Elevator Products

+ for standard and special installations
+ for mid- and high-rise
+ for low D/d-ratios
+ for compensation
PFEIFER DRAKO, an associate company of the PFEIFER Group, has produced and developed special wire ropes for the elevator construction industry for more than 200 years. Thanks to the extensive sales & distribution network and numerous associate companies in all corners of the globe, DRAKO’s special ropes are safety and reliably in use wherever people need to travel vertically. From Moscow to Kuala Lumpur, from New York to Hong Kong and also in Paris, London and Frankfurt, we build on close and long-term relations with our discerning customers. In turn, elevator manufacturers the world over have come to trust us as reliable partners.

At DRAKO, tradition and innovation share equal ranking: One aspect would not be possible without the other. To continue widening our knowledge about ropes and to ensure that our technology remains truly state of the art, we collaborate with universities and institutes. The streamlined precision manufacture of the serial products and the management of customized projects are governed by DIN EN ISO 9001 in accordance with our own quality management system (QMS).

Our company handles resources with as little impact on the environment as possible. We are certified to ISO 50001, 14001 and Okoprofit.

Our mission statement is defined as our adherence to the most up-to-date technical know-how, high-quality materials, safety, user-comfort and economic efficiency which are turned into a set of values transferred to our customers and enable us to embrace every challenge in a multi-cultural world.

We work to …

- the highest safety standards
- economical levels of efficiency and
- reliable service

… for the benefit of our customers, and that is our goal.

Front cover (from left to right):
Hütter-Aufräge GmbH and
Janzhoff-Aufräge GmbH
Eiffel Tower, Paris
Shanghai World Financial Center,
Shanghai
### Advantages of DRAKO steel wire ropes

- Special wire ropes for your application
- Proven strand design and high adaptability
- Long service life
- DRAKO-made fibre core, constant quality
- Low elastic and permanent elongation
- Weight compensating chains at different degrees of weight
- Weight compensating chains with various loop sizes
- Machine-welded chain links
- Inductive wear testing possible since there are no fillers in the coating
- Smart accessories for easier installation
- Low maintenance costs
- 100% rope quality, high quality assurance
- Fair cost-benefit ratio
- Highly qualified and experienced personnel
- Competent advice
- Reliable service
- Worldwide sales network

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About Wire Ropes

Definitions, Designation and Classification

The European Rope Standards EN 12385-2 (with the above title), EN 12385-5 (Stranded Ropes for Lifts) and EN 12385-1 (General Requirements) include rope designation with symbols laid down in EN 12385-2. These symbols – derived from English words – are the same for all European deliveries.

Symbols for rope cores

FC = fibre core
NFC = natural fibre core
SFC = synthetic fibre core
IWRC = independent wire rope core
PWRC = parallel laid fullsteel rope

Symbols for strand construction

S = strand construction Seale
W = strand construction Warrington
F = strand construction Filler or Filler Wire
WS = strand construction Warrington-Seale
M = strand construction Crosslay

Our special ropes can be ordered with their brand name, e.g. DRAKO 300T.

Rope class

So far each rope construction is governed by rope standards. In the recent rope standards similar rope constructions in so-called rope class are summarised, e.g. the rope constructions 6 x 19 Seale, 6 x 19 Warrington and 6 x 19 Filler in the rope grade 6 x 19. The rope standards contain tables with the technical data of the common rope grade.

General references: The rope standards mentioned in this catalogue are those valid at the time of printing.
**Rope tensile strength grade**
For ropes acc. to EN 12385-5 the rope grade addresses the nominal tensile strength grades of the outer and inner wires of the rope. Additionally, the rope grade defines the minimum breaking strength of this rope. Rope grade 1570 (without the unit N/mm²) means, that all wires of this rope are of the nominal tensile strength grade 1570 N/mm².

Rope grade 1370/1770 means, that this is a dual tensile rope (term of ISO 3344) and that the outer wires of the outer strands are of 1370 N/mm² and the inner wires of the rope are of 1770 N/mm² nominal tensile strength grade.

**Symbols for wire finish**
- U = bright (from uncoated)
- B = galvanized acc. class B

**Symbols for type of lay**
- sZ = right hand ordinary (or regular) lay
- zS = left hand ordinary (or regular) lay
- zZ = right hand lang lay
- sS = left hand lang lay

**Pictograms / Explanation**
For easy use and description of rope properties pictograms with the following meanings are used:

- Characteristics
- Rope grades
- Elastic elongation – at 10% of the minimum breaking strength F_{min}
- Permanent elongation – acc. to DIN 51201
- Rope diameter tolerance
Elevator Rope Construction

■ Elevator Ropes
All DRAKO elevator ropes are DRAKO-made. Ropes with fibre core can easily be identified by the DRAKO-identification label (orange coloured synthetic filament in the fibre core).

■ Strands
Strands consist of one or more layers of wire, which are closed in a helix around the centre wire.

■ Wires
Wires for elevator ropes are different from those for crane ropes a. s. o. Therefore we order only wires from wire mills nearby, which are qualified as suppliers of stable quality for many years.

■ Nominal tensile strength grade of wires
The nominal tensile strength grade in Germany is usually 1570 N/mm². Reasonably, the International standard for lift ropes, ISO 4344 as well as the USA, Japan and many European countries know and use elevator ropes of dual tensile rope grade. To come along with sheaves of low hardness, the outer wires are then of lower tensile strength grade.

DRAKO produces for the very different requirements of German and foreign customers ropes in dual tensile rope grade with a variety of tensile strength combinations. Ropes for roped hydraulic elevators are preferably supplied with rope grade 1770.

■ Cores
Two types of cores are used in the elevator industry depending on the application: The fibre core, made of natural or synthetic fibre, and the steel wire core, i.e. an independent wire rope core (IWRC). Because of their elasticity, ropes with fibre core adapt themselves within certain limits to the shape of the corresponding groove. Natural fibre cores (made of sisal-yarn) have a better storage capacity for the lubricant than synthetic fibre cores. But in any case, the lubricant in the fibre core is only sufficient for the lubrication and impregnation of the fibre core itself.

We produce the fibre cores for our elevator ropes in our own factory, the only way, to fulfill the high requirements of our works standard in regard to uniformity and stable lubricant content.

Synthetic fibre cores offer the advantage of an exactness in diameter and form-stability and are also not resistant in humid environment.

The IWRCs increase the metallic cross-section and thereby reduce the tensile stress in each individual wire. Consequently ropes with a steel wire core show a reduced stretch under the same load conditions compared to ropes with fibre core.

Direction of Lay
Only in very special cases – i. e. unguided or only wire guided counter-weight – it should be considered to take right and left hand lay ropes. The influence of the rope torque on the guiding forces of normal elevators with guide rails is extremely small. It should be much more important to have a set of ropes out of one production length (left hand and right hand can’t be out of one production run).

Lay Length
The lay length, f.i. mentioned on page 9, is described as follows: Lay length is the distance (H) parallel to the longitudinal rope axis in which an outer strand makes a complete turn (or helix) about the axis of the rope.
**Strand Constructions**

Here is information about certain strand and rope constructions that are better suited for specific applications in elevators.

For more detailed information about ropes and rope handling, please see our technical brochure "Steel Wire Ropes in Elevators". Please ask for it or look at [www.drako.de/en](http://www.drako.de/en).

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**Seale**

The most common strand construction for elevator ropes worldwide is Seale (1-9-9). This has at least the following reasons:

- Elevator ropes are known to get abrasion in usage, and the big outer wires of Seale have a big metallic cross-section to be abraded before the wires will break.

**Warrington**

Whenever a comparison of fatigue bending life of ropes on sheaves with round groove is made, ropes of Warrington strands are beating Seale ropes with a 20-40% more lifetime. This is due to more and smaller wires per strand. It must be taken into account that in elevators the rope is not only abrasion but also a lot of fatigue bending. Especially in elevators with double wrap drives or in roped hydraulic elevators, the latter is more important.

**Filler (Filler wire construction)**

Filler wire strand construction is an especially fatigue bending withstanding wire configuration. This is covered by the fact that it the rope 8 x 21 Fillier wire. + fibre core (strand) is part of the Canadian elevator rope standard. Suspension ropes, bigger in diameter than 16 mm (5/8") with 6 to 9 outer strands should have at least filler wire strands because of better flexibility. This especially refers to 6-strand ropes. The disadvantages of this strand construction are: very vulnerable to geometry distortion, especially, when the filler wire itself has not the nominal diameter. So the recommendation is given not to take Filler wire strands for ropes below 10mm diameter.

**Warrington-Seale**

Ropes of Warrington-Seale construction are normally not suitable for suspension and governor ropes. But compensating ropes up from 24 mm and suspension ropes up from 22 mm are not flexible enough with the accustomed strand constructions. This is reason enough for DRAKO to recommend beyond these limits Warrington-Seale constructions with more than just 25 wires.

---

**Contact between Rope and Groove**

Ropes are not a plain rod with a circular cross section; in fact they appear to be of polygonal cross section. Therefore the ropes touch the groove only at individual points. It can be only an advantage for the contact rope to groove, when the rope has more than 6 strands.

The success of our 9-strand DRAKO 300 T rope provides the evidence for this theory.
Quality
As we are specialized on the production of elevator ropes, we are accustomed to produce these ropes in big production lengths on special production lines with a very experienced staff of workers. This is one of the reasons for the high and equal level of DRAKO elevator rope quality.

Ropes from the same Batch
We recommend to have all ropes from the same production run (batch) to achieve the best possible performance of a rope set in an elevator. Replacing single ropes of a rope set has to be avoided.

Testing
All elevator ropes run through a testing procedure, which was developed especially for DRAKO elevator ropes. Here they are checked in whole length continuously in respect of diameter, of irregularities in material and closing. By this it is ensured that every production length corresponds to the special requirements of the DRAKO quality standard.

Tolerances of Rope Diameter
The tolerances of elevator rope diameters have to be much smaller than for other ropes. The reason for this smaller tolerances is to ensure the exact fit between the rope and the sheave groove to obtain enough traction but also to achieve best durability of rope and sheave.

According to EN 12385-5 and ISO 4344 the following standard diameter tolerances are valid for elevator ropes:

<table>
<thead>
<tr>
<th>Application</th>
<th>Core type</th>
<th>Rope grade</th>
<th>Nominal rope diameter (mm)</th>
<th>Max. unloaded</th>
<th>Minimum</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fibre core</td>
<td>6 x 19 – FC</td>
<td>≤ 10</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Fibre core</td>
<td>8 x 19 – FC</td>
<td>&gt; 10</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Traction drive ropes</td>
<td>Steel core</td>
<td>6 x 19 – IWRC</td>
<td>≤ 10</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Governor ropes see page 10 ft.</td>
<td>Steel core</td>
<td>8 x 19 – IWRC</td>
<td>&gt; 10</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

* $F_{rm}$ – minimum breaking strength of the rope

This shows, that the diameter tolerances of DRAKO elevator ropes are equal to or smaller than those of the European Standard EN 12385-5, especially, the international norm ISO 4344.

The observation of an exact rope diameter has a considerable influence on the service life of an elevator rope.

For traction elevators the following facts are valid:
1. the better rope diameter and sheave radius conform with each other,
2. the fewer the rope diameter decreases during operation,
3. the more uniform the rope diameter remains over the whole rope length of an elevator.

The points 1 – 3 are valid for U-grooves, point 2 and 3 also for V-grooves. A set of ropes is to be taken from the same production length.
Discard Criteria

Discard criteria according to the elevator rope standards EN 12385-5 and ISO 4344 and extended based on DIN 15020:

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Discard or examination within the time span prescribed by an expert</th>
<th>Immediate discard</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rope grade 6 × 19</td>
<td>Rope grade 8 × 19</td>
</tr>
<tr>
<td>Average number of wire break among outer strands</td>
<td>More than 12 per length of lay</td>
<td>More than 15 per length of lay</td>
</tr>
<tr>
<td>Number of wire break predominantly in one or two strands</td>
<td>More than 6 per length of lay</td>
<td>More than 8 per length of lay</td>
</tr>
<tr>
<td>Number of wire break adjacent to another in one outer strand</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Intermediate wire break (Valley breaks)</td>
<td>1 per length of lay</td>
<td>1 per length of lay</td>
</tr>
</tbody>
</table>

For comparison the discard criteria of the current standards:

<table>
<thead>
<tr>
<th>Rope construction</th>
<th>Number of wires in outer strands</th>
<th>Number of broken wires within a length of 6 × 0</th>
<th>Number of broken wires within a length of 30 × 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRAKO 6 × 19 S – FC</td>
<td>= 114 wires</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>DRAKO 6 × 19 W – FC</td>
<td>= 114 wires</td>
<td>10</td>
<td>19</td>
</tr>
<tr>
<td>DRAKO 8 × 19 F – FC</td>
<td>= 152 wires</td>
<td>10</td>
<td>19</td>
</tr>
<tr>
<td>DRAKO 8 × 20 F – FC</td>
<td>= 152 wires</td>
<td>13</td>
<td>26</td>
</tr>
<tr>
<td>DRAKO 8 × 25 F – FC</td>
<td>= 152 wires</td>
<td>15</td>
<td>28</td>
</tr>
<tr>
<td>DRAKO 250 T</td>
<td>= 152 wires</td>
<td>18</td>
<td>30</td>
</tr>
<tr>
<td>DRAKO 300 T</td>
<td>= 152 wires</td>
<td>18</td>
<td>30</td>
</tr>
<tr>
<td>DRAKO 180 B (in 6 × 36 WS – FC)</td>
<td>= 216 wires</td>
<td>18</td>
<td>32</td>
</tr>
</tbody>
</table>

The table above indicates whether a rope is to be replaced, based on the number of broken wires in the rope section with the highest number of such frays. The reference length is 6 × 0 or 30 × the rope diameter. The table complies with the specification of TRA 102 and DIN 15020, Bl. 2. The values apply only under the following conditions:

- The ropes are single layer regular lay ropes (the steel core is not considered a strand layer).
- The friction sheave is of cast iron or steel (for traction drive elevators).
- The broken wires are distributed evenly across the majority of the strands.

Reduction in rope diameter

The ropes should be replaced if the rope diameter is reduced by more than 6% based on a rope nominal diameter.

Please note:

- If wire fractures don’t occur in a regular pattern across the majority of the strands but are concentrated in one or two strands, the above table is not applicable.
- Such ropes must be replaced, if there are 5 or more broken wires adjacent to each other within one strand.
- Ropes with excessive crown wear tend to show rapidly increasing numbers of broken wires.

Under certain circumstances and depending on the operating conditions, the machine design and the loads, etc., ropes might have to be replaced, even if there are no visible broken wires at the outer strands: ropes with a diameter reduction of more than 6% (from nominal diameter) even in only a short section must be immediately removed.

If the elevator system contains plastic sheaves, refer to German safety instructions for elevators “SR Kunststoffrollen”, as ropes in such systems tend to show internal rather then external wire fractures. The above table is to be seen only as a guideline for rope inspection and the decision for rope discard. Please note that the above figures are never to be considered the only criteria for rope discard. Any detected changes in the rope must be taken into account when assessing a rope. The final decision to remove a rope must be made on the basis of the experience of the assessing person.

For DRAKO ropes installed in systems outside Germany, the relevant statutory regulations for rope replacement apply, please look to EN 12385-3 Annex C also.
Ropes for Traction Sheave Elevators with Steel Core (IWRC)

DRAKO 300 T and 300 TX
9-strand heavy duty rope

The strand construction of DRAKO 300 T and 300 TX is dependent on the rope diameter to optimize fatigue bending performance and wear resistance.

This rope has been probably the first elevator rope in the world with a steel core (IWRC). It has been designed in 1955 by DRAKO. After this rope being nationally and internationally successful in demanding building projects, ropes with steel core are now also implemented in the relevant European and ISO-standards.

Standard wire strength will soon reach the height limit in the challenge of the highest elevator shafts. Increasing the tensile strength of the rope wires will be a feasible way to shift this limit further. For example as 300TX with nominal wire strength of 1960 N/mm² the rope offers new advantages to high and super high rise applications. The number of ropes, and thereby the rope mass, could be reduced in many hoist ways. Invest and installation costs can be reduced. Weight savings in rope mass enable a sustainable reduction of the power consumption. Unfortunately the tensile grade 1960 lies beyond current standards for suspension ropes. But it is already state of the art and approved for small diameter ropes like DRAKO STX. So trend-setting in this direction has already begun!

Advantages
- very round cross-section, i.e. small pressure in the groove
- many wires, i.e. flexible, very good bending performance. One of the reasons is, that due to the special configuration of the wires in the strands and of the strands in the rope, wire crossings are avoided. Therefore the possibility of inner nonvisible wire breaks is reduced
- small permanent and elastic elongation. Result: the car is more directly linked to the machine (important in high shafts) and it is easier to approach the floors correctly

Field of Application
DRAKO 300 T is the most efficient solution as suspension rope for high and very high elevators and for all traction drive elevators with many deflection sheaves.

Please note:
Rope terminations must be secured against rotation. For big shaft heights rope should be prevented from untwisting whilst installation. The single blue marking line along the rope enables to control and to rectify this.
When replacing the ropes the grooves of the drive sheave the ropes and pulleys should be checked.
To make correct rope installation easier, especially on high rise installations, DRAKO steel core ropes are produced with a blue marking line.
**DRAKO 300 T and 300 TX**

9-strand heavy duty rope

<table>
<thead>
<tr>
<th>Nom. Rope diameter mm</th>
<th>Minimum breaking strength F_min kN</th>
<th>Length approx. kg/100 m</th>
<th>Metallic cross-section approx. mm²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1570</td>
<td>1770</td>
<td>1980**</td>
</tr>
<tr>
<td>8</td>
<td>42.1</td>
<td>45.0</td>
<td>26.1</td>
</tr>
<tr>
<td>9</td>
<td>53.3</td>
<td>–</td>
<td>33.1</td>
</tr>
<tr>
<td>9.5</td>
<td>59.4</td>
<td>–</td>
<td>38.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>66.0</td>
<td>71.0</td>
<td>–</td>
</tr>
<tr>
<td>11</td>
<td>79.9</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>12</td>
<td>95.1</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>13</td>
<td>111.6</td>
<td>118.3*</td>
<td>136*</td>
</tr>
</tbody>
</table>

* no stock material

|                       |                                   |                         |                                   |      |
| 14                    | 133                                | 141.0*                  | –                                 | 84   | 96.6 |
| 15                    | 163                                | –                       | –                                 | 96   | 110.9|
| 15.5                  | 174                                | 184.2*                  | 208*                              | 110  | 126.2|
| 18                    | 208*                               | –                       | –                                 | 131  | 151.0|
| 18.5                  | 220*                               | 233.1*                  | 258*                              | 139  | 159.7|
| 20                    | 248*                               | –                       | 298*                              | 154  | 178.0|

* no stock material

To make correct rope installation easier, especially on high rise installations, DRAKO steel core ropes are produced with a blue line along the rope. If the ropes have untwisted whilst being installed, the blue line enables to correct it.

Elevator ropes will be supplied with servings on both ends, if not specified otherwise.

* **DRAKO 300 TX** not covered by recent standard for suspension ropes.
Ropes for Traction Sheave Elevators
Double-Parallel Steel Core Ropes

NEW!

DRAKO 250 TPC
8-strand compacted double-parallel steel core rope

Thanks to the compaction of the strands, the metallic cross-section is additionally enlarged. This, in turn, leads to a further increase in breaking strength as compared to non-compacted double-parallel ropes. Moreover, the compacted outer strands are well-rounded and go easy on traction and deflection sheaves. The run is particularly quiet, which thus enhances ride comfort. Due to compaction, rotation is reduced during the installation process.

Field of Application
Suitable for systems with large loads and high demands not just on precision stopping for loading and unloading procedures but also in terms of ride comfort.

<table>
<thead>
<tr>
<th>Nominal Rope diameter mm</th>
<th>Minimum breaking strength $F_{\text{min}}$ 1570 kN</th>
<th>Minimum breaking strength $F_{\text{min}}$ 1770 kN</th>
<th>Length approx. mass kg/100 m</th>
<th>Metallic cross-section approx. $\text{mm}^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>13*</td>
<td>130</td>
<td>135.7</td>
<td>81.6</td>
<td>93.9</td>
</tr>
<tr>
<td>16*</td>
<td>198</td>
<td>206</td>
<td>118.3</td>
<td>142.8</td>
</tr>
<tr>
<td>17*</td>
<td>210</td>
<td>290</td>
<td>107.3</td>
<td>202.2</td>
</tr>
</tbody>
</table>

* no stock material

Adantages
- very round rope cross-section
- unrivaled large metallic filling factor
- high cross-stability
- very high breaking strengths with rope grade 1570 already
- very low elastic elongation
- high flexural performance
- super quiet smooth run

Please note:
At the installation stage, double-parallel ropes tend to untwist more than full-steel ropes with a separately stranded IWRC. For this reason, special attention is necessary during installation.

Twisted ropes are damaged in their structure and reveal substantial change in their original properties in terms of load capacity, elongation and service life.

To make correct rope installation easier, especially on high rise installations, DRAKO steel core ropes are produced with a blue marking line.
**DRAKO 300 TP**

9-strand double-parallel steel core rope

This is the strand design of the time-proven DRAKO 300 T, here with a double-parallel rope. The wide metallic cross-section leads to higher breaking strengths and reduced elastic and permanent elongation. The simplified stranding process with double-parallel ropes leads to a different rope behaviour during installation compared to our independently stranded IWRC ropes.

### Field of Application
Suitable for systems with high demands on precision stopping for loading and unloading procedures.

<table>
<thead>
<tr>
<th>Nominal Rope Diameter (mm)</th>
<th>Minimum Breaking Strength $F_{\text{min}}$ (kN)</th>
<th>Length Mass Approx. kg/100 m</th>
<th>Metallic Cross-section Approx. mm²</th>
</tr>
</thead>
<tbody>
<tr>
<td>12*</td>
<td>101</td>
<td>62.7</td>
<td>73.9</td>
</tr>
<tr>
<td>13</td>
<td>119</td>
<td>74.8</td>
<td>88.6</td>
</tr>
<tr>
<td>16</td>
<td>189</td>
<td>113.0</td>
<td>131.0</td>
</tr>
<tr>
<td>19</td>
<td>251</td>
<td>161.0</td>
<td>187.0</td>
</tr>
<tr>
<td>22*</td>
<td>340</td>
<td>213.0</td>
<td>240.0</td>
</tr>
</tbody>
</table>

* no stock material

---

**Please note:**

At the installation stage, double-parallel ropes tend to untwist more than full-steel ropes with a separately stranded IWRC. For this reason, special attention is necessary during installation.

Twisted ropes are damaged in their structure and reveal substantial change in their original properties in terms of load capacity, elongation and service life.

To make correct rope installation easier, especially on high rise installations, DRAKO steel core ropes are produced with a blue marking line.
DRAKO 250 T
8-strand steel core rope

In million ways, the established steel core rope with 8 outer strands in Warrington design also with smaller rope diameters. By intense testing and verification of safety now approved for very low D/d ratio. Also for indirect hydraulic elevators according to EN 81-2.

NEW TÜV Sud Certificate KPD67/2*
- very low D/d ratio of up to 8 mm in diameter
- required drive torque is greatly reduced
- cost saving drives
- space saving in indirect hydraulic elevators thanks to very small pulleys

So customized elevator systems with an optimized cost benefit ratio are possible.

Field of Application
The customer-focused and cost-optimized solution for individually designed and more frequented elevators.

Attention
Special traction ropes acc. to EN 12385-5, EN 81-1. Except for D/d ≤ 40 or rope diameter < 8.0 mm*.

<table>
<thead>
<tr>
<th>Nominal Rope Diameter mm</th>
<th>Minimum Breaking Strength $F_{min}$ 1570 kN</th>
<th>Minimum Breaking Strength $F_{min}$ 1770 kN</th>
<th>Length Mass Approx. kg/100 m</th>
<th>Metallic Cross-section Approx. mm²</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>-</td>
<td>20.8</td>
<td>18.4</td>
<td>18.5</td>
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<tr>
<td>6.5</td>
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<td>31.5</td>
<td>17.9</td>
<td>20.6</td>
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<td>8</td>
<td>43.3</td>
<td>40.6</td>
<td>27.3</td>
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<td>13</td>
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<td>83.4</td>
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<td>-</td>
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<tr>
<td>16</td>
<td>173</td>
<td>-</td>
<td>108.3</td>
<td>126</td>
</tr>
</tbody>
</table>

Please note:
The rope terminations must be secured against rotation.

To make correct rope installation easier, especially on high rise installations, DRAKO steel core ropes are produced with a blue line along the rope. If the ropes have not twisted whilst being installed, the blue line enables, to correct it.

Elevator ropes will be supplied with servings on both ends, if not specified otherwise.

Accessories, such as fitting with thread and symmetric wedge socket, are available and can be inquired.
DRAKO 210 TF and 210 TFS
8-strand steel and fibre core

Steel rope with 8 outer strands and combined steel and fibre core. Thanks to that combined core, this special traction rope offers enhanced cross-elasticity to adapt to unique groove requirements and slightly worn grooves. The fibre core also provides additional storage space for lubricant.

Field of Application
A special traction rope for regularly frequented systems.

**Advantages**
- Large metallic cross-section - i.e. high breaking strength in relation to diameter
- Slightly more deformable cross-section
- Good flexural performance with small deflections
- Low permanent and elastic elongation

### DRAKO 210 TF

<table>
<thead>
<tr>
<th>Nominal Rope diameter mm</th>
<th>Minimum breaking strength F_{min} 1570 KN</th>
<th>Length mass approx. kg/100 m</th>
<th>Metallic cross-section approx. mm²</th>
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<tbody>
<tr>
<td>8</td>
<td>40.0</td>
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<tr>
<td>12*</td>
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<td>64.1</td>
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<tr>
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<td>104</td>
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<td>13*</td>
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<tr>
<td>16</td>
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</table>

* no stock material

### DRAKO 210 TFS

<table>
<thead>
<tr>
<th>Nominal Rope diameter mm</th>
<th>Minimum breaking strength F_{min} 1570 KN</th>
<th>Length mass approx. kg/100 m</th>
<th>Metallic cross-section approx. mm²</th>
</tr>
</thead>
<tbody>
<tr>
<td>8*</td>
<td>39.7</td>
<td>25.0</td>
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<tr>
<td>10*</td>
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<td>13*</td>
<td>102.2</td>
<td>67.0</td>
<td>73.7</td>
</tr>
</tbody>
</table>

* no stock material

Please note:

Ropes in operation are to be relubricated at regular intervals. The combined steel and fibre core does not dispense with the need to relubricate. When changing rope, the somewhat higher rope cross-elasticity does not dispense with the need to rework and/or replace the traction sheave.

Elevator ropes will be supplied with servings on both ends, if not specified otherwise. Accessories, such as fitting with thread and symmetric wedge socket, are available and can be inquired.
Ropes for Traction Sheave Elevators with Fibre Core (FC)

DRAKO 8 x 19 NFC
8-strand suspension ropes with natural fibre core

Field of Application
The rope construction 8 x 19 Scale - NFC, see drawing, is without doubt the worldwide most common traction drive suspension rope. But also the rope construction 8 x 19 Warrington - NFC has its market share in Germany and UK due to better fatigue bending properties.
Anyway, 8-strand ropes with natural fibre core are the best solution for the normal traction drive elevator.
To make correct rope installation easier, especially on high rise installations, DRAKO 8 x 19 - NFC are produced with a yellow marking line.

Advantages
- rounder than 6-strand ropes, i.e. more contact points rope to groove
- deformable in cross-section; i.e. the new rope adapts a little bit to slightly worn out grooves
- wires smaller in diameter; i.e. flexible, good fatigue bending characteristics

Please note:
The rope quality of this rope construction depends on the quality of the fibres and the resulting fibre core. This is the reason, why DRAKO is only using DRAKO-made fibre cores.
As the elevator industry is using ropes for very different purposes, these ropes consequently differ in their construction, their lubrication and their rope grades.
Rope terminations must be secured against rotation.
## DRAKO 8 x 19 NFC

8-strand suspension ropes with natural fibre

### DRAKO 8 x 19 S – FC

<table>
<thead>
<tr>
<th>Nominal Rope diameter mm</th>
<th>Minimum breaking strength $F_{\text{min}}$ 1570 and 1370/1770 kN</th>
<th>Length mass approx. kg/100 m</th>
<th>Metallic cross-section approx. mm²</th>
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### DRAKO 8 x 19 W – FC

<table>
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<th>Minimum breaking strength $F_{\text{min}}$ 1570 and 1370/1770 kN</th>
<th>Length mass approx. kg/100 m</th>
<th>Metallic cross-section approx. mm²</th>
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</thead>
<tbody>
<tr>
<td>8</td>
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* no stock material

### DRAKO 8 x 25 F – FC

<table>
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<th>Minimum breaking strength $F_{\text{min}}$ 1570 and 1370/1770 kN</th>
<th>Length mass approx. kg/100 m</th>
<th>Metallic cross-section approx. mm²</th>
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<tr>
<td>19*</td>
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</tbody>
</table>

* no stock material

To make correct rope installation easier, especially on high rise installations, DRAKO 8 x 19 are produced with a yellow marking line. Elevator ropes will be supplied with seizures on both ends, if not specified otherwise.