International Standard 6984

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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

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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 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

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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.

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.

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 Diameters

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.

Table 1

Nominal diameter of the wire d mm	Tolerances, mm	
	Bright and galvanized wire Quality B	Galvanized wire Quality A
$0,8 \leqslant d < 1,0$	± 0,02	± 0,03
$1,0 \leqslant d < 1,6$	± 0,02	± 0,04
$1,6 \leqslant d < 2,4$	± 0,03	± 0,05
$2,4 \leqslant d < 3,5$	± 0,03	± 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 d mm	Tolerance on the nominal strength N/mm²
$0,8 \leqslant d < 1,0$	350
$1,0 \leqslant d < 1,5$	320
$1,5 \leqslant d < 2,0$	290
$d \geqslant 2,0$	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 d 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/mm²				
		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 d mm	Nominal number of simple torsion				
		Bright wires and galvanized wires Quality B			Galvanized wires Quality A	
		Nominal strength, N/mm²				
		1 570	1 770	1 960	1 570	1 770
100 d	$0,8 \leqslant d < 1,0$	35	33	27	23	21
	$1,0 \leqslant d < 1,3$	33	31	26	21	19
	$1,3 \leqslant d < 1,8$	32	29	25	20	18
	$1,8 \leqslant d < 2,3$	30	28	23	19	16
	$2,3 \leqslant d < 3,0$	28	25	21	16	13
	$3,0 \leqslant d < 3,4$	26	23	20	11	9
	$3,4 \leqslant d < 3,5$	24	21	18	10	8

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