
International Standard



6984

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

Unalloyed steel wires for stranded wire ropes for mine hoisting — Specifications

Fils en acier non allié pour câbles d'extraction toronnés utilisés dans les mines — Spécifications

First edition — 1981-11-01

ITeH STANDARD PREVIEW
(standards.iteh.ai)

[ISO 6984:1981](https://standards.iteh.ai/catalog/standards/sist/13277183-eea0-4ef5-a73b-52fbd014d2a8/iso-6984-1981)

<https://standards.iteh.ai/catalog/standards/sist/13277183-eea0-4ef5-a73b-52fbd014d2a8/iso-6984-1981>

UDC 677.721 : 622.242.5

Ref. No. ISO 6984-1981 (E)

Descriptors : steel products, wire rope, steel wire rope, lifts, dimensions, tests, marking.

Price based on 4 pages

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 6984 was developed by Technical Committee ISO/TC 105, *Steel wire ropes*, and was circulated to the member bodies in January 1980.

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

Austria	Hungary	Poland
Belgium	India	Romania
Canada	Israel	Spain
China	Italy	Sweden
Cuba	Korea, Rep. of	Switzerland
France	Mexico	United Kingdom
Germany, F.R.	Netherlands	Venezuela

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

Australia
Czechoslovakia
South Africa, Rep. of
USA

Unalloyed steel wires for stranded wire ropes for mine hoisting — Specifications

1 Scope

This International Standard gives specifications for unalloyed steel drawn wire intended for use in the manufacture of stranded wire ropes for mine hoisting. It specifies:

- the dimensional tolerances;
- the mechanical characteristics;
- the conditions with which coatings shall comply;
- the conditions of sampling and control.

The finished wires shall not show superficial or internal defects detrimental to their use.

When specified, wires shall be supplied with a coating obtained by the hot dip or electrolytic process.

In the first case, the zinc used for the bath shall be 99,9 % pure.

4.2 Diameter

4.2.1 Nominal diameter

The nominal diameter of the wire shall be the diameter designated by the purchaser on the order and shall be given in millimetres.

The nominal section, calculated from the nominal diameter, shall be used for the determination of the tensile strength.

4.2.2 Actual diameter

The actual diameter of the wire shall be the diameter given by the arithmetic mean of two measurements carried out according to the method given in 6.1.

These two measurements shall not differ by more than half the total tolerance given in table 1 and their arithmetic mean shall be within the limits of tolerance specified in table 1.

2 Field of application

This International Standard applies to round bright or galvanized (quality A or B) wires with a diameter between 0,8 mm and 3,5 mm, for use in the manufacture of stranded wire ropes for mine hoisting.

It does not apply to wires taken from these ropes.

3 References

ISO 89, *Steel — Tensile testing of wire.*

ISO 136, *Steel — Simple torsion testing of wire.*

ISO 144, *Steel — Reverse bend testing of wire.*

ISO 2232, *Drawn wire for general purpose non-alloy steel wire ropes — Specifications.*

ISO 3154, *Stranded wire ropes for mine hoisting — Technical delivery requirements.*

4 Wire characteristics

4.1 General conditions of manufacture

Wire shall be made by the basic open hearth, electric furnace, or basic oxygen steel process, or by equivalent methods.

Table 1

Nominal diameter of the wire d mm	Tolerances, mm	
	Bright and galvanized wire Quality B	Galvanized wire Quality A
$0,8 < d < 1,0$	$\pm 0,02$	$\pm 0,03$
$1,0 < d < 1,6$	$\pm 0,02$	$\pm 0,04$
$1,6 < d < 2,4$	$\pm 0,03$	$\pm 0,05$
$2,4 < d < 3,5$	$\pm 0,03$	$\pm 0,06$

4.3 Tensile grades

The tensile grades of wire are the following.

- 1 570 N/mm²
- 1 770 N/mm²
- 1 960 N/mm²

These nominal values are the lower limits of strength.

The upper limits are equal to the lower limits plus the tolerances given in table 2.

Table 2

Nominal diameter of the wire <i>d</i> mm	Tolerance on the nominal strength N/mm ²
0,8 < <i>d</i> < 1,0	350
1,0 < <i>d</i> < 1,5	320
1,5 < <i>d</i> < 2,0	290
<i>d</i> > 2,0	260

4.4 Reverse bend strength

The wires submitted to the reverse bend test shall be able to withstand before fracture the minimum number of reverse bends indicated in table 3.

4.5 Simple torsion strength

The wires submitted to the simple torsion test shall be able to withstand before fracture the number of turns indicated in table 4.

4.6 Galvanized coating

4.6.1 Qualities

Two qualities of galvanization are recognized.

- quality A, thick galvanization, for tensile grades 1 570 and 1 770 N/mm²,
- quality B, normal galvanization, for the three tensile grades (1 570, 1 770 and 1 960 N/mm²).

Other tensile grades may be used by agreement between the manufacturer and supplier.

4.6.2 Coating control

Coating control is defined by :

- the minimum mass of zinc coating in grams per square metre tested in accordance with annex A of ISO 2232,

Table 3

Nominal diameter of the wire <i>d</i> mm	Radius of curvature of the supports mm	Minimum number of reverse bends				
		Bright wires and galvanized wires Quality B			Galvanized wires Quality A	
		Nominal strength, N/mm ²				
		1 570	1 770	1 960	1 570	1 770
0,8	2,5	15	14	13	13	11
0,9		13	12	11	11	9
1,0		11	10	9	9	7
1,1	3,75	19	18	17	15	14
1,2		17	16	15	14	12
1,3		15	14	13	12	10
1,4		13	12	11	10	9
1,5		11	10	9	9	8
1,6	5	16	15	13	12	11
1,7		14	13	12	11	10
1,8		13	12	11	10	9
1,9		12	11	10	9	8
2,0		11	10	9	8	7
2,1	7,5	17	16	15	15	13
2,2		16	15	14	14	12
2,3		15	14	13	13	11
2,4		14	13	12	12	10
2,5		13	12	11	11	9
2,6		12	11	10	10	8
2,7		11	10	9	9	7
2,8		10	9	8	8	6
2,9		9	8	7	8	6
3,0		9	8	7	7	5
3,1	10	14	13	12	11	9
3,2		13	12	11	10	8
3,3		12	11	10	10	8
3,4		11	10	9	9	7
3,5		10	9	8	8	6

NOTE — If the diameter of the wire is between two consecutive diameters of the table, the number of bends corresponding to the next larger diameter shall be taken.

Table 4

Test length	Nominal diameter of the wire <i>d</i> mm	Nominal number of simple torsion				
		Bright wires and galvanized wires Quality B			Galvanized wires Quality A	
		Nominal strength, N/mm ²				
		1 570	1 770	1 960	1 570	1 770
100 <i>d</i>	0,8 < <i>d</i> < 1,0	35	33	27	23	21
	1,0 < <i>d</i> < 1,3	33	31	26	21	19
	1,3 < <i>d</i> < 1,8	32	29	25	20	18
	1,8 < <i>d</i> < 2,3	30	28	23	19	16
	2,3 < <i>d</i> < 3,0	28	25	21	16	13
	3,0 < <i>d</i> < 3,4	26	23	20	11	9
3,4 < <i>d</i> < 3,5	24	21	18	10	8	

NOTE — Tables 3 and 4 will be reconsidered after a period of 3 years.

— the continuity and the uniformity of zinc coating given as the number of one minute dips into a saturated solution of copper sulphate in accordance with annex B of ISO 2232.

For wires having a coating of quality A, a test for adhesion shall be carried out, according to annex C of ISO 2232.

Table 5 gives the minimum mass of zinc and the number of dips which the wires shall withstand as a function of the nominal diameter and the quality of the zinc coating.

5 Sampling

Samples required for testing shall be taken in accordance with the requirements of table 6 unless other methods of sampling have been agreed between purchaser and supplier.

Tests lengths shall be long enough to allow the tests and check tests to be carried out.

6 Tests

6.1 Measurement of the diameter

The diameter shall be determined by two measurements with a micrometer with an accuracy equal to 1/100 in two perpendicular directions in the same section and the same diametrical plane.

6.2 Tensile test

A 150 mm test piece should preferably be used.

The tensile test shall be carried out in accordance with the procedure given in ISO 89 with a speed of application of the load which may be higher than that specified in ISO 89 in view of the number of the tests on wire involved in the inspection of the batch. However, the speed shall never exceed a speed producing an elongation of 25 % of the distance between grips within 1 min.

In case of dispute, the tensile test shall be performed strictly in accordance with ISO 89, particularly insofar as the speed of application of the load is concerned.

6.3 Reverse bend test

The test shall be carried out according to ISO 144 with the radius of curvature to be used as indicated in table 3.

6.4 Simple torsion test

The test shall be carried out according to ISO 136 with the number of torsion indicated in table 4.

The length 100 d of the test piece between grips is preferable. When this length is impracticable, the alternative length is at the discretion of the wire manufacturer and then the minimum number of twists which the wire shall withstand shall be in direct ratio to the number specified in table 4 for a test length of

<https://standards.iteh.ai/catalog/standards/sib/19277183-eea0-4ef5-a73b-52fbd014d2a8/iso-6984-1981>

Table 5

Nominal diameter d mm	Galvanized coating			
	Quality B		Quality A	
	Minimum mass of zinc g/m ²	Minimum number of one minute dips	Minimum mass of zinc g/m ²	Minimum number of one minute dips
0,8 < d < 1,0	75	1	140	1
1,0 < d < 1,2	85	1	160	2
1,2 < d < 1,5	95	1,5	175	2
1,5 < d < 1,9	110	1,5	190	2,5
1,9 < d < 2,5	120	2	215	2,5
2,5 < d < 3,2	135	2	240	3
3,2 < d < 3,5	145	2,5	260	3,5

Table 6

Delivery unit	Samples for	
	mechanical tests	inspection tests galvanized coated
Production coil	At two ends of each coil	Both ends of one in five coils
Bobbins and spools	At one end of each bobbin or spool	At one end of every three bobbins or spools

6.5 Inspection of galvanized coat

The mass of zinc deposited and continuity and uniformity of coating shall be inspected in accordance with annexes A and B of ISO 2232. If a test for adhesion is required, it shall be in accordance with annex C of ISO 2232.

7 Information given by the purchaser

The purchaser shall indicate with the order :

- 1) the reference to this International Standard;
- 2) the nominal diameter of the wire;
- 3) the surface finish (bright, galvanized quality B or A);
- 4) the tensile grade;
- 5) the type of certificate to be given by the manufacturer;
- 6) the weight or length of the delivered unit.

8 Certificates

According to the order, one of the following control documents may be established :

8.1 Certificate of conformity

By this certificate, the manufacturer acknowledges that the conditions as specified in the purchaser's order (see annex A) are fulfilled.

8.2 Full works certificate

This certificate shall give the results of tests carried out by the manufacturer according to the specifications of this International Standard.

8.3 Certificate of acceptance

In particular cases, when requested by the purchaser, tests may be undertaken after manufacture in the presence of the purchaser or his representative. The test results shall be laid down in the certificate of acceptance which is equivalent to the full works certificate.

9 Marking

Each unit of delivery shall be marked and identified by a durable label, securely fixed to each coil or bobbin and which shall mention at least the following :

- the name of manufacturer or supplier;
- the identification relating to the wire (diameter, surface condition, tensile grade, mass or length per unit of delivery);
- the number of customer order;
- the number of bobbin or coil.

iTeh STANDARD PREVIEW
(standards.itih.ai)

ISO 6984:1981

<http://standards.itih.ai/standards/sist/13277183-eea0-4e5-a73b-28101d2a8/iso-6984-1981>