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भारतीय मानक मसौदा

**एरियल रोपवे के लिए इस्पात के तारों की रस्सियाँ — विशिष्टि
भाग 1 ढुलाई एवं वहन ढुलाई रस्सी**

(दूसरा पुनरीक्षण)

DRAFT Indian Standard

**STEEL WIRE ROPES FOR AERIAL ROPEWAYS — SPECIFICATION
PART 1 HAULING AND CARRYING HAULING ROPE**

(Second Revision)

ICS 45.100; 77.140.65

Wire Ropes and Wire Products Sectional
Committee, MED 10

Last date for comment
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FOREWORD

(Formal clauses to be added later)

This standard was first published in 1984 and subsequently revised in 2001. This standard is being revised again to keep pace with the latest technological developments and international practices. Also, in this revision, the standard has been brought into latest style and format of Indian Standard, and references to Indian Standard wherever applicable has been updated. In this revision, the following major changes have been made:

- a) Symbolic representation of various constructions of wire ropes has been modified.
- b) Size ranges has been modified as 13 to 44 mm diameter in place of 13 to 40 mm diameter for 6×17 S and 6×19 S construction.
- c) Cross lay construction 6×19 M (12/6-1) has been deleted since the same is not recommended to haulage system.
- d) Requirement for lubrication has been added.
- e) Requirement of mass and breaking force have been modified as per the mass factor 'K' and breaking force factor 'K' given in IS 6594.

Doc: MED 10 (27071)WC
December 2024

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: 2022 'Rules for rounding off numerical values (*second revision*)'. 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 ROPES FOR AERIAL
ROPEWAYS — SPECIFICATION
PART 1 HAULING AND CARRYING HAULING ROPE**

(Second Revision)

1 SCOPE

This standard (Part 1) covers general requirements for steel wire ropes for hauling and carrying-hauling purpose in aerial ropeways.

Most common rope constructions and rope types are given in following table. Common rope grades, cores and size ranges are identified by ‘x’ mark however, other sizes, intermediate grades (up to including 1960 grade) and core may be supplied as agreed between manufacturer and purchaser.

Specially developed constructions may be supplied to fulfil specific requirement of purchaser.

| <i>Construction</i> | <i>Rope Grade</i> | | | | <i>Core</i> | | <i>Size Range mm</i> | <i>Table No.</i> |
|----------------------|-------------------|------|------|------|-------------|-------|----------------------|------------------|
| | 1420 | 1570 | 1770 | 1960 | Fibre | Steel | | |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| 6 × 7 (6-1) | X | X | X | X | X | - | 8 to 40 | 1 |
| V 6 × 8 (7-Δ) | X | X | X | X | X | - | 8 to 40 | 2 |
| 6 × 17 S (8-8-1) | X | X | X | X | X | X | 13 to 44 | 3 |
| 6 × 19 S (9-9-1) | X | X | X | X | X | X | 13 to 44 | 3 |
| 6 × 25 F (12-6F-6-1) | X | X | X | X | X | X | 8 to 40 | 4 |
| V 6 × 22 (9/12-Δ) | X | X | X | X | X | X | 16 to 40 | 5 |
| V 6 × 25 (12/12-Δ) | X | X | X | X | X | X | 22 to 40 | 6 |

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. In case the standards are to be referred in this clause they are to be listed as follows:

| <i>IS No</i> | <i>Title</i> |
|----------------|--|
| IS 1804 : 2004 | Specification for fibre core for steel wire ropes (<i>fourth revision</i>) |
| IS 2363 : 2022 | Glossary of terms relating to wire ropes (<i>second revision</i>) |
| IS 6594 : 2024 | Technical supply conditions for steel wire ropes (<i>fourth revision</i>) |

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 2363 shall apply.

4 ROPE DIAMETER

4.1 Rope Size

Purchaser shall specify the size of the rope designated as ‘Nominal Diameter’. The most common rope sizes are given in Table 1 to 7, however other sizes may be supplied as agreed between manufacturer and purchaser.

4.2 Tolerance

The actual diameter of the rope as supplied shall be within following percent of the nominal diameter within +1% and +5% of the nominal diameter.

4.3 Difference between Diameter Measurements

The difference between minimum and maximum values of the four measurements taken in accordance with Annex B of IS 2365, and expressed as a percentage of nominal diameter shall not exceed 4%.

5 CONSTRUCTION AND MINIMUM BREAKING FORCE

5.1 Construction

The construction shall be either as covered in table 1 to 7 or another single layer rope construction as specified by manufacturer and covered in IS 6594.

5.2 Minimum Breaking Force

5.2.1 The values of minimum breaking force shall not be less than as specified in table 1 to table 7, given for more common construction and sizes and grades. For other rope diameters, the values shall not be less than those obtained using formula in **6.6** of IS 6594.

5.2.2 Minimum breaking force for wire ropes with ‘solid polymer’ core shall be same as of the wire ropes with ‘fibre core’. Minimum breaking force of wire ropes with core as ‘steel covered with solid polymer’ and wire ropes with core as ‘non-magnetic metallic covered with solid polymer’ shall be same as the minimum breaking force of wire ropes with steel core.

5.2.3 Minimum breaking force for compacted ropes shall be as agreed between manufacturer and purchaser.

6 GENERAL REQUIREMENTS

The wire ropes shall conform to IS 6594 and shall meet the requirements of **6.1** to **6.6**.

6.1 Core

The core shall be one of the following types

- a) Fibre
- b) Solid Polymer
- c) Non-magnetic metallic covered with solid polymer
- d) Steel covered with solid polymer
- e) Steel, as independent wire rope (CWR) or wire strand (WSC)

6.2 Joints

Tucked joints may be used for wires of 0.5 mm diameter and smaller. For other wires joints shall be made as specified in IS 6594.

6.3 Lay

The wire ropes shall be of right hand lang's lay unless otherwise specified.

6.4 Preforming

The haulage ropes shall be preformed.

6.5 Rope Grade

Rope grade shall be 1420, 1570, 1770 and 1960 although intermediate grades can also be specified.

6.6 Wire

Wire before rope making shall conform to IS 1835. The Tensile Strength Grades of wire shall be subject to the limits given in following table 'A';

| Sl No. | Rope Grade | Wire Tensile Strength Grade (N/mm²) | |
|---------------|-------------------|---|------|
| | (1) | (2) | (3) |
| i) | 1420 | 1370 | 1570 |
| ii) | 1570 | 1370 | 1770 |
| iii) | 1770 | 1570 | 1960 |
| iv) | 1960 | 1770 | 2160 |

NOTE — Wire tensile grade 1370 shall be as per IS/ISO 2408

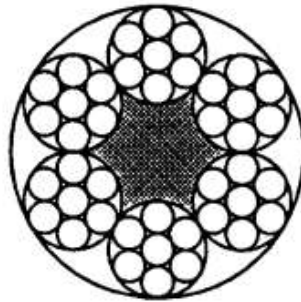
7 GALVANIZING

The wire ropes shall normally be supplied in ungalvanized condition. However, when specifically required, these may be galvanized class B or class AB only, using zinc or zinc-aluminum alloy.

8 WAVINESS

When the rope is measured for waviness over a length of rope equivalent to not less than three rope lay lengths shall not be more than $0.01 d + 0.2$ mm. The waviness shall be measured as per Annex A.

Table 1 Mass and Breaking Force for 6×7 (6-1) Construction
(Clauses 4 and 5)

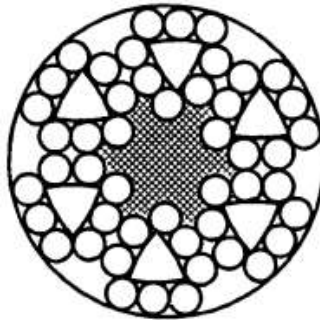


6x7 (6-1) - CF

| SI No. | Nominal Diameter | Approximate Mass | Minimum Breaking Force Corresponding to Rope Grade of | | | |
|--------|------------------|------------------|---|------|------|------|
| | | | 1420 | 1570 | 1770 | 1960 |
| | | Fibre Core (CF) | Fibre Core (CF) | | | |
| (1) | (2) | (3) | (4) | (5) | (6) | |
| mm | kg/100 m | kN | kN | kN | kN | |
| i) | 8 | 22.9 | 30 | 33 | 38 | 40 |
| ii) | 9 | 28.9 | 38 | 42 | 48 | 51 |
| iii) | 10 | 35.7 | 47 | 52 | 59 | 63 |
| iv) | 11 | 43.2 | 57 | 63 | 71 | 76 |
| v) | 12 | 51.5 | 68 | 75 | 85 | 91 |
| vi) | 13 | 60.4 | 80 | 88 | 99 | 107 |
| vii) | 14 | 70.1 | 92 | 102 | 115 | 124 |
| viii) | 16 | 91.5 | 121 | 134 | 151 | 162 |
| ix) | 18 | 116 | 153 | 169 | 191 | 205 |
| x) | 20 | 143 | 189 | 209 | 235 | 253 |
| xi) | 22 | 173 | 228 | 252 | 285 | 306 |
| xii) | 24 | 206 | 272 | 300 | 339 | 364 |

| | | | | | | |
|---|----|-----|-----|-----|-----|------|
| xiii) | 25 | 223 | 295 | 326 | 367 | 395 |
| xiv) | 26 | 242 | 319 | 353 | 397 | 427 |
| xv) | 28 | 280 | 370 | 409 | 461 | 495 |
| xvi) | 29 | 301 | 397 | 439 | 495 | 531 |
| xvii) | 32 | 366 | 483 | 534 | 602 | 647 |
| xviii) | 33 | 389 | 514 | 568 | 640 | 688 |
| xix) | 35 | 438 | 578 | 639 | 720 | 774 |
| xx) | 36 | 463 | 611 | 676 | 762 | 818 |
| xxi) | 37 | 489 | 646 | 714 | 805 | 865 |
| xxii) | 38 | 516 | 681 | 753 | 849 | 912 |
| xxiii) | 40 | 572 | 755 | 834 | 941 | 1010 |
| NOTE — To calculate aggregate breaking forces, multiply the figures given in col 3, 4, 5 and 6 by 1.111 | | | | | | |

Table 2 Mass and Breaking Force for V 6 × 8 (7-Δ) Construction
(Clauses 4 and 5)



V 6 × 8 (7-Δ) – CF

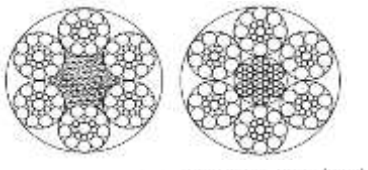
| SI No. | Nominal Diameter | Approximate Mass | Minimum Breaking Force Corresponding to Rope Grade of | | |
|--------|------------------|------------------|---|------|------|
| | | | 1420 | 1570 | 1770 |
| | | Fibre Core (CF) | Fibre Core (CF) | | |
| (1) | (2) | (3) | (4) | (5) | |
| mm | kg/100 m | kN | kN | kN | |
| i) | 8 | 26.2 | 33 | 36 | 41 |
| ii) | 9 | 33.2 | 42 | 46 | 52 |
| iii) | 10 | 41.0 | 51 | 57 | 64 |
| iv) | 11 | 49.6 | 62 | 69 | 78 |
| v) | 12 | 59.0 | 74 | 82 | 92 |
| vi) | 13 | 69.3 | 87 | 96 | 108 |
| vii) | 14 | 80.4 | 101 | 111 | 126 |
| viii) | 16 | 105 | 132 | 145 | 164 |
| ix) | 18 | 133 | 167 | 184 | 208 |
| x) | 19 | 148 | 186 | 205 | 231 |
| xi) | 20 | 164 | 206 | 227 | 256 |
| xii) | 22 | 198 | 249 | 275 | 310 |
| xiii) | 24 | 236 | 296 | 327 | 369 |
| xiv) | 25 | 256 | 321 | 355 | 400 |
| xv) | 26 | 277 | 347 | 384 | 433 |

| | | | | | |
|--------|----|-----|-----|-----|------|
| xvi) | 28 | 321 | 403 | 446 | 502 |
| xvii) | 29 | 345 | 432 | 478 | 539 |
| xviii) | 32 | 420 | 526 | 582 | 656 |
| xix) | 33 | 446 | 560 | 619 | 698 |
| xx) | 35 | 502 | 630 | 696 | 785 |
| xxi) | 36 | 531 | 666 | 737 | 830 |
| xxii) | 37 | 561 | 704 | 778 | 877 |
| xxiii) | 38 | 592 | 742 | 821 | 925 |
| xxiv) | 40 | 656 | 822 | 909 | 1025 |

NOTES

- 1 In case of a wire, 3 or more round wires forming a triangle may also be used.
- 2 To obtain the calculated aggregate breaking forces, multiply the figures given in col 3, 4 and 5 by 1.137.

Table 3 Mass and Breaking Force for 6×17S (8-8-1) and 6×19S (9-9-1) Constructions
(Clauses 4 and 5)

| Typical Cross Section | | Typical Construction | |
|--|--------------------------|----------------------------|--|
|  <p>WITH FIBRE CORE (CF) WITH STEEL CORE (CWR)</p> | Rope Construction | Strand Construction | |
| | 6 x 17S | 8-8-1 | |
| | 6 x 19S | 9-9-1 | |

| Sl No. | Nominal Diameter | Approximate Mass | | Minimum Breaking Force Corresponding to Rope Grade of | | | | | | | |
|--------|------------------|------------------|------------------|---|------------------|-----------------|------------------|-----------------|------------------|-----------------|------------------|
| | | | | 1420 | | 1570 | | 1770 | | 1960 | |
| | | Fibre Core (CF) | Steel Core (CWR) | Fibre Core (CF) | Steel Core (CWR) | Fibre Core (CF) | Steel Core (CWR) | Fibre Core (CF) | Steel Core (CWR) | Fibre Core (CF) | Steel Core (CWR) |
| | | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| | mm | kg/100 m | kg/100 m | kN | kN | kN | kN | kN | kN | kN | kN |
| i) | 13 | 63.0 | 69.3 | 79 | 86 | 88 | 95 | 99 | 107 | 110 | 118 |
| ii) | 14 | 73.0 | 80.3 | 92 | 99 | 102 | 110 | 115 | 124 | 127 | 137 |
| iii) | 16 | 95.4 | 105 | 120 | 130 | 133 | 144 | 150 | 162 | 166 | 179 |
| iv) | 17 | 107 | 118 | 136 | 147 | 150 | 162 | 169 | 183 | 187 | 202 |
| v) | 18 | 121 | 133 | 152 | 164 | 168 | 182 | 190 | 205 | 210 | 227 |
| vi) | 20 | 149 | 164 | 188 | 203 | 208 | 224 | 234 | 253 | 260 | 280 |
| vii) | 22 | 180 | 198 | 227 | 246 | 252 | 272 | 284 | 306 | 314 | 339 |
| viii) | 24 | 215 | 236 | 271 | 292 | 299 | 323 | 337 | 364 | 374 | 403 |
| ix) | 25 | 233 | 256 | 294 | 317 | 325 | 351 | 366 | 395 | 405 | 438 |
| x) | 26 | 252 | 277 | 318 | 343 | 351 | 379 | 396 | 428 | 439 | 474 |
| xi) | 28 | 292 | 321 | 368 | 398 | 407 | 440 | 459 | 496 | 509 | 549 |
| xii) | 29 | 313 | 345 | 395 | 427 | 437 | 472 | 493 | 532 | 546 | 589 |
| xiii) | 32 | 382 | 420 | 481 | 520 | 532 | 575 | 600 | 648 | 664 | 717 |
| xiv) | 33 | 406 | 446 | 512 | 553 | 566 | 611 | 638 | 689 | 706 | 763 |
| xv) | 36 | 483 | 531 | 609 | 658 | 673 | 727 | 759 | 820 | 841 | 908 |
| xvi) | 37 | 510 | 561 | 643 | 695 | 711 | 768 | 802 | 866 | 888 | 959 |

| | | | | | | | | | | | |
|--------|----|-----|-----|-----|-----|------|------|------|------|------|------|
| xvii) | 38 | 538 | 592 | 679 | 733 | 750 | 810 | 846 | 913 | 937 | 1012 |
| xviii) | 40 | 596 | 656 | 752 | 812 | 831 | 898 | 937 | 1012 | 1038 | 1121 |
| xix) | 42 | 657 | 723 | 829 | 895 | 917 | 990 | 1033 | 1116 | 1144 | 1236 |
| xx) | 44 | 721 | 794 | 910 | 983 | 1006 | 1086 | 1134 | 1225 | 1256 | 1356 |

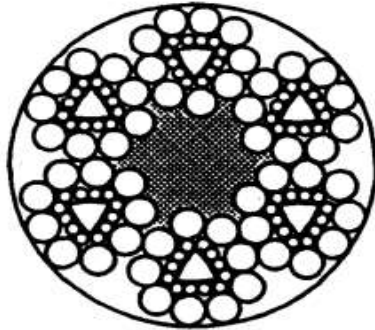
NOTE — To calculate aggregate breaking forces, multiply the figures given in col 4, 6, 8 & 10 by 1.163 and col 5, 7, 9 and 11 by 1.25.

Table 4 Mass and Breaking Force for 6 × 25 F (12-6F-6-1) Construction
(Clauses 4 and 5)

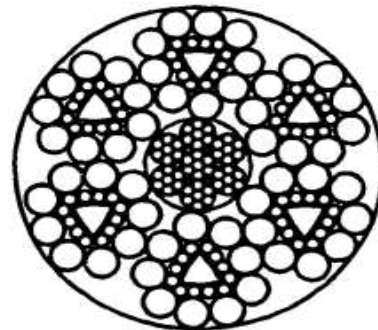
| SI No. | Nominal Diameter | Approximate Mass | | Minimum Breaking Force Corresponding to Rope Grade of | | | | | | | |
|--------|------------------|------------------|------------------|---|------------------|-----------------|------------------|-----------------|------------------|-----------------|------------------|
| | | | | 1420 | | 1570 | | 1770 | | 1960 | |
| | | Fibre Core (CF) | Steel Core (CWR) | Fibre Core (CF) | Steel Core (CWR) | Fibre Core (CF) | Steel Core (CWR) | Fibre Core (CF) | Steel Core (CWR) | Fibre Core (CF) | Steel Core (CWR) |
| | | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| | mm | kg/100 m | kg/100 m | kN | kN | kN | kN | kN | kN | kN | kN |
| i) | 8 | 24.3 | 26.8 | 31 | 33 | 34 | 37 | 38 | 41 | 42 | 46 |
| ii) | 9 | 30.8 | 33.9 | 39 | 42 | 43 | 46 | 48 | 52 | 54 | 58 |
| iii) | 10 | 38.0 | 41.8 | 48 | 52 | 53 | 57 | 60 | 65 | 66 | 71 |
| iv) | 11 | 46.0 | 50.6 | 58 | 63 | 64 | 69 | 72 | 78 | 80 | 86 |
| v) | 12 | 54.7 | 60.2 | 69 | 75 | 76 | 82 | 86 | 93 | 95 | 103 |
| vi) | 13 | 64.3 | 70.7 | 81 | 88 | 90 | 97 | 101 | 109 | 112 | 121 |
| vii) | 14 | 74.5 | 82.0 | 94 | 102 | 104 | 112 | 117 | 127 | 130 | 140 |
| viii) | 16 | 97.3 | 107 | 123 | 133 | 136 | 147 | 153 | 165 | 169 | 183 |
| ix) | 18 | 123 | 135 | 155 | 168 | 172 | 186 | 194 | 209 | 214 | 232 |
| x) | 20 | 152 | 167 | 192 | 207 | 212 | 229 | 239 | 258 | 265 | 286 |
| xi) | 22 | 184 | 202 | 232 | 251 | 257 | 277 | 289 | 312 | 320 | 346 |
| xii) | 24 | 219 | 241 | 276 | 298 | 305 | 330 | 344 | 372 | 381 | 412 |
| xiii) | 25 | 238 | 261 | 300 | 324 | 331 | 358 | 374 | 403 | 414 | 447 |
| xiv) | 26 | 257 | 283 | 324 | 350 | 358 | 387 | 404 | 436 | 447 | 483 |
| xv) | 28 | 298 | 328 | 376 | 406 | 416 | 449 | 469 | 506 | 519 | 560 |
| xvi) | 32 | 389 | 428 | 491 | 530 | 543 | 586 | 612 | 661 | 678 | 732 |
| xvii) | 36 | 493 | 542 | 621 | 671 | 687 | 742 | 775 | 837 | 858 | 926 |
| xviii) | 40 | 608 | 669 | 767 | 829 | 848 | 916 | 956 | 1033 | 1059 | 1144 |

NOTE — To calculate aggregate breaking forces, multiply the figures given in col 4, 6, 8 & 10 by 1.163 and col 5, 7, 9 and 11 by 1.25.

Table 5 Mass and Breaking Force for V 6 × 22(9/12 – A) Construction
(Clauses 4 and 5)



V 6 × 22 (9/12 – Δ) – CF

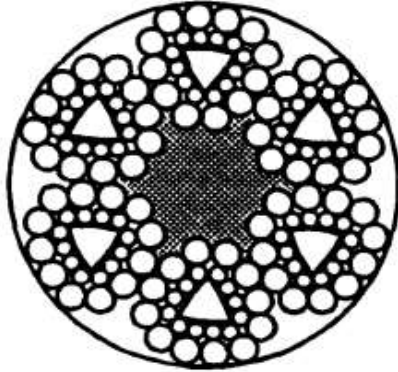


V 6 × 22 (9/12 – Δ) – CWR

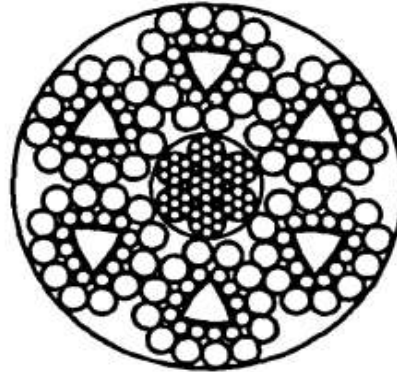
| Sl No. | Nominal Diameter | Approximate Mass | | Minimum Breaking Force Corresponding to Rope Grade of | | | | | |
|--------|------------------|------------------|------------------|---|------------------|-----------------|------------------|-----------------|------------------|
| | | | | 1420 | | 1570 | | 1770 | |
| | | Fibre Core (CF) | Steel Core (CWR) | Fibre Core (CF) | Steel Core (CWR) | Fibre Core (CF) | Steel Core (CWR) | Fibre Core (CF) | Steel Core (CWR) |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | |
| mm | kg/100 m | kg/100 m | kN | kN | kN | kN | kN | kN | |
| i) | 16 | 105 | 114 | 128 | 135 | 141 | 150 | 159 | 169 |
| ii) | 18 | 133 | 145 | 161 | 171 | 179 | 189 | 201 | 213 |
| iii) | 20 | 164 | 179 | 199 | 211 | 220 | 234 | 249 | 263 |
| iv) | 22 | 198 | 216 | 241 | 256 | 267 | 283 | 301 | 319 |
| v) | 24 | 236 | 257 | 287 | 304 | 317 | 336 | 358 | 379 |
| vi) | 25 | 256 | 279 | 312 | 330 | 344 | 365 | 388 | 412 |
| vii) | 26 | 277 | 302 | 337 | 357 | 373 | 395 | 420 | 445 |
| viii) | 28 | 321 | 350 | 391 | 414 | 432 | 458 | 487 | 516 |
| ix) | 29 | 345 | 376 | 419 | 444 | 463 | 491 | 522 | 554 |
| x) | 32 | 420 | 458 | 510 | 541 | 564 | 598 | 636 | 674 |
| xi) | 33 | 446 | 487 | 543 | 575 | 600 | 636 | 677 | 717 |
| xii) | 35 | 502 | 548 | 611 | 647 | 675 | 715 | 761 | 807 |
| xiii) | 36 | 531 | 579 | 646 | 685 | 714 | 757 | 805 | 853 |
| xiv) | 37 | 561 | 612 | 682 | 723 | 754 | 800 | 851 | 901 |
| xv) | 38 | 592 | 645 | 720 | 763 | 796 | 843 | 897 | 951 |
| xvi) | 40 | 656 | 715 | 797 | 845 | 882 | 934 | 994 | 1054 |

NOTES
1 In case of Δ wire, 3 or more round wires forming a triangle may also be used.
2 To obtain the calculated aggregate breaking forces multiply the figures given in col 4, 6 & 8 by 1.177 and col 5, 7 and 9 by 1.25.

Table 6 Mass and Breaking Force for V 6 x 25(12 112 – A) Construction
(Clauses 4 and 5)



V 6 x 25 (12/12 – Δ) – CF



V 6 x 25 (12/12 – Δ) – CWR

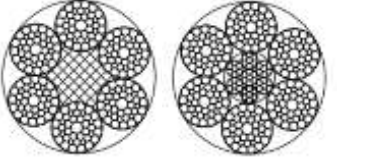
| SI No. | Nominal Diameter | Approximate Mass | | Minimum Breaking Force Corresponding to Rope Grade of | | | | | |
|--------|------------------|------------------|------------------|---|------------------|-----------------|------------------|-----------------|------------------|
| | | | | 1420 | | 1570 | | 1770 | |
| | | Fibre Core (CF) | Steel Core (CWR) | Fibre Core (CF) | Steel Core (CWR) | Fibre Core (CF) | Steel Core (CWR) | Fibre Core (CF) | Steel Core (CWR) |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | |
| mm | kg/100 m | kg/100 m | kN | kN | kN | kN | kN | kN | |
| i) | 22 | 198 | 216 | 241 | 256 | 267 | 283 | 301 | 319 |
| ii) | 24 | 236 | 257 | 287 | 304 | 317 | 336 | 358 | 379 |
| iii) | 25 | 256 | 279 | 312 | 330 | 344 | 365 | 388 | 412 |
| iv) | 26 | 277 | 302 | 337 | 357 | 373 | 395 | 420 | 445 |
| v) | 28 | 321 | 350 | 391 | 414 | 432 | 458 | 487 | 516 |
| vi) | 29 | 245 | 376 | 419 | 444 | 463 | 491 | 522 | 554 |
| vii) | 32 | 420 | 458 | 510 | 541 | 564 | 598 | 636 | 674 |
| viii) | 33 | 446 | 487 | 543 | 575 | 600 | 636 | 677 | 717 |
| ix) | 35 | 502 | 548 | 611 | 647 | 675 | 715 | 761 | 807 |
| x) | 36 | 531 | 579 | 646 | 685 | 714 | 757 | 805 | 853 |
| xi) | 37 | 561 | 612 | 682 | 723 | 754 | 800 | 851 | 901 |
| xii) | 38 | 592 | 645 | 720 | 763 | 796 | 843 | 897 | 951 |
| xiii) | 40 | 656 | 715 | 797 | 845 | 882 | 934 | 994 | 1054 |

NOTES

1 In case of Δ wire, 3 or more round wires forming a triangle may also be used.

2 To obtain the calculated aggregate breaking forces multiply the figures given in col 4, 6 & 8 by 1.177 and col 5, 7 and 9 by 1.25.

Table 7 Mass and Breaking Force for 6x31SW (12-6+6-6-1) and 6x36 (14-7+7-7-1) Constructions
(Clauses 4 and 5)

| Typical Cross Section | | Typical Construction | |
|---|--|----------------------|---------------------|
|  | | Rope Construction | Strand Construction |
| | | 6 × 31 SW | 12-6 + 6-6-1 |
| | | 6 × 36 SW | 14-7 + 7-7-1 |

| SI No. | Nominal Diameter | Approximate Mass | | Minimum Breaking Force Corresponding to Rope Grade of | | | | | | | | |
|--------|------------------|------------------|------------------|---|------------------|-----------------|------------------|-----------------|------------------|-----------------|------------------|------|
| | | | | 1420 | | 1570 | | 1770 | | 1960 | | |
| | | Fibre Core (CF) | Steel Core (CWR) | Fibre Core (CF) | Steel Core (CWR) | Fibre Core (CF) | Steel Core (CWR) | Fibre Core (CF) | Steel Core (CWR) | Fibre Core (CF) | Steel Core (CWR) | |
| | | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
| | mm | kg/100 m | kg/100 m | kN | kN | kN | kN | kN | kN | kN | kN | kN |
| i) | 28 | 298 | 328 | 367 | 397 | 406 | 439 | 458 | 494 | 507 | 548 | |
| ii) | 29 | 320 | 352 | 394 | 426 | 436 | 470 | 491 | 530 | 544 | 587 | |
| iii) | 30 | 342 | 376 | 422 | 455 | 466 | 503 | 526 | 568 | 582 | 629 | |
| iv) | 32 | 389 | 428 | 480 | 518 | 530 | 573 | 598 | 646 | 662 | 715 | |
| v) | 34 | 440 | 483 | 542 | 585 | 599 | 647 | 675 | 729 | 747 | 807 | |
| vi) | 35 | 466 | 512 | 574 | 620 | 634 | 685 | 715 | 773 | 792 | 855 | |
| vii) | 36 | 493 | 542 | 607 | 656 | 671 | 725 | 757 | 817 | 838 | 905 | |
| viii) | 38 | 549 | 604 | 676 | 731 | 748 | 808 | 843 | 911 | 934 | 1008 | |
| ix) | 40 | 608 | 669 | 750 | 810 | 829 | 895 | 934 | 1009 | 1035 | 1117 | |
| x) | 42 | 671 | 738 | 826 | 892 | 914 | 987 | 1030 | 1112 | 1141 | 1232 | |
| xi) | 44 | 736 | 810 | 907 | 980 | 1003 | 1083 | 1130 | 1221 | 1252 | 1352 | |
| xii) | 45 | 770 | 847 | 949 | 1025 | 1049 | 1133 | 1182 | 1277 | 1309 | 1414 | |
| xiii) | 46 | 805 | 885 | 991 | 1071 | 1096 | 1184 | 1236 | 1334 | 1368 | 1478 | |
| xiv) | 48 | 876 | 964 | 1079 | 1166 | 1193 | 1289 | 1345 | 1453 | 1490 | 1609 | |
| xv) | 50 | 951 | 1046 | 1171 | 1265 | 1295 | 1398 | 1460 | 1577 | 1617 | 1746 | |
| xvi) | 51 | 989 | 1088 | 1218 | 1316 | 1347 | 1455 | 1519 | 1640 | 1682 | 1816 | |
| xvii) | 52 | 1028 | 1131 | 1267 | 1368 | 1401 | 1513 | 1579 | 1705 | 1748 | 1888 | |
| xviii) | 54 | 1109 | 1219 | 1366 | 1475 | 1510 | 1631 | 1703 | 1839 | 1885 | 2036 | |
| xix) | 55 | 1150 | 1265 | 1417 | 1530 | 1567 | 1692 | 1766 | 1908 | 1956 | 2113 | |
| xx) | 56 | 1192 | 1311 | 1469 | 1587 | 1624 | 1754 | 1831 | 1978 | 2028 | 2190 | |
| xxi) | 58 | 1279 | 1407 | 1576 | 1702 | 1742 | 1882 | 1964 | 2122 | 2175 | 2349 | |
| xxii) | 60 | 1369 | 1506 | 1686 | 1821 | 1865 | 2014 | 2102 | 2270 | 2328 | 2514 | |

NOTE — To calculate aggregate breaking forces, multiply the figures given in col 4, 6, 8 & 10 by 1.19 and col 5, 7, 9 and 11 by 1.28.

8 LUBRICATION

All wire ropes shall be thoroughly lubricated with a suitable compound during manufacturing process.

9 TEST

The haulage ropes shall meet the test requirements laid down in IS 6594.

10 MARKING

10.1 The size, construction, rope grade, lay, core, coating and length of wire rope, reel/coil number along with the order number of purchaser and any other marking which may be specified by the purchaser shall be legibly mentioned on a suitable tag securely attached, when wire ropes are supplied in coils. In case wire ropes are supplied in reels, the information may be stenciled on both sides of the reels or stenciled on one side of the reel and a suitable tag giving the same information may be attached on the other side of the reel.

10.2 BIS Certification Marking

10.2.1 The product may also be marked with the Standard Mark.

10.2.2 The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations framed thereunder, and the products may be marked with the standard mark.

ANNEX A

(Clause 8)

METHOD OF TEST FOR DETERMINATION OF WAVINESS

A-1 Tools

Straight edge with a straightness of 0.05 mm and a length exceeding at least three rope lay length and feeler type gauge (or equivalent instrument) having increments of at least 0.05 mm and an accuracy of 0.01 mm.

A-2 Method

A-2.1 At the starting and finishing end of the rope in the closing machine, set the straight edge against the tensioned rope in such a way that the rope weight will not have any influence on the results.

A-2.2 Without pressure on the straight edge, determine where the edge makes contact with the rope and secure the edge to the rope at two or more of these positions without affecting the straightness of the straight edge.

A-2.3 With a feeler type of gauge, measure the clearance (gap) between each strand and the straight edge over three rope lay lengths and record the results. The rope waviness shall be the maximum recorded value of the clearance (gap).