires per strand, 2 to 3 layers over a king wire.

2) 1 N/mm² = 1 MPa

3) The use of dual tensile ropes is to be re-considered after a period of five years.

4.2.2 Man-made fibre cores shall be made from the following.

- a) New fibre made from polyolefines, i.e. polypropylene or polyethylene. The original form of the material may be monofilament, film or fibrillated film.
- b) Any suitable alternative material agreed between supplier and purchaser.

4.2.3 Other cores may be used by agreement between supplier and purchaser.

4.3 Lubricants

The rope lubricants shall comply with ISO 4346.

5 Rope characteristics

5.1 Type and direction of lay

Unless otherwise specified, all ropes shall be right-hand ordinary lay.

5.2 Strand manufacture

The strands shall be uniformly made and free from defects. King wires shall be of a size to provide sufficient support to enable the covering wires to be evenly laid.

5.3 Rope manufacture

5.3.1 The completed rope shall be evenly laid, and free from loose wires, distorted strands, and other irregularities; it shall remain in this condition when unwound from the reel or coil. The strands shall lie tightly on the core, and the core shall be capable of adequately supporting the strands in service.

When uncoiled, and under no load, the rope shall not be wavy.

5.3.2 Wires shall be joined by welding or brazing. Alternatively, for wires of up to and including 0,25 mm diameter, joints may be made by tucking or twisting.

5.3.3 All ropes shall be preformed unless otherwise specified by the purchaser. The free ends shall be secured against untwisting.

5.3.4 The core shall be of a size to provide sufficient support and to enable the covering strands to be evenly laid.

5.3.5 It is recommended that the ropes of any one lift installation should be taken from one rope-making.

5.4 Rope lubrication

The wires used in the rope shall be coated with lubricant. The main fibre core shall be adequately lubricated.

5.5 Rope size and tolerances

5.5.1 Nominal diameter

The nominal diameter, in millimetres, shall be that by which the rope is designated. It shall be one of those given in clause 3.

5.5.2 Measured (actual) diameter

The diameter, in millimetres, of the rope as supplied shall be measured with a suitable caliper fitted with jaws broad enough to cover not less than two adjacent strands. The measurements shall be taken on a straight portion of the rope, at two points spaced at least 1 m apart; at each point the two diameters at right angles shall be measured. The average of these four measurements is the actual diameter.

The actual diameter shall be measured under no load and under a load of 5 % or alternatively 10 % of the minimum breaking load (MBL). The actual diameter shall be equal to the nominal diameter with a tolerance according to table 1.

Table 1

Rope diameter mm	Tolerances for rope diameter, %		
	no load	5 % MBL	10 % MBL
≤ 10	+ 6 + 2	+ 5 + 1	+ 4 0
> 10	+ 5 + 2	+ 4 + 1	+ 3 0

5.5.3 Ovality

The measurements for ovality (out-of-roundness) shall be taken in accordance with 5.5.2.

The maximum variation between any of the four measurements made under 5 or 10 % of the minimum breaking load shall not exceed 3 % of the nominal diameter.

5.6 Length

The length of the rope supplied shall be that given on the order subject to the following tolerances:

- ≤ 400 m : $\begin{matrix} + 5 \\ 0 \end{matrix}$ %
- > 400 m : $\begin{matrix} + 20 \\ 0 \end{matrix}$ m for each 1 000 m or part thereof

The rope shall be measured under no load.

If exact lengths are required, the tolerances shall be the subject of an agreement between supplier and purchaser.

5.7 Mass

The approximate mass, in kilograms per 100 m, is given in tables 2 and 3.

The method of calculation is given in ISO 2408.

5.8 Minimum breaking load

The minimum breaking load, in kilonewtons, is the load which must be reached or exceeded when a tensile test to destruction is carried out in accordance with ISO 3108. The values are given in tables 2 and 3.

The method of calculation is given in ISO 2408.

5.9 Test on wire from the rope

Only the tensile test and torsion test, according to ISO 3178, shall be made.

6 Certificates

The certificates shall be in conformity with those specified in ISO 3178.

7 Facilities for inspection

The facilities for inspection shall be those specified in ISO 3178.

8 Packing

Ropes shall be supplied in coils or on reels, at the discretion of the manufacturer, unless specified by the purchaser to be on reels.

During transit and storage the ropes shall be protected against damage, for example from moisture, dust or dirt.

9 Marking

The purchaser's order number or the test certificate number, and any other marking which may be specified by the purchaser, shall be legibly marked upon a tag securely attached to each coil or reel.

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10 Physical properties

10.1 Wire rope 6 × 19 equal (parallel) lay

Table 2

Nominal diameter mm	Approximate mass		Minimum breaking load of rope corresponding to nominal tensile grade R_0 of the wires of :	
	natural fibre kg/100 m	man-made fibre kg/100 m	1 570 N/mm ² , single tensile; 1 370/1 770 N/mm ² , dual tensile, both calculated on a single tensile of 1 500 N/mm ² kN	1 770 N/mm ² , single tensile kN
6	13,0	12,7	17,8	21,0
8	23,1	22,5	31,7	37,4
10	36,1	35,2	49,5	58,4
11	43,7	42,6	59,9	70,7
13	61,0	59,5	83,7	98,7
16	92,4	90,1	127	150
19	130	127	179	211
22	175	170	240	283

10.2 Wire rope 8 × 19 equal (parallel) lay

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Table 3

Nominal diameter mm	Approximate mass		Minimum breaking load of rope corresponding to nominal tensile grade R_0 of the wires of :	
	natural fibre kg/100 m	man-made fibre kg/100 m	1 570 N/mm ² , single tensile; 1 370/1 770 N/mm ² , dual tensile, both calculated on a single tensile of 1 500 N/mm ² kN	1 770 N/mm ² , single tensile kN
8	22,2	21,7	28,1	33,2
10	34,7	33,9	44,0	51,9
11	42,0	41,0	53,2	62,8
13	58,6	57,3	74,3	87,6
16	88,8	86,8	113	133
19	125	122	159	187
22	168	164	213	251

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