भारतीय मानक
Indian Standard

IS 2365 : 2018

लिफ्ट, एलेवेटर एवं हॉस्ट्स के लिए इस्पात तार निलंबन रस्सियाँ — विशिष्टि

(दूसरा पुनरीक्षण)

Steel Wire Suspension Ropes for Lifts, Elevators and Hoists — Specification

(Second Revision)

ICS 53.020.30; 77.140.65

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुरशाह ज़फर मार्ग, नई दिल्ली – 110002
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December 2018 **Price Group 5**

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Wire Ropes and Wire Products Sectional Committee had been approved by the Mechanical Engineering Division Council.

This standard was first published in 1963 and subsequently revised in 1977. While revising this standard, 6 X 25 (22/12/A) triangular strand construction of wire rope has been deleted from the standard because of the limited use. Also the title of the standard has been slightly modified.

In this revision, the rope size and tolerance shall be within +6/-0 percent of the nominal diameter for nominal rope diameter up to 10 mm (≤ 10 mm) and +5/-0 percent for nominal rope diameter larger than 10 mm (>10 mm), and minimum breaking force for rope diameters not covered in these tables can be calculated as per IS 6594 : 2018 Technical supply conditions for steel wire ropes and strands (*third revision*). Values of rope grade for dual tensile grade ropes to calculate minimum breaking force are given in Annex A.

The composition of the Committee responsible for the formulation of this standard is given in Annex B.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 ‘Rules for rounding off numerical values (*revised*). The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

STEEL WIRE SUSPENSION ROPES FOR LIFTS, ELEVATORS AND HOISTS — SPECIFICATION

(Second Revision)

1 SCOPE

This standard covers steel wire ropes for use with lifts, elevators and hoists having cars or platforms carrying passengers or goods and working in guides. This standard does not apply to ropes used for winding purpose in mines. The following rope constructions, types, rope grades, cores and range of sizes are covered as identified by "X" mark:

	Rope Grade Single Tensile			Core		Size Range	Ref. to Table
Construction	1 230	1 420	1 570	*Fibre*	*Steel*	*mm*	
6X19M (12/6-1)	X	X	X	X	–	6 to 12	1 (Single Tensile)
6X19S (9-9-1)	X	X	X	X	–	6 to 20	2 (Single Tensile)
6X25F (12-6 F-6-1)	X	X	X	X	–	6 to 20	3 (Single Tensile)
8X19S (9-9-1)	X	X	X	X	X	8 to 20	4 (Single Tensile)
8X25F (12-6 F-6-1)	X	X	X	X	X	8 to 20	5 (Single Tensile)

	Rope Grade Dual Tensile			Core		Size Range	Ref. to Table
Construction	1 180/1 770	1 370/1 779	1 570/1 770	*Fibre*	*Steel*	*mm*	
6X19S (9-9-1)	X	X	–	X	–	6 to 20	2 (Dual Tensile)
6X25F (12-6 F-6-1)	X	X	–	X	–	6 to 20	3 (Dual Tensile)
8X19S (9-9-1)	X	X	X	X	X	8 to 20	4 (Dual Tensile)
8X25F (12-6 F-6-1)	X	X	X	X	X	8 to 20	5 (Dual Tensile)

2 REFERENCES

The standards listed below contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below:

IS No.	*Title*
1804 : 2004	Steel wire ropes — Fibre main cores — Specification (*fourth revision*)
1835 : 1976	Specification for round steel wire ropes (*third revision*)
2363 : 1981	Glossary of terms relating to wire ropes (*first revision*)
6594 : 2018	Technical supply conditions for steel wire ropes and strands (*third revision*)

3 TERMINOLOGY

For the purpose of this standard the definitions given in IS 2363 'Glossary of terms relating to wire ropes' shall apply.

4 ROPE SIZE AND TOLERANCE

The size of the rope, designated as 'nominal diameter' shall be one of those given in Table 1 to 5. The actual diameter of the rope as supplied shall be within +6/-0 percent of the nominal diameter for nominal rope diameter up to 10 mm (≤ 10 mm) and +5/-0 percent for nominal rope diameter larger than 10 mm (>10 mm).

5 MINIMUM BREAKING LOAD

Shall be as given in Table 1 to 5. Minimum breaking force for rope diameters not covered in these tables can be calculated as per IS 6594. Values of rope grade for dual tensile grade ropes to calculate minimum breaking force are given in Annexure-A

6 GENERAL REQUIREMENTS

The wire ropes shall confirm to IS 6594 'Technical supply conditions for wire ropes and strands' and shall also meet the following requirements.

6.1 Core

The main core of the rope shall be either of fibre (CF) or steel (CWR) only. CWS shall not be used in core of steel core ropes. In case of steel core, CWR shall comprise of outer strands not less than that of the rope and shall confirm to the requirements of IS 6594. In case of fibre core (CF), the cores shall confirm to the requirement of IS 1804.

6.2 Joints

If jointing by trucking is required, it shall be in the case of wires 0.5 mm diameter and smaller.

6.3 Mass

The mass of ropes given in Tables 1 to 5 are for fully greased ropes. The ropes which are not lubricated may be lighter.

6.4 Galvanizing

When Galvanizing is required, it shall confirm to Type B of IS 1835.

6.5 Tensile Grade

In dual tensile grades, the outer wires shall be of lower tensile and the inner wires shall be of higher tensile.

7 MARKING

For the purpose of this standard the markings given in IS 6594 and the following shall apply.

7.1 BIS Certification Marking

The steel wire ropes may also be marked with the Standard Mark.

7.1.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations made thereunder. The details of the conditions under which the licence for use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

Table 1 Breaking Load and Mass for 6X19M (12/6-1) Construction

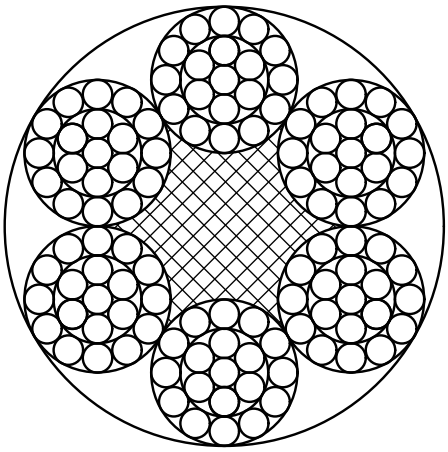


FIG. 1

Single Tensile								
	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of					
			1 230		1 420		1 570	
Nominal Diameter	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core
	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
mm	kg/100m	kg/100m	kN	kN	kN	kN	kN	kN
6	12.5	13.7	13.6	–	15.7	–	17.4	–
7	17.0	18.6	18.5	–	21	–	24	–
8	22.1	24.4	24	–	28	–	31	–
9	28.0	30.8	31	–	35	–	39	–
10	34.6	38.1	38	–	44	–	48	–
11	41.9	46.1	46	–	53	–	58	–
12	49.8	54.8	54	–	63	–	69	–

Table 2 Breaking Load and Mass for 6X19S (9-9-1) Construction

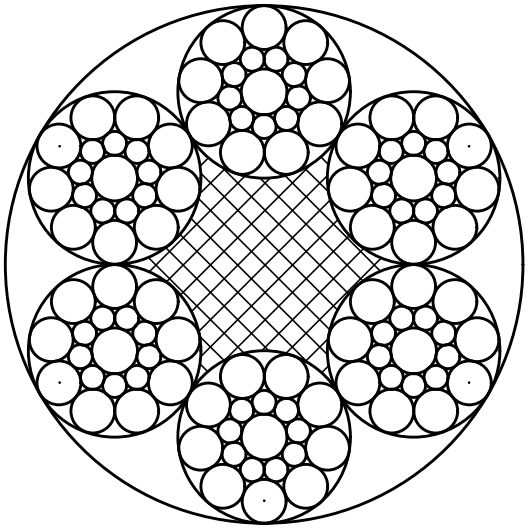


FIG. 2

Table 2A SingleTensile								
	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of					
			1 230		1 420		1 570	
Nominal Diameter	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core
	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
mm	kg/100m	kg/100m	kN	kN	kN	kN	kN	kN
6	13.4	–	14.7	–	16.9	–	18.7	–
8	23.8	–	26	–	30	–	33	–
10	37.3	–	41	–	47	–	52	–
12	53.7	–	59	–	68	–	75	–
13	63	–	69	–	79	–	88	–
14	73	–	80	–	92	–	102	–
16	95.4	–	104	–	120	–	133	–
18	121	–	132	–	152	–	168	–
19	135	–	147	–	170	–	188	–
20	149	–	162	–	188	–	208	–

Table 2B Dual Tensile								
	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of					
			1 180/1 770		1 370/1 770		1 570/1 770	
Nominal Diameter	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core
	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
mm	kg/100m	Kg/100m	kN	kN	kN	kN	kN	kN
6	13.4	–	16.3	–	17.8	–	–	–
8	23.8	–	28.9	–	31.7	–	–	–
10	37.3	–	45.2	–	49.5	–	–	–
12	53.7	–	65.1	–	71.3	–	–	–
13	63	–	76.4	–	83.7	–	–	–
14	73	–	88.6	–	97	–	–	–
16	95.4	–	116	–	127	–	–	–
18	121	–	146	–	160	–	–	–
19	135	–	163	–	179	–	–	–
20	149	–	181	–	198	–	–	–

Table 3 Breaking Load and Mass for 6X25F (12-6 F-6-1) Construction

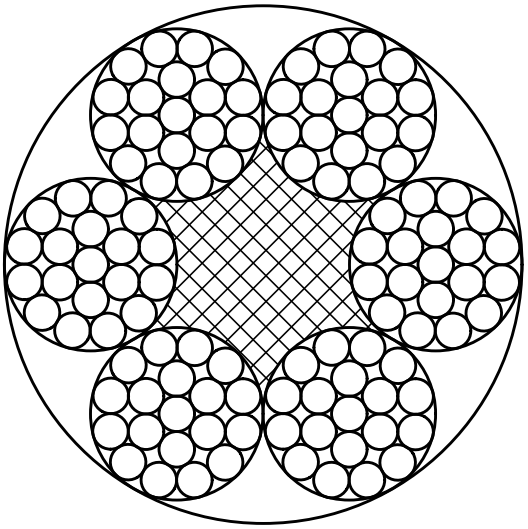
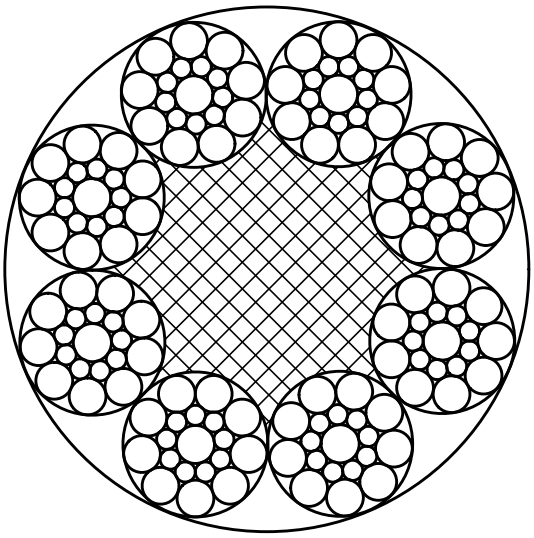


FIG. 3

Table 3A Single Tensile								
	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of					
			1 230		1 420		1 570	
Nominal Diameter	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core
	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
mm	kg/100m	kg/100m	kN	kN	kN	kN	kN	kN
6	13.7	–	15	–	17.3	–	19.1	–
8	24.3	–	27	–	31	–	34	–
10	38	–	42	–	48	–	53	–
12	54.7	–	60	–	69	–	76	–
13	64.3	–	70	–	81	–	90	–
14	74.5	–	81	–	94	–	104	–
16	97.3	–	106	–	123	–	136	–
18	123	–	135	–	155	–	172	–
19	137	–	150	–	173	–	191	–
20	152	–	166	–	192	–	212	–

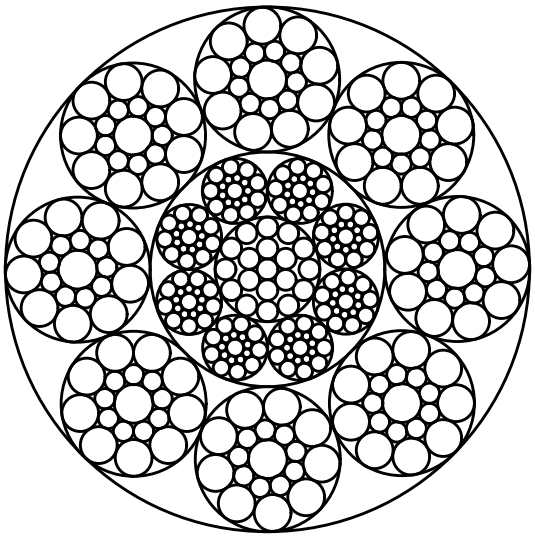
Table 3B Dual Tensile								
	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of					
			1 180/1 770		1 370/1 770		1 570/1 770	
Nominal Diameter	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core
	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
mm	Kg/100m	kg/100m	kN	kN	kN	kN	kN	kN
6	13.7	–	16.3	–	17.8	–	–	–
8	24.3	–	28.9	–	31.7	–	–	–
10	38	–	45.2	–	49.5	–	–	–
12	54.7	–	65.1	–	71.3	–	–	–
13	64.3	–	76.4	–	83.7	–	–	–
14	74.5	–	88.6	–	97	–	–	–
16	97.3	–	116	–	127	–	–	–
18	123	–	146	–	160	–	–	–
19	137	–	163	–	179	–	–	–
20	152	–	181	–	198	–	–	–

Table 4 Breaking Load and Mass for 8 X 19S (9-9-1) Construction



CF

FIG. 4 (A)



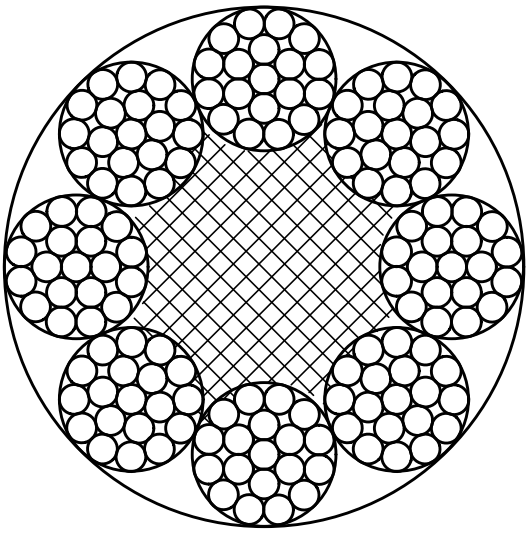
CWR

FIG. 4 (B)

Table 4A Single Tensile								
	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of					
			1 230		1 420		1 570	
Nominal Diameter	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core
	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
mm	kg/100m	kg/100m	kN	kN	kN	kN	kN	kN
8	22.3	27.2	23	27	26	31	29	34
9	28.2	34.4	29	34	33	39	37	43
10	34.9	42.5	35	42	41	48	45	53
11	42.2	51.4	43	50	49	58	55	64
12	50.2	61.2	51	60	59	69	65	77
13	58.9	71.8	60	70	69	81	76	90
14	68.3	83.3	69	82	80	94	88	104
16	89.2	109	90	107	104	123	115	136
18	113	138	114	135	132	156	146	172
19	126	153	127	150	147	174	163	192
20	139	170	141	167	163	192	180	213

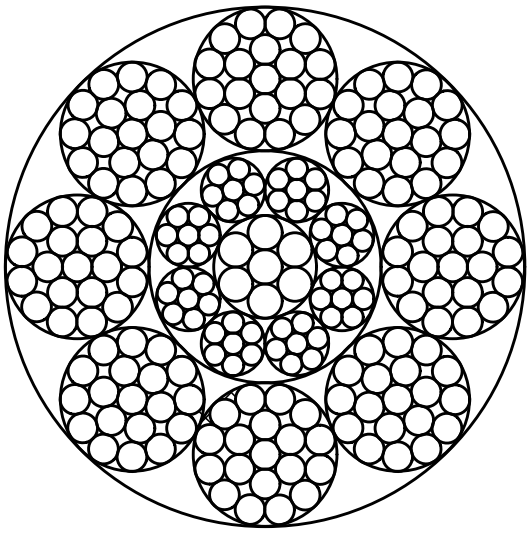
Table 4B Dual Tensile								
	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of					
			1 180/1 770		1 370/1 770		1 570/1 770	
Nominal Diameter	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core
	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
mm	kg/100m	kg/100m	kN	kN	kN	kN	kN	kN
8	22.3	27.2	25.7	33.6	28.1	35.8	30.8	38
9	28.2	34.4	32.5	42.5	35.6	45.3	38.9	48.2
10	34.9	42.5	40.1	52.5	44	55.9	48.1	59.5
11	42.2	51.4	48.6	63.5	53.2	67.6	58.1	71.9
12	50.2	61.2	57.8	75.6	63.3	80.5	69.2	85.6
13	58.9	71.8	67.8	88.7	74.3	94.5	81.2	100
14	68.3	83.3	78.7	102	86.1	110	94.2	117
16	89.2	109	103	134	113	143	123	152
18	113	138	130	170	142	181	156	193
19	126	153	145	190	159	202	173	215
20	139	170	161	210	176	224	192	238

Table 5 Breaking Load And Mass for 8x25 F(12-6F-6-1) Construction



CF

FIG. 5 (A)



CWR

FIG. 5 (B)

Table 5A Single Tensile								
	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of					
			1 230		1 420		1 570	
Nominal Diameter	*Fibre Core*	*Steel Core*	*Fibre Core*	*Steel Core*	*Fibre Core*	*Steel Core*	*Fibre Core*	*Steel Core*
	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
mm	kg/100m	kg/100m	kN	kN	kN	kN	kN	kN
8	22.8	27.8	23	**27**	27	31	30	35
9	28.9	35.2	29	**35**	34	40	37	44
10	35.7	43.5	36	**43**	42	49	46	54
11	43.1	52.6	44	**52**	50	60	56	66
12	51.3	62.6	52	**61**	60	71	66	78
13	60.2	73.5	61	**72**	70	83	78	92
14	69.9	85.2	71	**84**	82	96	90	107
16	91.3	111	92	**109**	107	126	118	139
18	116	141	117	**138**	135	159	149	176
19	129	157	130	**154**	151	178	166	196
20	143	174	144	**170**	167	197	184	218

Table 5B Dual Tensile								
	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of					
			1 180/1 770		1 370/1 770		1 570/1 770	
Nominal Diameter	*Fibre Core*	*Steel Core*	Fibre Core	Steel Core	Fibre Core	Steel Core	Fibre Core	Steel Core
	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)	(CF)	(CWR)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
mm	kg/100m	kg/100m	kN	kN	kN	kN	kN	kN
8	22.8	27.8	25.7	33.6	28.1	35.8	30.8	38
9	28.9	35.2	32.5	42.5	35.6	45.3	38.9	48.2
10	35.7	43.5	40.1	52.5	44	55.9	48.1	59.5
11	43.1	52.6	48.6	63.5	53.2	67.6	58.1	71.9
12	51.3	62.6	57.8	75.6	63.3	80.5	69.2	85.6
13	60.2	73.5	67.8	88.7	74.3	94.5	81.2	100
14	69.9	85.2	78.7	102	86.1	110	94.2	117
16	91.3	111	103	134	113	143	123	152
18	116	141	130	170	142	181	156	193
19	129	157	145	190	159	202	173	215
20	143	174	161	210	176	224	192	238

ANNEX A

Values of Rope Grades (R0) in Newton per square millimeter for dual tensile grade ropes to calculate minimum breaking force as per IS 6594, for the rope diameters not covered in Table 4B (dual tensile) and Table 5B (dual tensile) are given in following Table A-1

Table A-1 Values of Rope Grades (R0) for Dual Tensile Grade Ropes to Calculate Minimum Breaking Force

Dual Tensile Rope Grade	Rope Class	R0 (Newton/mm2)
1180/1770	6 x 19S, 6 x 25F, 8 x 19S and 8 x 25F with fibre core	1370
1370/1770	6 x19S, 6 x 25F, 8 x 19S and 8 x 25F with fibre core	1500
1570/1770	6 x19S, 6 x 25F, 8 x 19S and 8 x 25F with fibre core	1640
1180/1770	8 x 19S and 8 x 25F with steel core	1475
1370/1770	8 x 19S and 8 x 25F with steel core	1570
1570/1770	8 x 19S and 8 x 25F with steel core	1670

ANNEX B

(Foreword)

COMMITTEE COMPOSITION

Wire Ropes And Wire Products Sectional Committee, MED 10

Organization	*Representative(s)*
Directorate General of Mines Safety, Dhanmbad	Shri D. B. Naik (***Chairman***), Shri Vijay Kumar Kavali (*Alternate*)
Amzone International, Mumbai	Shri Shubho Ghosh Shri Ajit Vikram Singh (*Alternate*)
Bharat Coking Coal Limited, Dhanbad	Shri K. K. Sinha Shri R. K. Munshi (*Alternate*)
Bharat Wire Ropes Limited, Mumbai	Shri Ashwini Lokhande
Central Institute of Mining and Fuel Reasearch, Dhanbad	Dr Manoj Kumar Singh, Dr Debasish Bssak (*Alternate*)
Directorate of Quality Assurance, New Delhi	Col K. Suresh Lt Col JA Vora (*Alternate*)
Directorate General FAC Advice Service and Lab INSTT, Mumbai	Shri G. M. E. K. Raj Shri R. C. Gupta (*Alternate*)
Directorate General of Supplies and Disposals (Quality Assurance Wing), New Delhi	Shri Akhilesh Kumar Shri R. K. Agarwal (*Alternate*)
Directorate General of Aeronautical Quality Assurance, New Delhi	Shri Nitin A. Meshram Shri Sanjeev Diwan (*Alternate*)
Eastern Coalfields Limited, Kolkata	Shri Chaterjee Shri Kapil K. Rai (*Alternate*)
Maccaferri Environment Solutions Pvt Limited, Navi Mumbai	Smt. Minimal Korulla Shri Rudra Budhbhatti (*Alternate*)
Ministry of Shipping, New Delhi	Shri B. Poiyaamzhi Shri D. J. Basub (*Alternate*)
National Test House, Kolkata	Shri S. P. Roy Shri R. N. Ram (*Alternate*)
Oil and Natural Gas Commission, Dehradun	Shri S. S. Ali Shri A. K. Aggarwal (*Alternate*)
Orient Wire Ropes, Indore	Shri Sameer Golwelkar Shri Shishir Akarte (*Alternate*)
South Eastern coalfields Limited, Bilaspur	Shri S. K. Mishra Shri G. Ramaswami (*Alternate*)
Tata Steel Limited, Dhanbad	Shri A. N. Bhagat Shri Tanmay Bhattacharya (*Alternate*)
The Shipping Coporation of India Limited, Mumbai	Shri G. S. Bhalla Capt R. Modi (*Alternate*)
The Singreni Collierries Co Limited	Shri Ivn Prasada Rao Shri N. V. K. Vishwananda Raju (*Alternate*)
Usha Martin Industries Limited, Ranchi	Shri Subrata Dutta Shri Sandeep Jaiswal (*Alternate*)
Director General, BIS	Shri Rajneesh Khosla, Scientist 'E' and Head (MED) [Representing Director General (*Ex-officio*)]

Member Secretary
Shri Sandeep Keshav,
Scientist B (MED), BIS

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act*, 2016 to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards: Monthly Additions'.

This Indian Standard has been developed from Doc No.: MED 10 (11515).

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