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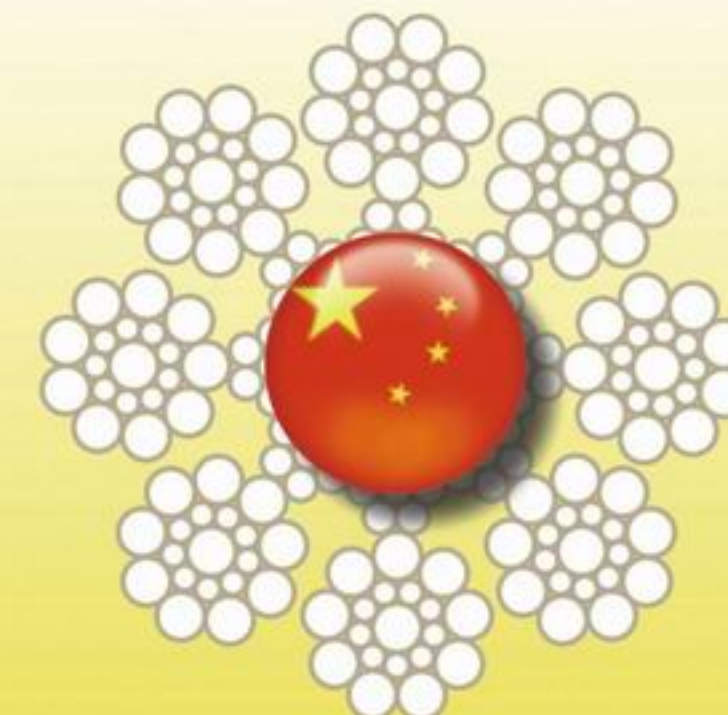
AMIS Ltd.

# ELEVATOR-ROPE

电梯钢丝绳



**German Engineering  
德国工艺**



**Chinese Manufacturing  
中国制造**



**Global Quality  
全球质量**

Gustav Wolf Elevator Rope combines German precision with the enthusiasm of the Chinese workforce in our facility in Suzhou.

We have the technology and skills to manufacture wire ropes which meet global standards for highest quality.

**Gustav Wolf - Made in China for China and the World.**

固丝德夫沃夫苏州结合了德国严谨和中国活力。

固丝德夫沃夫苏州的技术和技能保证产品达到集团高质量标准。

**固丝德夫沃夫—中国制造，  
为中国和全世界提供电梯钢丝绳产品和服务。**

**GUSTAV WOLF**

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ISO 9001:2008  
ISO 14001:2004  
by German TUV



About Us  
公司简介

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Gustav Wolf was established in 1887 and is well known in the elevator and wire rope industry. Headquarters are in Guetersloh, Germany. Six factories located in Germany, France, U.A.E., India and China produce highest quality elevator ropes designed in Germany to meet requirements of the global elevator industry.



固丝德夫沃夫成立于1887年，在电梯和钢丝绳业内久富盛名。集团总部位于德国的居特斯洛，在德国、法国、印度、阿联酋以及中国5个国家拥有6个工厂。固丝德夫沃夫钢丝绳由固丝德夫沃夫公司自行设计和生产的，以满足全球电梯产业的需求。



Gustav Wolf Wire Rope (Suzhou) Co., Ltd. was established in 2007. It is the fourth elevator rope producing factory of Gustav Wolf Germany. Suzhou, as well as all other production plants follow the same severe quality system and specifications which are centralized and controlled at the German Technical Head Quarters. Elevator ropes produced in Suzhou are available according to GB, EN/ISO, BS, JIS, ASTM and customer specific standards.



固丝德夫沃夫钢绳（苏州）有限公司成立于2007年，以德国品质体系与本土化生产管理为中国乃至全球客户提供更高质量的电梯钢丝绳产品、更完美的服务，并且成为电梯钢丝绳国际市场上的领军企业。产品生产标准参照GB, EN, ISO, BS, JIS, ASTM以及客户的特殊要求进行生产。





## Factors Influencing the Rope Service Life 影响钢丝绳使用寿命的因素

For the economic use of elevator ropes, the correct rope construction as well as its long service life are very important. As to the factors influencing the rope service life, we have to differentiate between

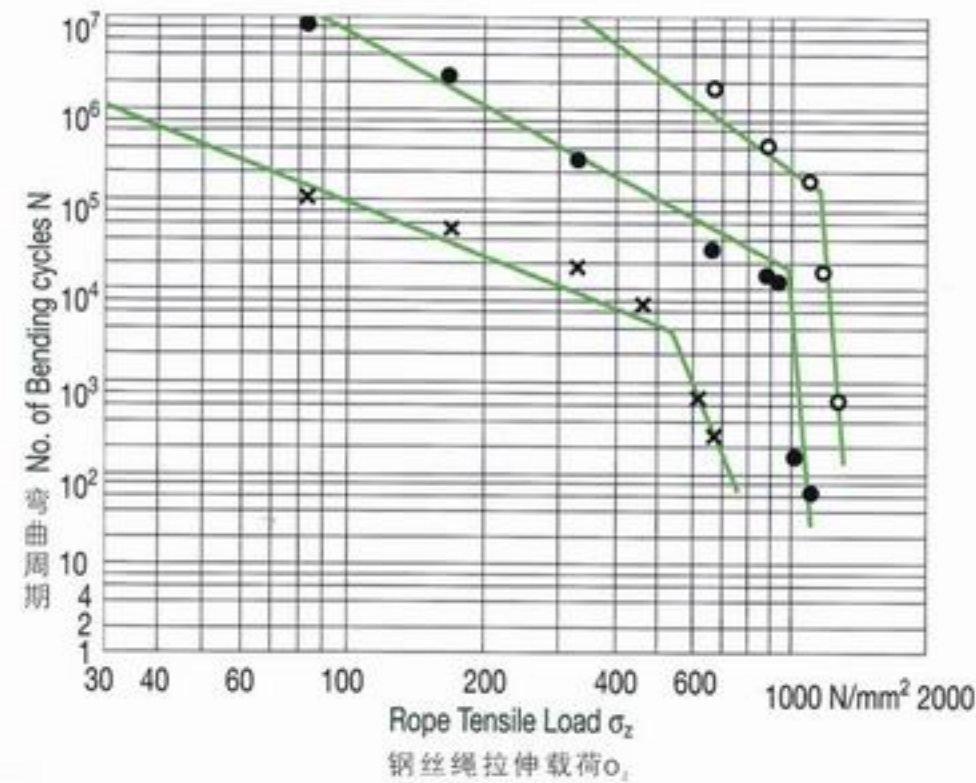
为使电梯钢丝绳使用更经济，合理有效的安装同钢丝绳的自身使用寿命一样重要。对于影响钢丝绳使用寿命的各种因素，我们必须加以区别：

- Influencing factors related to the installation
- Influencing factors related to the operation
- Influencing factors related to the rope
- 与安装有关的影响因素：
- 与操作有关的影响因素：
- 与钢丝绳自身有关的影响因素：

Installation and operational factors are determined by the rope user.

The influencing factors related to the rope are determined by the rope manufacturer. Basic rope-related factors are: Construction, Core, Wire, Lubrication.

与安装和操作有关的影响因素由钢丝绳使用者决定。与钢丝绳有关的影响因素由钢丝绳的制造商决定。跟钢丝绳有关的基本因素是：结构、绳芯、钢丝、润滑。



Number of bending cycles till failure of a Seale-Rope 8x19 with fibre core  
带纤维芯西鲁式 (seale) 钢绳8x19s失效前的弯曲周期

D/d=10 x  
25 ●  
63 ○

Seale FE+8X19.regular lay  
西鲁式FE+8X19.交互捻  
D=8.3mm, Rm:1617N/mm²

Cylinder oil applied to rope surface, not re-lubricated  
钢绳表面涂有发动机用润滑油，无需重新润滑

## Rope construction 结构

Standard rope constructions for elevators are Seale and Warrington with 19 wires per outer stand. Modern elevator ropes are used in 8-or 9-stand construction, including Filler Wire constructions up to 25 wires. Reduction of bending stresses, wear resistance as well as stability towards lateral pressure were considered for the optimization. The design of the construction, i.e. the geometry of the relevant rope type, is done by CAD-system guaranteeing a correct load distribution and wire spacing.

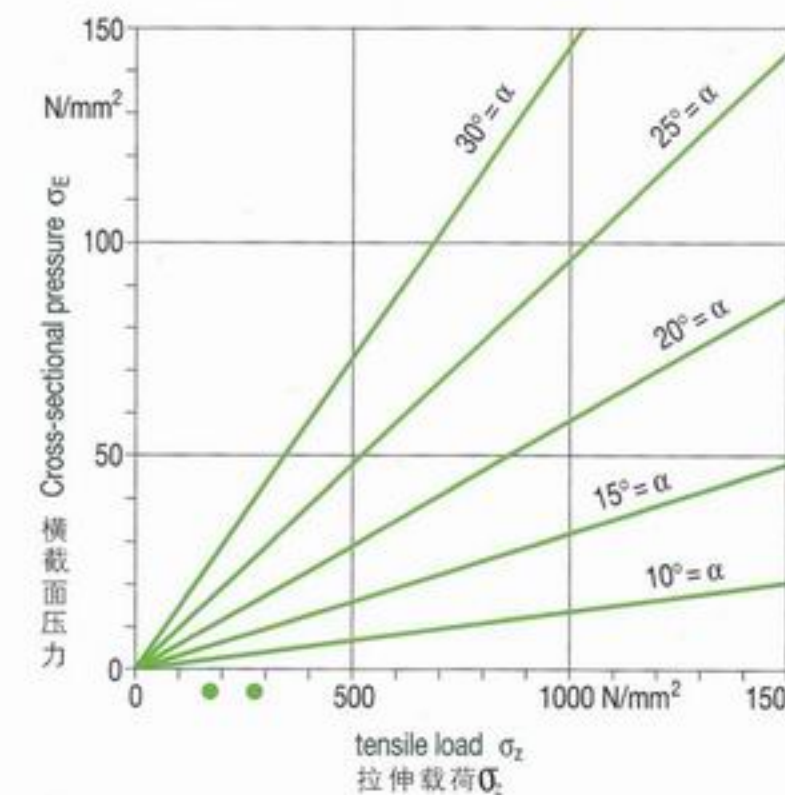
电梯钢丝绳的标准结构包括西鲁式 (seale) 和瓦林吞式 (warrington)，外层每股有19根钢丝。现代电梯钢丝绳采用8股或9股结构，包括填充钢丝，此结构有25根钢丝。在减少弯曲应力、耐磨损和增强对径向压力的稳定性方面进行了优化。我们采用CAD系统设计钢丝绳结构，确保正确的载荷分布和钢丝间距。



## Rope Core 绳芯

Under load, fibre cores of elevator ropes have to absorb considerable transversal pressure from the strands. The fibre core is the key part of the rope which needs special attention regarding material choice and production. Therefore all cores of Gustav Wolf elevator ropes are produced in-house, including Suzhou.

High quality elevator ropes are equipped with a steel-reinforced fibre core or a full steel core.



在受力情况下由于横截面减少，电梯钢丝绳会产生相当大的应力，纤维芯必须能够吸收这些应力。因此，必须特别注意纤维芯的生产过程及使用材料。从选择合适的纱线和带润滑油的设备开始，固丝德夫沃夫电梯钢丝绳芯的生产全部由本公司亲力亲为。因此，我们生产的电梯钢丝绳的绳芯品质是可靠的。

高品质电梯钢丝绳装有钢增强纤维芯或全钢制芯。

Cross-sectional pressure  $\sigma_E$  in relation to tensile load  $\sigma_z$  for parallel lay ropes 8 x 19 with fibre core

平行捻8x19麻芯结构钢丝绳横截面压力与钢绳负载的比例关系



## Wire 钢丝

Our wire is based on GB, JIS, DIN EN 10264-2, ISO 1142, BS.

The nominal wire tensile strength most frequently used is 1570 N/mm<sup>2</sup>. For semi-hydraulic elevators or tempered driving pulleys the tensile strength 1770 N/mm<sup>2</sup> is also used. Elevators with soft driving pulleys require the use of ropes with mixed tensile strengths (outer layer 1180 N/mm<sup>2</sup> or 1370 N/mm<sup>2</sup>, inner layer 1770 N/mm<sup>2</sup>-GW type DT) or as weight compensation rope (outer layer 680 N/mm<sup>2</sup>, inner layer 1250 N/mm<sup>2</sup>-GW type Iron Grade).

我们的产品符合GB, JIS, DIN EN 10264-2, ISO 1142和BS标准

对于电梯钢丝绳而言，最常用的钢丝抗拉公称强度是1570N/mm<sup>2</sup>。对于半水压电梯或回火主动滑轮，抗拉强度也可采用1770N/mm<sup>2</sup>。带有软主动滑轮的升降机需要使用带有混合拉伸强度的钢丝绳（外层为1180N/mm<sup>2</sup>或1370N/mm<sup>2</sup>，内层为1770N/mm<sup>2</sup>）或者重量补偿钢丝绳（外层为680N/mm<sup>2</sup>，内层1250N/mm<sup>2</sup>-GW型Iron Grade）。



## Lubrication 润滑

During production, Gustav Wolf ropes are carefully lubricated and ready for operation. The specific design of the steel core of the rope types PAWO F 3 and PAWO F 7 is particularly suitable for a precise internal rope lubrication.

在制造过程中，我们为电梯钢丝绳涂上了润滑油以供运行使用。PAWO F3和PAWO F7钢丝绳钢芯的设计特别适合对钢丝绳内部进行精确润滑。

## Rope Application 钢丝绳的应用

For the various designs of elevators, the rope is subject to very different Stresses. The design and choice of the suitable construction is done by optimizing between:

- high bending resistance
- high resistance to abrasion
- low elongation

由于电梯的设计类型不同，钢丝绳所产生的应力也不同。我们通过对以下性能进行优化来设计和选取合适的结构：

- 高抗弯曲性能：
- 高耐磨损性能：
- 低延伸率：

### Types of rope drives

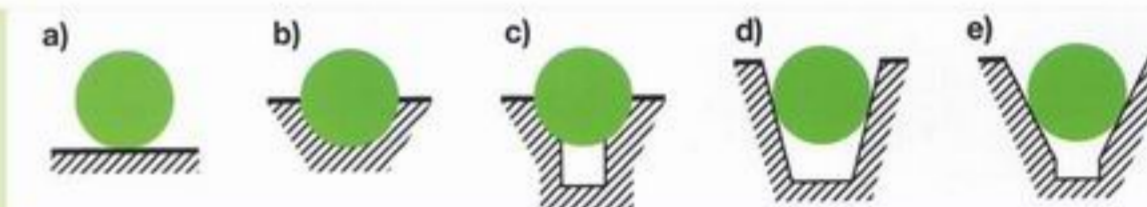
- 1 cabin
- 2 counterweight
- 3 traction sheave (drum)
- 4 rope pulley
- 5 idle pulley



### 钢丝绳使用的类型

- 1.轿厢
- 2.平衡重
- 3.牵引滑轮（鼓轮）
- 4.绳索滑轮
- 5.惰轮

## Sheave grooves 牵引滑轮绳槽



Traction sheaves are made from cast iron. Both non-hardened as well as hardened pulleys are in service.

Depending on the required friction, different groove shapes are used within the driving pulley. Sometimes, the rope is guided well (round groove) or pressed into the groove (V-groove), thus creating enormous transversal pressures on the rope cross section.

牵引滑轮由铸铁制造。非硬化和硬化润滑皆可使用。

根据需要的摩擦力，在主动滑轮中采用不同形状绳槽。有时，钢丝绳被较好地导入（圆形绳槽）或压入（V型绳槽）绳槽，从而在钢丝绳的横截面产生了很大的径向压力。

### Groove types

1. even drum
2. round groove with out undercut
3. undercut round groove
4. V-groove
5. undercut V-groove

### 绳槽类型

- 1.平滑鼓盘式
- 2.不带底槽的圆形绳槽
- 3.带底槽的圆形绳槽
- 4.V型绳槽
- 5.带底槽的V型绳槽



## Rope Service Life 钢丝绳的使用寿命



In some cases, the rope service life can be reduced substantially by the individual groove types.

在某些情况下，绳槽的特殊类型会使钢丝绳的使用寿命大大降低。

	r/d	fN3
Round Groove 圆形绳槽r/d	0.53	1.00
	0.55	0.79
	0.60	0.66
	0.70	0.54
	0.80	0.51
	1.00	0.48

	γ	fN3
V-groove, V-angle γ V型绳槽V型夹角	35°	0.054
	36°	0.066
	38°	0.095
	40°	0.14
	42°	0.18
45°	0.25	

Correction factors according to Feyrer, Drahtseile  
根据feyrer的修正因数fN3

	α	fN3
Undercut groove Undercut angle α 半空槽的圆形绳槽	75°	0.40
	80°	0.33
	50°	0.26
	90°	0.20
	95°	0.15
	100°	0.10
	105°	0.066

Correction factors fN3 acc. to Feyrer: r-groove radius d-nominal rope diameter  
根据feyrer的修正因数fN3  
r-绳槽半径  
d-钢丝绳公称直径

## Rope Selection Recommendation 电梯钢丝绳选型推荐

Rope Specification	Wire Tensile Grade	Wire Hardness	Elevator Speed	Rope Lifetime*
F819 S-FE	1570	400	≤ 2.5m/s	100%
F819 W-FE	1570	400	≤ 2.5m/s	100%
F819 S-FE DT	1370/1770	360/450	≤ 2.5m/s	100%
POWO F3	1570	400	≤ 6m/s	140%
POWO F7	1570	400	≤ 6m/s	140%
POWO F7 S	1570	400	6-10m/s	250%
POWO F10	1570	400	>6m/s	270%

型号	抗拉强度	硬度 ( HB)	适用电梯速度	使用寿命
F819 S-FE	1570	400	≤ 2.5m/s	100%
F819 W-FE	1570	400	≤ 2.5m/s	100%
F819 S-FE DT	1370/1770	360/450	≤ 2.5m/s	100%
POWO F3	1570	400	≤ 6m/s	140%
POWO F7	1570	400	≤ 6m/s	140%
POWO F7 S	1570	400	6-10m/s	250%
POWO F10	1570	400	>6m/s	270%



## Rope Selection 钢丝绳的选择

Elevator ropes have to be selected according to their application and operation. Wear resistance in the driving pulley as well as fatigue bending resistance in relation to the rope reeving have to be considered here.

### F819 S-FE and F819 W-FE Elevator Ropes with Fibre Core

These ropes are used in many standard elevators and meet the technical values of the DIN ISO for elevator ropes. They are produced in Seale or Warrington construction.

### PAWO F3 Special Rope with Steel Reinforced Core for Elevators

As an approved lifting component for traction sheave elevators we offer our elevator rope according to works standard PAWO F 3. This rope has been approved for decades in manifold applications. The outer strands of the rope are designed in Seale construction. The 9 thick wires each of the outer layer offer an increased wear resistance. This rope is particularly used in installations where the rope service life is determined to an increased extent by the attack of the driving pulley rather than fatigue bending. On account of the steel rope core, a higher metallic cross section is achieved, combined with excellent elongation behaviour. Deformations of the rope cross-section, e.g. in V-grooves, are reduced noticeably. The fibre share in the steel wire rope core serves as a lubricant depot.

### PAWO F7 Special Rope with Steel Reinforced Core for Elevators

The rope PAWO F 7 was included in our programme as a development of the rope PAWO F 3. The outer strands of the rope are designed in Warrington construction. This rope is particularly used in installations where the rope service life is determined to an increased extent by the share of fatigue bending on driving pulleys and deflection pulleys rather than wear of the outer wires. The steel wire rope core offers good elongation behaviour and prevents to a large extent the deformation of the rope cross section when passing from the round groove of the deflection sheave e.g. into the V-groove of the traction sheave and vice versa.

必须根据应用和运行场合来选择钢丝绳。选择时既要考虑主动滑轮中的耐磨性能又要考虑与钢丝绳支索有关的抗弯曲疲劳性能。

### F819 S-FE 和 F819 W-FE 带纤维芯的电梯钢丝绳

这类钢丝绳应用在许多标准电梯上,并且满足DINISO中有关电梯钢丝绳的技术要求。这类钢丝绳分为西鲁式(Seale)或瓦林吞式(Warrington)结构。

### PAWO F3 带钢制增强芯的电梯专用钢丝绳

作为牵引滑轮式的一种合适吊装部件,我们提供的电梯钢丝绳符合工厂标准PAWO F3。几十年来,这种钢丝绳被广泛用于许多场合。这种钢丝绳的外部股设计为西鲁式(Seale)结构。外层每股有9根钢丝,增强了耐磨损性能。这种钢丝绳主要用于那些钢丝绳使用寿命受主动滑轮的影响而不是由弯曲疲劳所决定的电梯中。钢制绳芯增加了金属横截面积并且具有优良的延展性能,大大减少钢丝绳横截面的变形,如在V形绳中。钢制绳芯中的纤维部分可以起着储存润滑油的作用。

### PAWO F7 带钢制增强芯的电梯专用钢丝绳

在我们的设计中,PAWO F7钢丝绳被认为是PAWO F3钢丝绳的改进。钢丝绳外层股被设计为瓦林吞式(Warrington)结构,主要应用于钢丝绳使用寿命在更大程度上由主动滑轮和偏心滑轮的疲劳弯曲决定而不是由外层钢丝的磨损决定的场合。这种钢制钢丝绳芯具有良好的延展性能,并且当钢丝绳从偏心滑轮的圆形绳槽进入引滑轮的V形槽时,能够有效防止钢丝绳的变形。

### PAWO F7S Special Full Steel Rope for Elevators

The outer strands of the rope are designed in Warrington construction. The rope is mainly used in installations where the rope service life is influenced more by the share of fatigue bendings. The independent wire rope core reduces the elongation and offers an additional metallic cross-section in comparison to the rope PAWO F 7.

### PAWO F10 Special Full Steel Rope with 9 outer strands

For elevator installations with even higher demands than covered by the ropes PAWO F 3 and PAWO F 7 we developed the rope PAWO F 10. With its 9-strand-construction this rope allows an excellent seat of the round rope surface in the rope sheave. The flexibility is also increased. The very compact design of the core offers an additional metallic cross section.

### PAWO 819W Full Steel Rope

The rope PAWO 819W is an 8-strand-rope in Warrington construction with a tensile strength of 1770 N/mm<sup>2</sup>. As these ropes offer a low elongation, this advantage is often used for the construction of hydraulic elevators.

### PAWO F 4e and PAWO F 5e Special Rope with Electrical Conductors for Maintenance Platforms

These ropes include one or more electrical conductors to perform steering or work functions. DIN EN 1808 specifies the demands for steel wire ropes with electrical conductors. Large buildings are equipped with PAWO ropes of this type.

### PAWO F7S 全钢芯电梯专用钢丝绳

这种钢丝绳的外层股设计成瓦林吞式(Warrington)结构。主要用于钢丝绳的使用寿命受弯曲疲劳影响较大的设备。与钢丝绳PAWO F7相比,独立的钢丝绳芯减少了延伸率,并额外增加了金属横截面积。

### PAWO F10 9股全钢芯电梯专用钢丝绳

对于需要比PAWO F3和PAWO F7性能更高的钢丝绳的电梯,我们研制了PAWO F10。该钢丝绳采用9股结构,能够在绳索滑轮中更贴合圆形绳槽。钢丝绳的柔韧性也得到增强。钢丝绳芯的紧凑设计增加了金属横截面积。

### PAWO 819W 全钢芯钢丝绳

PAWO 819W钢丝绳是瓦林吞式(Warrington)结构的8股钢丝绳,抗拉强度为1770N/mm<sup>2</sup>。由于这种钢丝绳具有较低延伸率,因而常用于液压电梯结构。

### PAWO F 4e 和 PAWO F 5e 带电缆芯的吊篮专用钢丝绳

这种钢丝绳内部带有一个或者更多的电缆芯,电缆芯用来完成操纵或运行功能。DIN EN1808 规定了对带电缆芯的钢丝绳的要求。大型建筑一般装有这类PAWO钢丝绳。

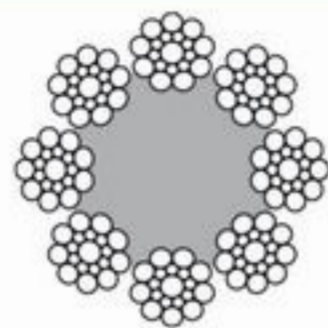


Hoist Ropes  
曳引钢丝绳

**F819 S-FE**  
Elevator rope with fibre core 纤维芯电梯钢丝绳

• Tensile Grade: 1570N/mm<sup>2</sup>, Also available in other grades and standards, such as JIS, etc.  
• 抗拉强度: 1570N/mm<sup>2</sup>, 也可生产提供符合JIS和其它标准的电梯钢丝绳。

Part Number 产品编号	Rope-∅ 直径 mm	calculated mass 计算质量 kg/m	minimum breaking load 最小破断拉力 kN
621208010	8	0.215	30.5
621209010	9	0.270	38.4
621210010	10	0.340	48.2
621211010	11	0.411	58.4
621212010	12	0.488	69.2
621213010	13	0.579	80.7
621214010	14	0.667	93.0
621215010	15	0.774	108.0
621216010	16	0.871	121.0
621218010	18	1.087	154.0
621219010	19	1.213	171.0
621220010	20	1.346	188.0

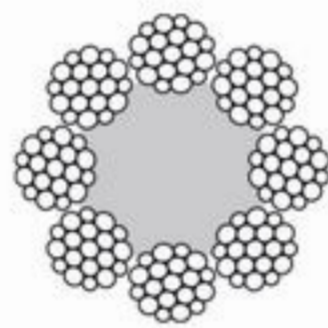


Construction: 8\*19 Seale with fiber core, regular lay  
Number of Load bearing wire 152  
结构: 8x19,纤维芯, 西鲁式, 交互捻  
承载钢丝数量:152

**F819 W-FE**  
Elevator rope with fibre core 纤维芯电梯钢丝绳

• Tensile Grade: 1570N/mm<sup>2</sup>, Also available in other grades and standards, such as JIS, etc.  
• 抗拉强度: 1570N/mm<sup>2</sup>, 也可生产提供符合JIS和其它标准的电梯钢丝绳。

Part Number 产品编号	Rope-∅ 直径 mm	calculated mass 计算质量 kg/m	minimum breaking load 最小破断拉力 kN
631208010	8	0.230	31.9
631209010	9	0.290	40.7
631210010	10	0.350	49.9
631211010	11	0.430	60.2
631212010	12	0.500	71.2
631213010	13	0.590	83.3
631214010	14	0.690	97.1
631215010	15	0.780	110.9
631216010	16	0.890	126.0
631218010	18	1.120	157.4
631219010	19	1.250	178.2
631220010	20	1.390	197.1

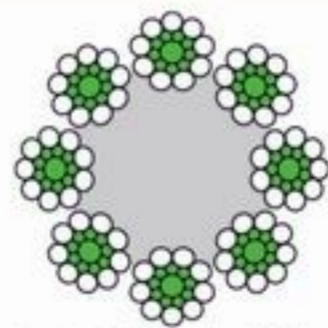


Construction: 8\*19 Warrington with fiber core, regular lay  
Number of Load bearing wire 152  
结构: 8x19,纤维芯, 瓦林吞式, 交互捻  
承载钢丝数量:152

**F819 S-FE DT**  
Elevator rope with fibre core 纤维芯电梯钢丝绳

• Tensile Grade: 1370/1770N/mm<sup>2</sup> Dual Tensile, Also available in other grades and standards, such as JIS, etc.  
• 抗拉强度: 1370/1770N/mm<sup>2</sup>双强度, 也可生产提供符合JIS和其它标准的电梯钢丝绳。

Part Number 产品编号	Rope-∅ 直径 mm	calculated mass 计算质量 kg/m	minimum breaking load 最小破断拉力 kN
621108010	8	0.220	30.5
621109010	9	0.280	38.4
621110010	10	0.350	48.2
621111010	11	0.430	58.4
621112010	12	0.500	69.2
621113010	13	0.590	80.7
621114010	14	0.680	93.0
621115010	15	0.780	108.0
621116010	16	0.890	121.0
621118010	18	1.110	154.0
621119011	19	1.260	171.0
621120011	20	1.400	188.0



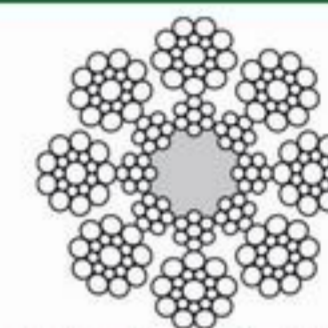
Construction: 8\*19 Seale with fiber core, regular lay  
Number of Load bearing wire 152  
结构: 8x19,纤维芯, 西鲁式, 交互捻  
承载钢丝数量:152

Hoist Ropes  
曳引钢丝绳

**PAWO F3**  
Special elevator rope with steel reinforced fibre core 钢制增强纤维芯特殊电梯钢丝绳

• Tensile Grade: 1570N/mm<sup>2</sup>, Also available in other grades and standards, such as JIS, etc.  
• 抗拉强度: 1570N/mm<sup>2</sup>, 也可生产提供符合JIS和其它标准的电梯钢丝绳。

Part Number 产品编号	Rope-∅ 直径 mm	calculated mass 计算质量 kg/m	minimum breaking load 最小破断拉力 kN
761206531	6.5 *)	0.161	25.9
761207031	7	0.188	29.4
761208031	8	0.243	38.0
761209031	9	0.307	48.3
761210032	10	0.385	60.5
761211031	11	0.466	73.4
761212031	12	0.551	86.8
761213031	13	0.656	103.1
761214031	14	0.759	119.3
761215031	15	0.875	137.6
761216031	16	0.984	154.8
761218031	18	1.230	193.6
761219031	19	1.380	217.6
761220031	20	1.530	241.5



Construction: 8 x 19 Seale with steel reinforced core, regular lay  
Number of load bearing wires: 152  
结构: 8x19,带钢制增强芯西鲁式, 交互捻  
承载钢丝数量:152  
\*)∅6.5 mm: 114 load bearing wires (6 x 19 S)  
直径6.5 mm: 承载钢丝数量114 (6 x 19 西鲁式)

**PAWO F7**  
Special elevator rope with steel reinforced fibre core 钢制增强纤维芯特殊电梯钢丝绳

• Tensile Grade: 1570N/mm<sup>2</sup>, Also available in other grades and standards, such as JIS, etc.  
• 抗拉强度: 1570N/mm<sup>2</sup>, 也可生产提供符合JIS和其它标准的电梯钢丝绳。

Part Number 产品编号	Rope-∅ 直径 mm	calculated mass 计算质量 kg/m	minimum breaking load 最小破断拉力 kN
631208034	8	0.258	40.6
631209034	9	0.329	51.8
631210034	10	0.403	63.4
631211034	11	0.488	76.8
631212034	12	0.576	90.7
631213034	13	0.671	105.0
631214034	14	0.790	124.3
631215034	15	0.889	139.9
631216034	16	1.020	160.4
631218034	18	1.279	201.2
631219034	19	1.434	225.6
631220034	20	1.589	250.1



Construction: 8 x 19 Warrington with steel reinforced core, regular lay  
Number of load bearing wires: 152  
结构: 8x19,带钢制增强芯,瓦林吞式, 交互捻  
承载钢丝数量:152





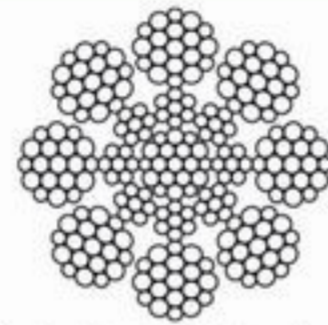
Hoist Ropes  
曳引钢丝绳

**PAWO F7 S**

**Special - full steel rope for elevators 特殊-全钢制钢丝绳芯钢丝绳**

• Tensile Grade : 1570N/mm<sup>2</sup>, Also available in other grades and standards, such as JIS, etc.  
• 抗拉强度: 1570N/mm<sup>2</sup>, 也可生产提供符合JIS和其它标准的电梯钢丝绳。

Part Number 产品编号	Rope- $\varnothing$ 直径 mm	calculated mass 计算质量 kg/m	minimum breaking load 最小破断拉力 kN
631208033	8	0.280	44.6
631209032	9	0.356	56.0
631210033	10	0.436	69.5
631211032	11	0.528	83.1
631212032	12	0.628	98.9
631213033	13	0.727	116.0
631214031	14	0.857	134.8
631215032	15	0.972	152.8
631216032	16	1.105	176.1
631218031	18	1.388	218.6
631219031	19	1.555	245.2
631220031	20	1.718	270.8



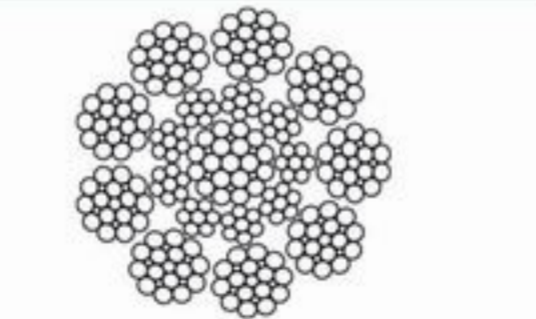
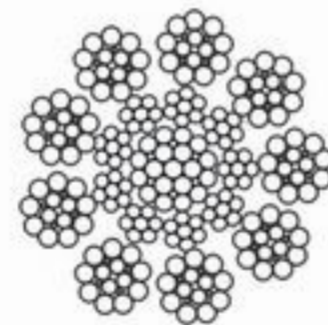
Construction: 8 x 19 Warrington with IWRC, regular lay  
Number of load bearing wires: 152  
结构: 8x19, 带全钢制钢丝绳芯, 瓦林吞式, 交互捻  
承载钢丝数量: 152

**PAWO F10**

**Special - full steel rope for elevators with 9 outer stands 特殊-外层为9股的全钢制钢丝绳**

• Tensile Grade : 1570N/mm<sup>2</sup>, Also available in other grades and standards, such as JIS, etc.  
• 抗拉强度: 1570N/mm<sup>2</sup>, 也可生产提供符合JIS和其它标准的电梯钢丝绳。

Part Number 产品编号	Rope- $\varnothing$ 直径 mm	calculated mass 计算质量 kg/m	minimum breaking load 最小破断拉力 kN
721208032	8	0.270	43.2
721209031	9	0.350	50.4
721210032	10	0.419	67.2
721211032	11	0.503	80.2
721212032	12	0.600	95.6
721213032	13	0.707	113.4
721214031	14	0.880	122.7
721215031	15	1.000	140.3
721216032	16	1.080	174.0
721218030	18	1.410	200.0
721219031	19	1.610	224.7
721220031	20	1.780	250.0



Construction: Full steel rope with 9 outer strands, regular lay  
结构: 外层为9股的全钢制钢丝绳, 交互捻

Number of load bearing wires 承载钢丝数量:  
 $\varnothing$  8 - 12 mm: 117 load bearing wires  
 $\varnothing$  8 - 20 mm: 144 load bearing wires  
 $\varnothing$  8 - 12 mm: 承载钢丝数量117  
 $\varnothing$  8 - 20 mm: 承载钢丝数量144

Compensation Hydraulic Ropes  
补偿钢丝绳

**PAWO 819W**

**Full steel rope for Hydraulic Lifts / Weight Compensation**

全钢芯钢丝绳用于  
液压升降机/重量补偿

• Tensile Grade : 1770N/mm<sup>2</sup>, Also available in other grades and standards, such as JIS, etc.  
• 抗拉强度: 1770N/mm<sup>2</sup>, 也可生产提供符合JIS和其它标准的电梯钢丝绳。

Part Number 产品编号	Rope- $\varnothing$ 直径 mm	calculated mass 计算质量 kg/m	minimum breaking load 最小破断拉力 kN
741308030	8	0.27	46.0
741309033	9	0.34	58.8
741310032	10	0.40	70.3
741311031	11	0.51	87.0
741312030	12	0.63	107.0
741313033	13	0.73	123.0



Construction: 8 x 19 Warrington with IWRC, regular lay  
Number of load bearing wires: 152

结构: 8x19, 带全钢制钢丝绳芯, 瓦林吞式, 交互捻  
承载钢丝数量: 152

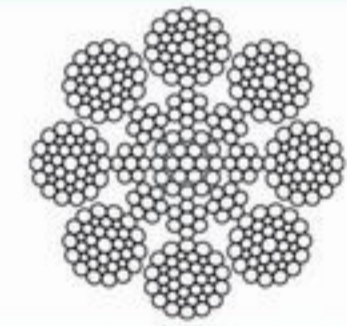
**PAWO 836WS (Imported)**

**Full steel rope for Hydraulic Lifts / Weight Compensation**

全钢芯钢丝绳用于  
液压升降机/重量补偿

• Tensile Grade : 1770N/mm<sup>2</sup>, Also available in other grades and standards, such as JIS, etc.  
• 抗拉强度: 1770N/mm<sup>2</sup>, 也可生产提供符合JIS和其它标准的电梯钢丝绳。

Part Number 产品编号	Rope- $\varnothing$ 直径 mm	calculated mass 计算质量 kg/m	minimum breaking load 最小破断拉力 kN
741313032	13	0.73	124.0
741314081	14	0.84	135.9
741315030	15	0.96	158.0
741316032	16	1.10	188.8
741318032	18	1.38	229.3
741320032	20	1.71	285.0
741322030	22	2.060	342.3



Construction: 8 x 36 Warrington-Seale with IWRC, regular lay  
Number of load bearing wires: 288

结构: 8x36, 带全钢制钢丝绳芯, 瓦林吞式, 交互捻  
承载钢丝数量: 288





Ropes with Electrical Conductors

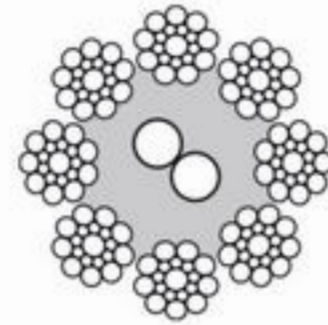
吊篮钢丝绳

**PAWO F4e (Imported)**

Special rope with electrical conductors for maintenance platforms 带电缆芯的吊篮专用钢丝绳

• Tensile Grade: 1770N/mm<sup>2</sup>. Also available in other grades and standards, such as JIS, etc.  
 • 抗拉强度: 1770N/mm<sup>2</sup>, 也可生产提供符合JIS和其它标准的电梯钢丝绳。

Part Number 产品编号	Rope- $\varnothing$ 直径 mm	calculated mass 计算质量 kg/m	minimum breaking load 最小破断拉力 kN	electrical conductor (cross-section) 电缆芯 (横截面) mm <sup>2</sup>
775306530	6.5	0.163	21.9	2 x 0.60
775307030	7	0.198	26.1	2 x 0.60
775308030	8	0.254	33.2	2 x 0.96
775309030	9	0.311	42.3	2 x 0.96
775310030	10	0.374	51.9	2 x 0.96
775311030	11	0.453	63.0	2 x 0.96
775312030	12	0.572	80.4	2 x 0.96
775313030	13	0.657	93.1	2 x 0.96
775314032	14	0.718	102.0	2 x 0.96
775316032	16	0.967	139.3	2 x 0.96



Construction: 152 wires Seale, regular lay  
 Standard construction of the conductor:  
 2 strands  
 Special manufacture of electrical conductors  
 consisting of 3 or more strands on request  
 Number of load bearing wires: 152

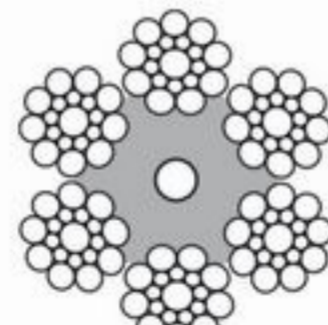
结构: 152根钢丝, 西鲁式, 交互捻  
 导线的标准结构: 2股, 带3股或3股以上的电缆芯的  
 钢丝绳需要定制  
 承载钢丝数量: 152

**PAWO F5e (Imported)**

Special rope with electrical conductors for maintenance platforms 带电缆芯的吊篮专用钢丝绳

• Tensile Grade: 1770N/mm<sup>2</sup>. Also available in other grades and standards, such as JIS, etc.  
 • 抗拉强度: 1770N/mm<sup>2</sup>, 也可生产提供符合JIS和其它标准的电梯钢丝绳。

Part Number 产品编号	Rope- $\varnothing$ 直径 mm	calculated mass 计算质量 kg/m	minimum breaking load 最小破断拉力 kN	electrical conductor (cross-section) 电缆芯 (横截面) mm <sup>2</sup>
775306532	6.5	0.155	24.70	0.96
775307032	7	0.179	29.60	0.96
775308032	8	0.234	38.20	0.96
775309032	9	0.296	48.20	0.96
775310033	10	0.366	61.95	0.96
775311031	11	0.442	71.84	0.96
775312033	12	0.526	87.38	0.96
775313033	13	0.618	98.94	0.96
775316033	16	0.935	153.29	0.96



Construction: 114 wires Seale, regular lay  
 Standard construction of the conductor: 1 strand  
 Number of load bearing wires: 114

结构: 114根钢丝, 西鲁式, 交互捻  
 导线的标准结构: 1股  
 承载钢丝数量: 114

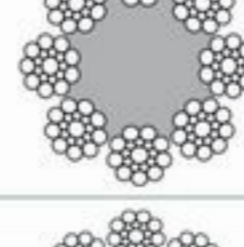
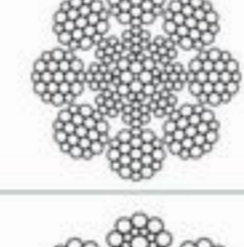
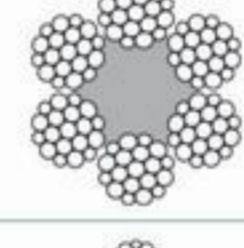
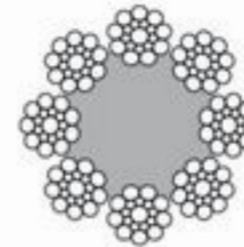
Governor Ropes

限速器钢丝绳

**PAWO F1 - Ropes for Over Speed Governors 用于加速控制器的钢丝绳**

• Tensile Grade: 1570N/mm<sup>2</sup> or 1770N/mm<sup>2</sup>. Also available in other grades and standards, such as JIS, etc.  
 • 抗拉强度: 1570N/mm<sup>2</sup> 或 1770N/mm<sup>2</sup>, 也可生产提供符合JIS和其它标准的电梯钢丝绳。

Part Number 产品编号	Rope- $\varnothing$ 直径 mm	Construction 结构	calculated mass 计算质量 kg/m	minimum breaking load 最小破断拉力 kN
601306010 605306012	6.0	6 x 19s - FC/PP 1770 sZ	0.122	21.00
605306030	6.0	6 x 19 - WSC <sup>1</sup> 1770 sZ	0.153	26.00
601306510 605306510	6.5	6 x 19S - FC/PP 1770 sZ	0.148	24.70
761206531	6.5	6 x 19 S - IWRC with FC/PP 1570 sZ PAWO F3	0.16	25.90
591306510	6.5	6 x 19 W + FC <sup>1</sup> 1770 sZ	0.160	25.80
741306531	6.5	8 x 19 W - IWRC <sup>2</sup> 1770 sZ PAWO 819W	0.170	29.70
601306010	8.0	6 x 19S - FC/PP 1770 sZ	0.219	37.40
761208031	8.0	8 x 19 S - IWRC <sup>2</sup> with FC/PP 1570 sZ PAWO F3	0.243	38.00





Discarding Criteria  
报废标准

• Examination according to visible wire breaks 根据可视断丝  
DIN 15 020-Sheet 2 transmission groups 2m-5m 标准DIN 15 020-检查表2 分类组2m-5m

Number of permissible wire breaks for elevator ropes

Rope specifications	Rope- $J$ constructions	Number of load bearing wires in the outer strands	number of visible wire breaks on a length of 6 x Rope- $\varnothing$	number of visible wire breaks on a length of 30 x Rope- $\varnothing$
钢丝绳规格	直径/结构	承载钢丝数量	在长度为钢丝绳直径6倍的范围内可看到的断裂钢丝数	在长度为钢丝绳直径30倍的范围内可看到的断裂钢丝数
F819 S-FE		152	10	20
F819 W-FE		152	13	26
F819 S-FE DT		152	10	20
PAWO F3	$\varnothing 6,5 \text{ mm}$	114	6	12
	$\varnothing 7 - 20 \text{ mm}$	152	10	20
PAWO F7	$\varnothing 8 - 20 \text{ mm}$	152	13	26
PAWO F7S	$\varnothing 8 - 20 \text{ mm}$	152	13	26
PAWO F10	$\varnothing 6 - 12 \text{ mm}$	117	10	20
	$\varnothing 13 - 20 \text{ mm}$	144	13	26
PAWO 819W		152	13	26
PAWO 836WS		288	24	48
PAWO F4e		152	10	20
PAWO F5e		114	6	12
PAWO F1	6 x 19	114	10	20
	6 x 19 S	114	6	12
	6 x 19 W	114	10	20
	8 x 19 S	152	10	20
	8 x 19 W	152	13	26

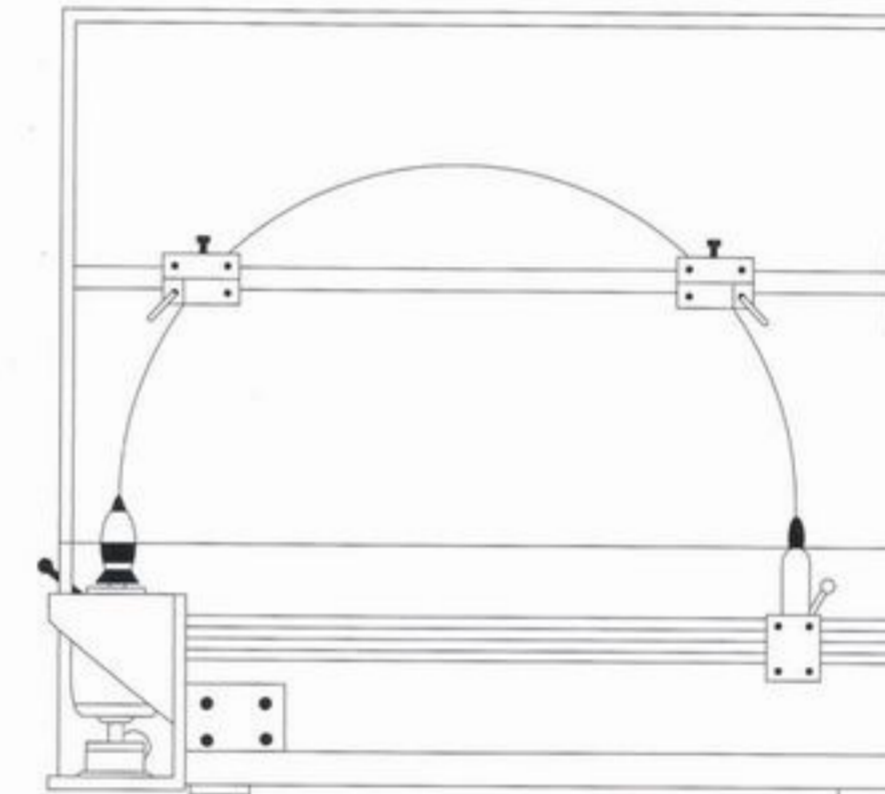
For further surveillance( e.g. judgement of rope diameter) the requirements of DIN 15 020 ISO4309 sheet 23.4 have to be observed.

要进一步检查，如对绳子直径检测，必须根据DIN 15 020、ISO4309表格 23.4的规定观察钢丝绳外观。

Quality Assurance  
质量保证

Gustav Wolf is ISO 9001 and 14001 certified by the German TUV. Incoming control, production and pre-shipment control of all products are liable to strict regulations. In Germany, a company-owned laboratory is available for the development. Physical as well as chemical testing are done with comprehensive laboratory equipment. Integrated testing machines enable statistic long-term evaluations.

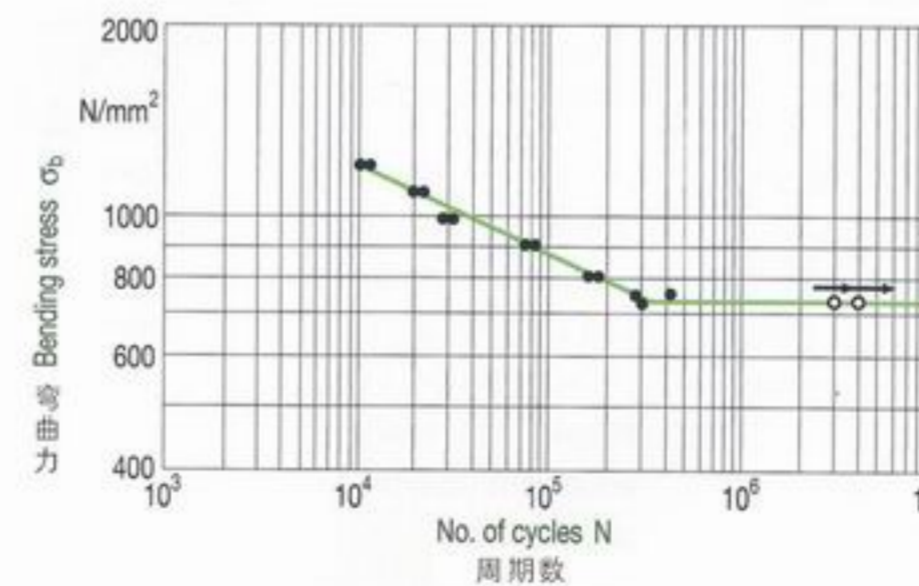
固丝德夫沃夫通过了ISO 9001、ISO 14001和TUV认证。所有产品的生产控制和装运前控制均遵守严格的规定。在德国公司拥有用于研发的实验室。采用完善的实验设备进行物理和化学检测。完善的检测机械保证了长期统计评估的进行。



Wire rotation bending machine IFT stuttgart  
钢丝旋转弯曲机械IFT stuttgart



Rope fatigue life testing machine  
钢丝绳弯曲疲劳试验机



Wire diameter:  
钢丝直径: 1.06mm  
Tensile strength R<sub>m</sub>:  
抗拉强度: 2078N/mm<sup>2</sup>  
R<sub>10.2</sub>  
Rp0.2: 1806N/mm<sup>2</sup>  
Rotating bending fatigue  $\sigma_{bw}$ ,  
旋转弯曲疲劳试验 $\sigma_{bw}$ : 720N/mm<sup>2</sup>  
Wöhler-curve from wire rotation bending  
钢丝旋转弯曲Wöhler曲线



Handling · Installation · Maintenance

维护 · 安装 · 保养



Installation

During installation any twisting of the ropes should be avoided, especially in case of large heights. Free rope ends will start untwisting under their own weight. Once the installation has been completed, the end terminations must be secured against twists.

Rope Tension

It is important to tension the ropes equally directly after the installation and during subsequent inspections, thus avoiding different wear of grooves and rope. Rope Tension Devices can be supplied by Gustav Wolf.

安装

安装钢丝绳的时候要避免扭曲，特别是负载很大的时候。钢丝绳的绳端由于自身的重量而不会扭曲。一旦安装完成，一定要确认绳端不会产生扭曲。

钢丝绳张紧

在钢丝绳安装完成后续的检查过程中，张紧钢丝绳是非常重要的，这样可以避免钢丝绳和绳槽之间的磨损。固丝德夫沃夫提供钢丝绳张紧设备。



Re-Lubrication

Particularly for heavy-duty installations the service life of a rope will be considerably prolonged on account of timely and regular re-lubrication. The lubrication will reduce wear and avoid corrosion. During the process of re-lubrication, only small quantities should be applied to the complete rope length.

For Gustav Wolf traction sheave ropes we recommend our, Rope Lubricant T86. (See page 20) T86 is fluid and able to creep, thus easily penetrating the rope interior.

重新润滑

定时定期的重新润滑会大大延长钢丝绳的使用寿命，特别是对重载设备。润滑可以减少磨损，避免腐蚀。在重新润滑过程中，只需少量润滑剂就可以润滑整根钢绳。

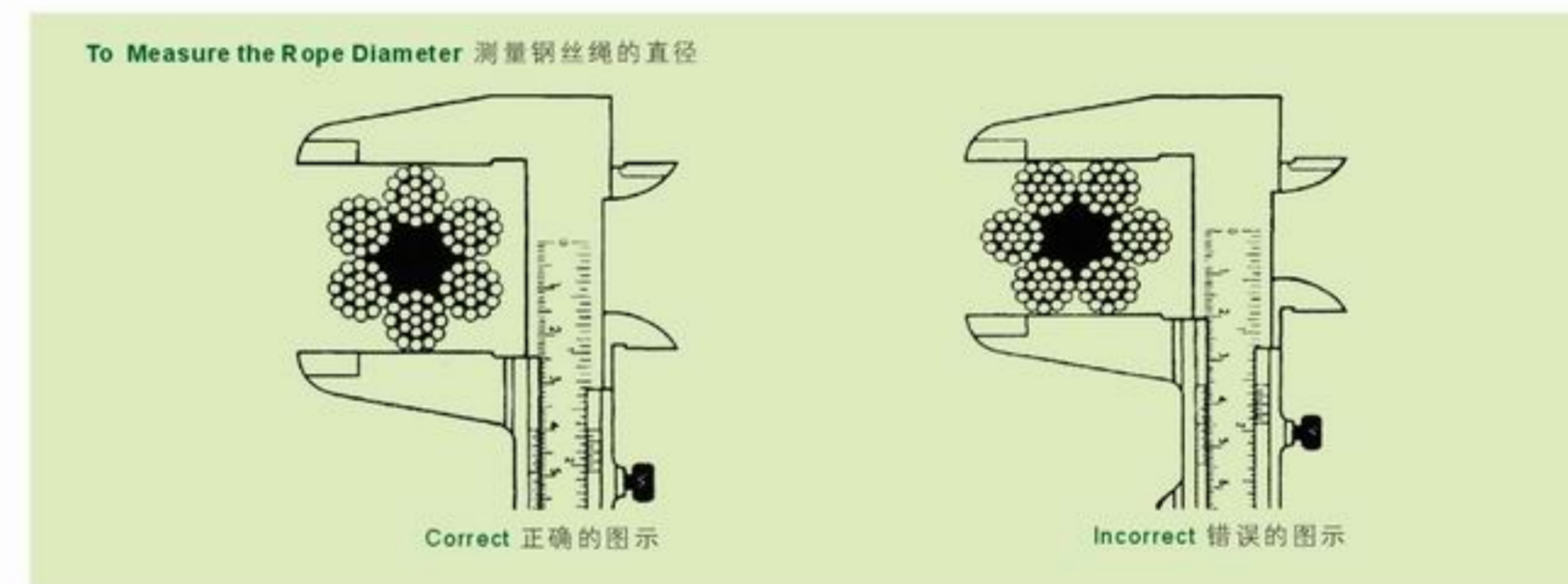
我们推荐您使用“钢丝绳润滑剂T86”对固丝德夫沃夫牵引滑轮钢丝绳进行润滑。(详见20页)T86是液态的，能够渗透，这样就能很容易浸到钢丝绳的内部。

The pay-off of a wire rope from a coil or a reel always has to be done by rolling the rope, never by pulling it laterally.

卷起钢丝绳的时候应根据钢丝绳的旋向把钢丝绳旋转地缠绕在卷轴上或盘起，不要逆反其旋向操作。否则容易损坏钢丝绳。

Handling · Installation · Maintenance

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Rope Lubricant T86

钢丝绳润滑剂T86

Gustav Wolf Elevator Ropes are sufficiently lubricated during production. During operation this lubrication reservoir decreases. Therefore, the elevator ropes must be re-lubricated in regular intervals. Thus, the service life will be prolonged.

For Gustav Wolf elevator ropes we recommend our, "Rope Lubricant T86" which is available in

1-l-bottle with cap part-no. 4500T8601

5-l-plastic can part-no. 4500T8605

Gustav Wolf 电梯钢丝绳在生产过程中已充分润滑。操作过程中润滑作用会减弱。因此，必须定期对电梯钢丝绳进行润滑，这样才会延长其使用寿命。

我们向您推荐“钢丝绳润滑剂T86”对Gustav Wolf 电梯钢丝绳进行润滑。产品包括：

带喷嘴的1升瓶装

5升金属罐装



Packaging  
包装



Master reel (large length)  
大轮

Cut-to-length traction ropes  
on wooden spools  
木质线轴

Traction ropes in coils, bundled  
捆绑成卷



Several sets of elevator ropes packed in a grid-box pallet (multipath packing)

方形铁格货箱



Several sets of elevator ropes packed in a cardboard box on a one-way pallet

纸板箱

# GUSTAV WOLF

GLOBAL ACTION  
全球化战略



German Technology - Global Presence

德国技术，全球展现