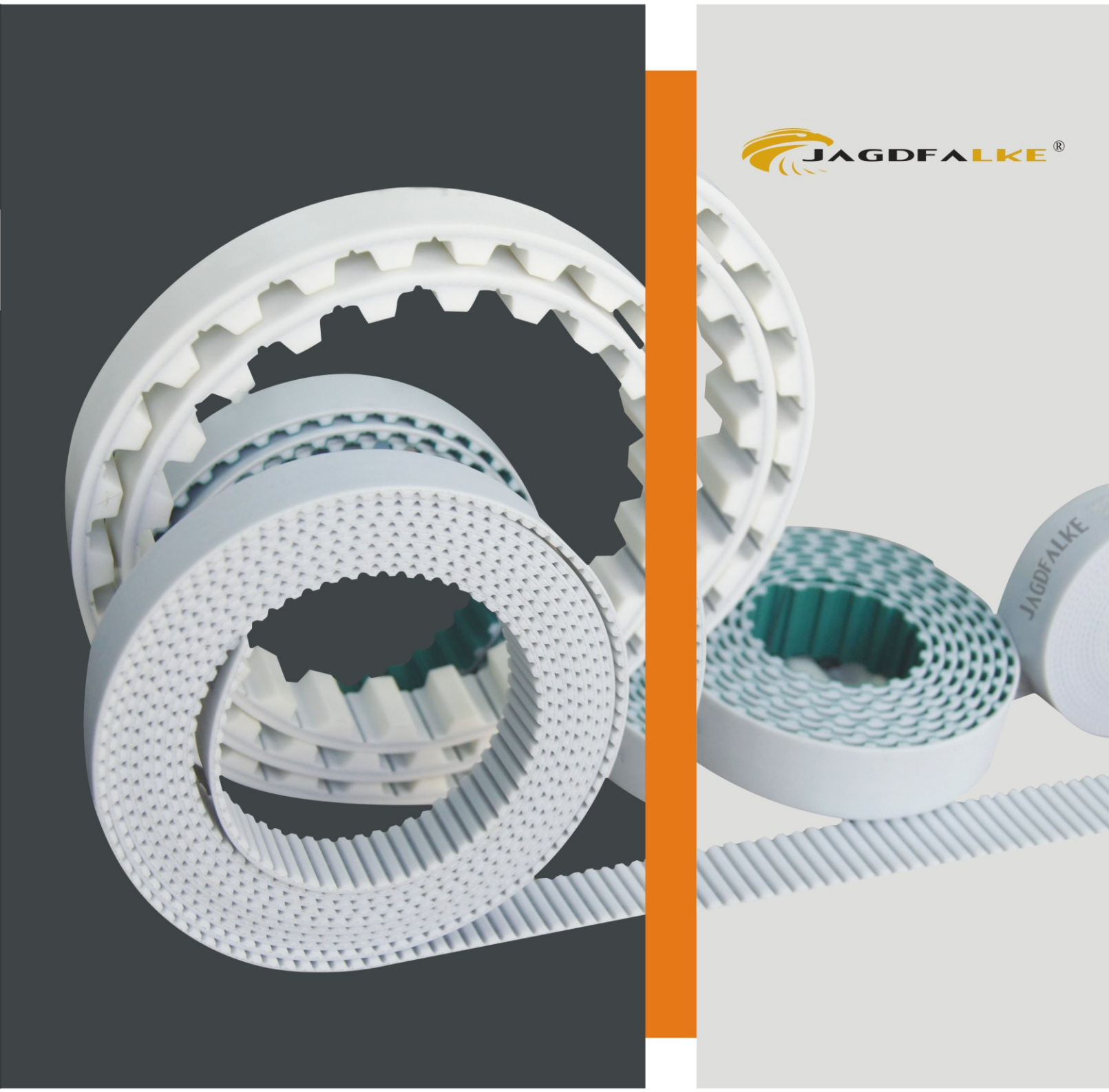

亚德法尔克 开口聚氨酯同步带

OPEN-END TIMING BELTS

JAGDFALKE®

开口聚氨酯同步带
Synchronous Drive Belts

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Product description

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性能 Properties

亚德法尔克®开口同步皮带用于同步传输旋转与直线运动。

亚德法尔克®开口同步皮带是以高耐磨的聚氨酯弹性体制成的工业传动带，配有钢丝芯绳抗拉层。皮带采用新开发的生产技术制造而成，长度精确。
亚德法尔克®开口同步皮带既可以开口带型式使用，也可环形带型式使用。在所有情况下，皮带都能确保均匀传输旋转运动，并且角度精确。亚德法尔克®开口同步皮带传动设计所需成本较低，即便在恶劣工况条件的情况下也是如此。皮带的性能甚至为要求最高的传动设计提供了高度可靠、免维护的解决方案。
亚德法尔克®开口同步皮带 具有10种齿型，数种标准宽度，涵盖各种负荷和维护条件的多种不同应用。该系列皮带非常适用于中心距较大的传动装置、同步传送带系统和带滑轨的运输装置，以及线性和控制工程中的定位与反向传动。现代的生产技术和严格的过程质量控制确保了产品的最大可靠性和始终如一的高标准质量。

齿型啮合确保了精确同步
带齿与带轮齿按照齿轮啮合的相同方式。齿型啮合传动原理确保了同步运行，消除了速度变化。

以低设计成本实现各种应用
亚德法尔克®开口同步皮带可用作开口式或环形式的同步传动装置或运输带。对于特殊应用，亚德法尔克®开口同步皮带可以焊接档片作为标记和传输之用。作为开口式传动部件，亚德法尔克 开口®同步皮带具有重复传递旋转运动的精度和多重定位控制，因此是线性和控制传动装置的理想之选。

JAGDFALKE®OPEN-END TIMING Belts for synchronous transmission of rotary and linear motion.
JAGDFALKE®OPEN-END TIMING belts are power transmission products made from a highly durable polyurethane elastomer incorporating a steel-cord tension member. They are manufactured precisely to length using a newly developed production technique.
JAGDFALKE®OPEN-END TIMING belts can be used in the openended or endless form. In all cases, they ensure that rotary motion is transmitted uniformly and with angular precision. JAGDFALKE®OPEN-END TIMING belts permit low-cost drive designs, even where difficult operating conditions have to be taken into account. Their properties provide a highly reliable, maintenance-free solution to even the most demanding drive problems.
JAGDFALKE®OPEN-END TIMING belts are available in ten tooth profiles and several standard widths, covering a host of different applications involving various loads and service conditions. They are ideal for drives with a large centre distance, for synchronous conveyor systems and transport devices with sliding rails as well as for positioning and reversing drives in linear and control engineering. Modern production techniques and rigorous in-process quality controls guarantee products with maximum reliability and a consistently high standard of quality.

Precise synchronism due to positive engagement
The belt teeth mesh with those of the pulley in the same manner as the teeth on a gear. This positive drive principle provides synchronous operation and eliminates speed variation.

A variety of possible applications at low design cost
JAGDFALKE®OPEN-END TIMING belts can be used as synchronous drive or transport belts in either the open-ended or endless version. For special applications, JAGDFALKE®OPEN-END TIMING belts can have heavy-duty profiles welded to them for indexing and conveying applications. As open-ended drive components, JAGDFALKE®OPEN-END TIMING belts are ideal for linear and control drives that have to transmit rotary motion with repeat accuracy and multiple positioning control.

轴和轴承负荷低

轮齿夹点原理仅需非常小的初始皮带张力。因此轴和轴承的负荷最小。

紧凑传动设计

高动态稳定性和挠曲性确保可以使用直径更小的带轮，缩短中心距，以及使用带背惰轮。这样，传动装置不仅重量轻、成本低，而且所需空间较小。

无需维护

JAGDFALKE®聚氨酯皮带免维护，无需润滑或重新张紧。使用高强度的钢丝芯绳抗拉层保证了稳定的皮带张力。

高效

同步传动带优异的抗弯曲性能以及皮带与带轮齿形间精确的尺寸配合使得驱动装置效率高达98%。

JAGDFALKE®聚氨酯皮带具有以下性能

- 耐磨
- 耐石油和油脂
- 耐汽油和苯
- 耐水解
- 抗紫外线抗氧化
- 温度范围为−30℃到80℃（当温度低于−10℃或是高于50℃时，请致电我们的技术人员）
- 可烫接

Low loads on shafts and bearings

The tooth grip principle requires only low initial belt tensioning. Thus the load on shafts and bearings is kept to a minimum.

Compact drive design

High dynamic stability and flexibility allows the use of small pulley diameters, low centre distances, and belt-back idlers. This enables a lightweight, low-cost drive setup with less space requirement.

No maintenance

JAGDFALKE®OPEN-END TIMING belts are maintenance-free; no lubrication or retensioning is required. Constant belt tension is guaranteed by the use of a high-strength steel-cord tension member.

High efficiency

The superb flexural properties of the synchronous drive belt as well as the exact dimensional mating of the belt and pulley tooth contours permit drives with an efficiency of 98 %.

JAGDFALKE® belts are resistant to

- wear
- oil and grease
- petrol and benzene
- hydrolysis
- UV and ozone
- temperatures ranging from –30 °C to 80 °C (for operational temperatures outside –10 °C to 50 °C please seek advice from our technical experts)
- can be bonded to thermoplastics

版本与结构 Versions and construction

HF 除3mm节线外的所有高挠性齿形，适用于带轮直径小的传动装置。

HP 高性能HTD和STD齿型，适用于自动化控制系统。

HS 高刚度抗拉层HTD和STD齿型，适用于高精度线性传动装置。

XHP 抗拉强度较高的 HTD 14M 齿型，适用于提升系统。

PAZ 齿面带有聚酰胺织物饰面，例如滑轨运输系统。

PAR 皮带背面有聚酰胺织物饰面，适用于摩擦式输送。

可按客户要求生产其他特殊版本的聚氨酯同步带。适用于芳纶芯绳。

HF high flexibility version all profiles except for 3 mm pitch e.g. for drives with small pulley diameters.

HP high power reinforced version HTD and STD profiles, e.g. for heavy-duty control systems.

HS high stiffness of tension member HTD and STD profiles, e.g. for high-precision linear drives.

XHP extremely high power tensile-strength HTD 14M profile, e.g. for lifting systems.

PAZ with polyamide fabric facing on the teeth side e.g. for sliding-rail transport systems.

PAR with polyamide fabric facing on the back of the belt e.g. for skid-queuing conveyors.

Other special versions can be supplied on request, e.g. aramide tension member.

结构

Construction

我们的同步传动带由以下部分构成：

- 聚氨酯凸齿和带背，颜色：黑色
- 钢丝芯绳抗拉层，线绳左/右旋向，保证传动平衡。

聚氨酯凸齿与带背

带齿和带背由高强度聚氨酯弹性体制成，与抗拉层粘接良好。聚氨酯的耐磨性高，确保了传动装置拥有故障少和较长的使用寿命的优点。钢丝线绳的平衡分布进一步强化了这些功能。

钢丝线绳抗拉层

啮合传动系统的同步传动带必须具有高抗伸长性和高抗拉强度。与皮带边缘平行分布的超强抗拉钢丝线绳确保皮带具有高载荷能力和精确的运行性能。

Our synchronous drive belts are made up of:

- polyurethane teeth and back, color: black
- steel-cord tension member, with balanced right/left-handed cord twist

Polyurethane teeth and back

Belt teeth and back are made from a tough polyurethane elastomer with excellent adhesion to the tension member. The high wear resistance of the polyurethane ensures trouble-free drive performance and a long service life. These features are enhanced even more by the balanced layout of the tension cords.

Steel-cord tension member

Synchronous drive belts for positive drive systems must have a high resistance to elongation and a high tensile strength. Extra-strong steel tension cords, laid parallel to the belt edges, guarantee the belt’s high loading capacity and accurate running properties.

标识 Designation

JAGDFALKE®按照说明节线长度、齿距和带宽，以及皮带版本代码的不同皮带类型的定义标准对 JAGDFALKE® 同步传动带做出了规定，见第4页。

- **节线长度（单位：m）**
  皮带的节线长度是指抗拉层中心线的周长。
- **齿距（单位：mm）**
  齿距为节线上相邻两齿之间的线性距离。
- **带宽（单位：mm）**
  带宽与宽度标识意思完全相同。

JAGDFALKE®OPEN-END TIMING belts are specified in accordance with defined standards for the different belt types showing the pitch length, tooth pitch and belt width, plus a code for the belt version, see page 4.

- **Pitch length in m**
  The pitch length of the belt is the overall circum ference, or length measured at the neutral pitch line. The pitch length is located in the middle of the tension member.
- **Tooth pitch in mm**
  The tooth pitch is the linear distance between two adjacent teeth at the pitch line.
- **Belt width in mm**
  The belt width and width designation are identical.

例 Examples

同步传动带 – M 30-8M -50HP / Synchronous drive belts – M 30 - 8M - 50 HP		
M	开口型	open-ended type
30	节线长度 30m	pitch length 30 m
8M	齿距 8mm，HTD 齿型	tooth pitch 8 mm, HTD profile
50	带宽 50mm	belt width 50 mm
HP	高性能	reinforced version

同步传动带 – V 2400-S 5M-30 HF / Synchronous drive belts – V 2400 - S 5M - 30 HF		
V	环形带	endless type
2400	带长 2400mm	belt length 2400 mm
S 5M	齿距 5mm，STD 齿型	tooth pitch 5 mm, STD profile
30	带宽 30mm	belt width 30 mm
HF	高挠性	flexible version

同步传动带 – 10 x M 30 H 100 PAZ / Synchronous drive belts – 10 x M 30 H 100 PAZ		
10	带轮数量	number of rolls
M	开口型	open-ended type
30	节线长度 30m	pitch length 30 m
H	齿距 0.5 英寸=12.7mm	tooth pitch 0.5 Inch = 12.7 mm
100	带宽1.0 英寸=25.4mm	belt width 1.0 Inch = 25.4 mm
PAZ	齿面包布	with fabric facing on the pulley side

齿数为节线长度和节距之比： The number of teeth is a function of pitch length and pitch:

$$z = \frac{L_w}{t}$$

产品系列 Product range

齿型

JAGDFALKE® 同步传动带有 10 种齿型。HTD 和 STD 同步同步传动带的尺寸与 ISO/F DIS 13050（草拟版本）中规中规定的规格相对应。 第9页上的表1总结了齿型尺寸以及我公司所产皮带的其它技术信息。对于精度要求高的线性传动装置，必须使用特殊带轮。有关带轮的更多信息，见第2节“带轮”（从第11页开始）。

长度

JAGDFALKE® 同步传统带具有开口式和环形式两个版本。

宽度

JAGDFALKE®同步传动带有几种标准宽度。尺寸见第9页表2。可按客户要求生产其它宽度的开口聚氨酯同步带。

版本

JAGDFALKE® 同步传动带由聚氨酯材料制成，钢丝芯绳与皮带边缘平行对齐，是供传动和运输工程使用的精密部件。为满为满足各种工况要求，提供了若干个版本。
更多详情，参见第4页和第5页上的“性能”一章。

Profiles

JAGDFALKE®OPEN-END TIMING belts are manufactured in 10 profile sizes. Dimensions of HTD and STD synchronous drive belts correspond to the specifications laid down in ISO/F DIS 13050 (draft version). Table 1 on page 9 gives a summary of the profile dimensions as well as other technical information for the belts we supply. Special pulleys must be used for linear drives with high precision requirements. More information about pulleys is given in section 2 on “Pulleys” which starts on page 11.

Lengths

JAGDFALKE®OPEN-END TIMING belts are available in either the open-ended or endless version.

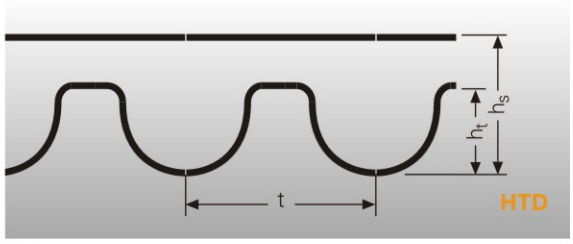
Widths

JAGDFALKE®OPEN-END TIMING belts are supplied in several standard widths. Dimensions are given in Table 2 on page 9. Other widths are available on request.

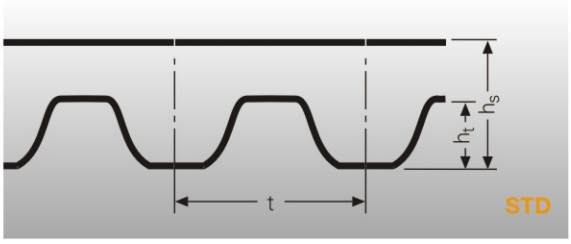
Versions

JAGDFALKE®OPEN-END TIMING belts made from polyurethane with steel cords aligned parallel to the belt edges are precision-made components for applications in drive and transportation engineering. Several versions are available to meet various operating requirements. More details are given on page 4 and 5 under “Properties”.

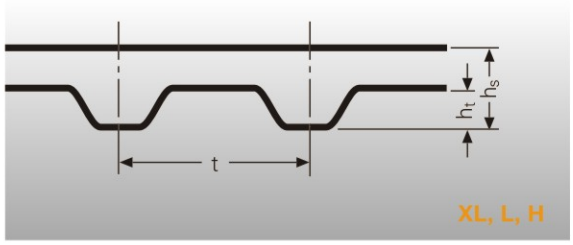
图 Fig. 1



齿型 Tooth profile
HTD 3M, HTD 5M, HTD 8M, HTD 14M



齿型 Tooth profile
*STD S 5M, STD S 8M, STD S 3M**
**可按客户要求生产 on request*



齿型 Tooth profile
XL, L, H

规格 / Specifications

Tab. 1

齿型	Tooth Profile		HTD				STD			Trapez		
			3M	5M	8M	14M	S 3M	S 5M	S 8M	XL	L	H
齿距 t	Tooth pitch t	mm	3.00	5.00	8.00	14.00	3.00	5.00	8.00	5.08	9.525	12.70
		Inch								0.20	0.375	0.50
带厚 h_s	Belt thickness h_s	mm	2.40	3.60	5.60	10.00	2.30	3.40	5.20	2.30	3.60	4.30
齿高 h_t	Tooth heigth h_t	mm	1.30	2.10	3.40	6.10	1.14	1.90	3.00	1.27	1.91	2.29
每毫米带宽的重量 m_{spez} 类型：	Weight m_{spez} per mm of belt width Type:											
HF	HF	10^{-3} kg/m		3.36	5.40	10.37		3.21	5.24	2.16	3.650	4.53
HP	HP	10^{-3} kg/m	3.15	4.06	6.32	11.27	3.08	3.91	6.22			
HS	HS	10^{-3} kg/m		4.70	7.22	11.40		4.64	7.12			
XHP	XHP	10^{-3} kg/m				14.00						
标准长度 类型：	Standard lengths Type:											
M L_w	M L_w	m	30 bzw. or 60									

带宽 b（单位：mm）/ Belt width – b in mm

Tab. 2

齿型 Tooth profile

HTD				STD			Trapez		
3M	5M	8M	14M	S 3M	S 5M	S 8M	XL	L	H
5	5			5	5		6.35		
10	10	10		10	10	10	9.40	9.40	
15	15	15		15	15	15	12.70	12.70	12.70
	20	20				20	19.05	19.05	19.05
25	25	25	25	25	25		25.40		25.40
		30				30			
			40					38.10	38.10
50	50	50	50/55	50	50	50	50.80	50.80	50.80
		85	85			85			76.20
		100	100			100			101.60
			120			120*			
			150**						

可按客户要求生产其它中间宽度的开口聚氨酯同步带。 Other intermediate widths on request.
**仅限 HS 版 only in version HS*
***仅限 XHP 版 only in version XHP*

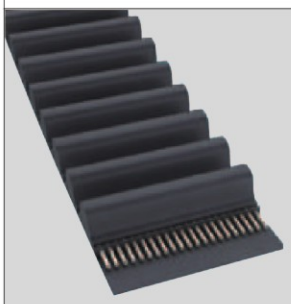
开口聚氨酯同步带

适用于物料输送，线性传动系统和自动门系统

Open-end polyurethane timing belts

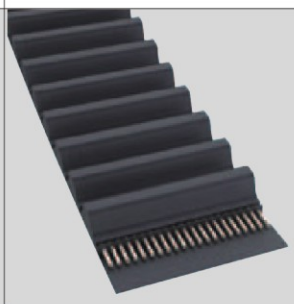
for material flow, linear and transport technology, entry systems

HTD



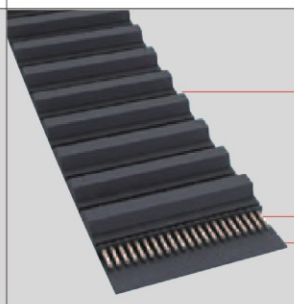
齿型 /Profile
3M
5M
8M
14M

STD



齿型 /Profile
S3M
S5M
S8M

XL-H



齿型/Profile
XL
L
H

*可按客户要求在齿面包布或带背包布

** Fabric cover on teeth and backing (PAZ/ PAR) upon request

Other profiles upon request

可按客户要求生产其它齿型的开口聚氨酯同步带

性能：

- 耐磨
- 耐石油和油脂
- 耐燃料和苯
- 耐水解
- 抗紫外线抗氧化
- 温度范围为-30℃到+80℃
  （当温度低于-10℃或是高于+50℃时请参照技术指导）
  可烫接
- 原材料及生产过程均无硅油
- 免维护

Properties:

- wear-resistant
- oil- and grease-resistant
- resistant to fuel and benzene
- hydrolysis-resistant
- resistant to UV and ozone
- temperature range from -30°C to +80°C
  (please request technical advice for temperatures below -10° C and above +50° C)
- can be welded with thermoplastics
- raw materials and production are silicone free

平皮带 Flat belt

适用于小空间驱动的升降系统

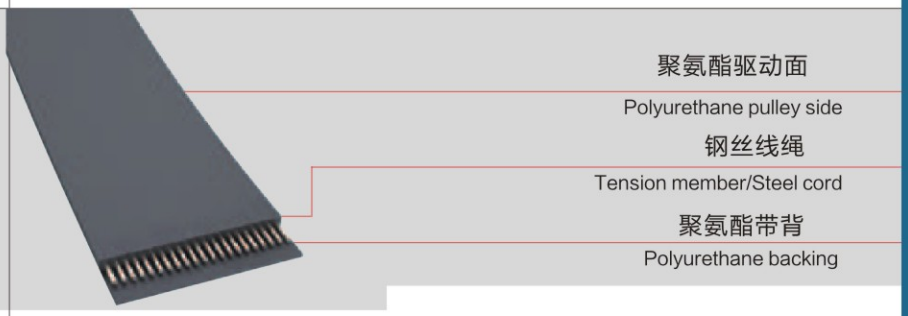
For space-saving drive configurations in lift systems

F

钢丝种类/Versions

HF
HP
HS
XHP
XHS

F



可按客户需求在两面亚槽

grooveless on both sides, on request

性能： Properties:

- 耐磨
- 耐石油和油脂
- 耐燃料和苯
- 耐水解
- 抗紫外线抗氧化
- 温度范围为-30℃到+80℃
  （当温度低于-10℃或是高于+50℃时请参照技术指导）
  可烫接
- 原材料及生产过程均无硅油
- 免维护

- wear-resistant
- oil- and grease-resistant
- resistant to fuel and benzene
- hydrolysis-resistant
- resistant to UV and ozone
- temperature range from -30°C to +80°C
  (please request technical advice for temperatures below −10° C and above +50° C)
- can be welded with thermoplastics
- raw materials and production are silicone free

公差 Tolerances

JAGDFALKE® 同步传动带属精密部件。 在制造的各个阶段均需要可靠的工艺技术和最大精度。长度、宽度和厚度的公差范围很小。

JAGDFALKE®OPEN-END TIMING belts are precision made products. Manufacturing involves reliable process techniques and maximum accuracy throughout all stages. Deviations in length, width and thickness are subject to extremely tight tolerances.

带长公差 / Belt lenght tolerances Tab. 3

节线长度 L_w （单位：mm）Pitch length L_w mm	长度公差 Length tolerance %
L_w	± 0.1

带宽公差 / Belt width tolerances Tab. 4

齿型	Tooth Profile		HTD				STD			Trapez		
			3M	5M	8M	14M	S 3M	S 5M	S 8M	XL	L	H
带宽 b	Belt width b	达 up to 25 mm	± 0.5	± 0.5	± 0.6	± 0.6	± 0.5	± 0.5	± 0.6	± 0.5	± 0.6	± 0.6
		> 25–50 mm	± 0.6	± 0.6	± 0.7	± 1.0	± 0.6	± 0.6	± 0.7	± 0.6	± 0.7	± 0.7
		> 50 mm			± 0.8	± 1.2			± 0.8		± 0.8	± 0.8

带厚公差（M 型） / Belt thickness tolerances (Type M) Tab. 5

齿型	Tooth Profile		HTD				STD			Trapez		
			3M	5M	8M	14M	S 3M	S 5M	S 8M	XL	L	H
带厚 h_s	Belt thickness h_s	mm	2.4	3.6	5.6	10.0	2.3	3.4	5.2	2.3	3.6	4.3
厚度公差	Thickness tolerance	mm	± 0.25	± 0.25	± 0.4	± 0.6	± 0.25	± 0.25	± 0.4	± 0.25	± 0.4	± 0.4

2 带轮 Pulleys

- 标识
- 最低齿数
- 带轮直径
- 公差
- 夹板

- Designation
- Minimum number of teeth
- Pulley diameters
- Tolerances
- Clamp plates

标识 Designation

要确保同步皮带传动装置拥有准确的动力传输、平稳运行以及较长的使用寿命，精密的皮带/带轮必须精确配合。
亚德法尔克工程师对带轮的齿隙剖面进行了修改，以便在理论上符合各自的带型。
建议使用优化后的带轮，尤其是JAGDFALKE®OPEN-END TIMING HTD 皮带。
可以从当地供应商处购买齿形优化的带轮。
定位要求高的线性传动装置需要使用间隙最小的带轮。欲进行特殊的传输装置设计，请咨询我公司的应用工程师。

标识

依照各类皮带的标准，亚德法尔克皮带传动装置的带轮根据齿数、齿距、带轮宽度以及显示带轮类型的代码确定。

- **P**
  齿形带轮的一般标识。

- **齿数**
  Die Zähnezahl der Synchronscheibe errechnet sich
  带轮的齿数根据节圆周长和节距进行计算：

$$z = \frac{U_w}{t} = \frac{\pi \cdot d_w}{t}$$

- **齿距（单位：mm）**
  带轮的齿距为节径圆周相邻齿上的两个参考点之间的距离。在皮带节线跑到带轮上面时，节径是带轮厚度的两倍，比带轮的外径要大。

Precise belt/pulley conformance is vital to ensure accurate power transmission as well as smooth operation and a long service life for synchronous belt drives.
JAGDFALKE engineers have modified pulley tooth-gap profiles so that they conform ideally to the respective belt profiles.

Pulleys with optimized profiles are obtainable from your local pulley supplier.
Linear drives with demanding positioning requirements need pulleys with minimized gap clearance. If you are planning a special drive design, please consult our application engineers for advice.

Designation

Pulleys for JAGDFALKE®OPEN-END TIMING belt drives are identified in accordance with the standards defined for the various belt types by their number of teeth, tooth pitch and pulley width, as well as a code denoting the type of pulley.

- **P**
  General designation for toothed pulleys.

- **Number of teeth**
  The pulley’s number of teeth is calculated from the pitch circumference and the pitch:

$$z = \frac{U_w}{t} = \frac{\pi \cdot d_w}{t}$$

- **Tooth pitch in mm**
  The tooth pitch of the pulley is the distance between two reference points on adjacent teeth at the circumference of the pitch diameter. The pitch diameter is larger than the outside diameter of the pulley by double the thickness at which the pitch line of belt rides above the pulley.

带轮宽度（单位：mm）

宽度标识明确了相应同步传动带的确切宽度，而不是带轮的宽度。

带轮挡边

F 表示两侧都有挡边的带轮。挡边带轮可以防止皮带滑落。必须至少使用一个带有两个挡边的带轮，通常情况下，出于成本考虑，传动装置上较小的带轮为挡边带轮。也可以在其他侧为每一个带轮配备一个挡边。

Pulley width in mm

The width designation defines the exact width of the corresponding synchronous drive belt, and not that of the pulley.

Flanged pulley data

F stands for pulleys that are flanged on both sides. Flanged pulleys prevent the belt from riding off. At least one pulley with two flanges must be used and generally, for economy, the smaller pulley of a drive is the flanged pulley. It is also possible to provide each pulley with one flange on alternate sides.

例 **Examples**

HTD 带轮 P 36 - 8M – 40 / HTD pulley P 36 - 8M - 40		
P	带轮	pulley
36	36 齿	36 teeth
8M	8mm 齿距，HTD 齿型	8 mm tooth pitch, HTD profile
40	40mm 宽皮带带轮	pulley for 40 mm wide belts

STD 带轮 P 48-S 5M-30 / STD pulley P 48 - S 5M - 30		
P	带轮	pulley
48	48 齿	48 teeth
S 5M	5mm 齿距，STD 齿型	5 mm tooth pitch, STD profile
30	30mm 宽皮带带轮	pulley for 30 mm wide belts

带轮 P 48 H 100 F / pulley P 48 H 100 F		
P	带轮	pulley
48	48 齿	48 teeth
H	0.5 英寸=12.7mm齿距	0.5 inch = 12.7 mm tooth pitch
100	25.4mm 宽皮带带轮	pulley for 25.4 mm wide belts
F	两侧带法兰带轮	pulley flanged on both sides

最低齿数 Minimum number of teeth

装有 JAGDFALKE® 同步传动带的传动装置的带轮应满足规定的最低齿数。表 6 说明了带轮的最低齿数 z_{min}、最小节径 $d_{w\ min}$ 以及设计传动装置时需考虑的内外惰轮的最小直径 d_{min}。内惰轮应为齿形带轮。

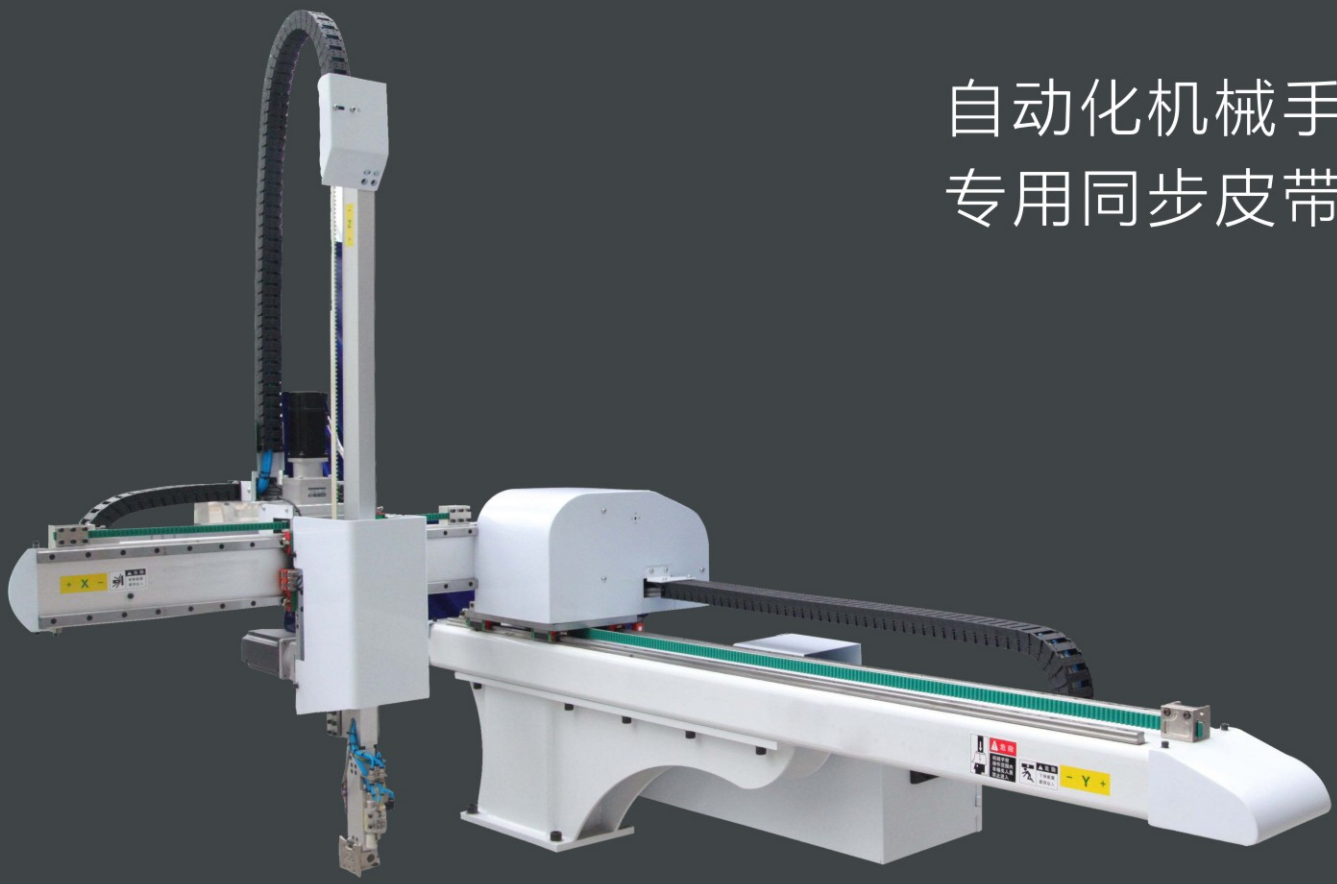
Drives fitted with JAGDFALKE®OPEN-END TIMING belts should have pulleys that meet the specified minimum number of teeth. Table 6 shows the minimum number of teeth z_{min} and the minimum pitch diameter $d_{w\ min}$ for pulleys as well as the minimum diameter d_{min} for inside and outside idlers that are to be considered when designing a drive. Inside idlers should be toothed pulleys.

最低齿数 – z_{min} / Minimum number of teeth – z_{min} Tab. 6

齿型 Tooth Profile					HTD				STD			Trapez		
					3M	5M	8M	14M	S 3M	S 5M	S 8M	XL	L	H
最低齿数 – z_{min} Minimum number of teeth z_{min}														
类型 Type	HF					12	16	18		12	16	10	12	14
	HP				20	16	20	26	20	16	20			
	HS					24	28	34		24	28			
	XHP							44						
最小节径 Ø $d_{w\ min}$ Minimum pitch Ø $d_{w\ min}$														
类型 Type	HF			mm		19.10	40.74	80.21		19.10	40.74	16.17	36.38	56.60
	HP			mm	19.10	25.46	50.93	115.86	19.10	25.46	50.93			
	HS			mm		38.20	71.30	151.52		38.20	71.30			
	XHP			mm				196.08						
惰轮最小直径 Ø d_{min} Minimum Ø of idler d_{min}														
类型 Type	HF	内部	inside	mm		19.10	40.74	80.21		19.10	40.74	19.40	39.41	60.64
		外部	outside	mm		30.00	60.00	120.00		30.00	60.00	30.00	60.00	90.00
	HP	内部	inside	mm	19.10	25.46	50.93	115.86	19.10	25.46	50.93			
		外部	outside	mm	30.00	50.00	100.00	160.00	30.00	50.00	100.00			
	HS	内部	inside	mm		38.20	71.30	151.52		44.56	71.30			
		外部	outside	mm		80.00	120.00	180.00		80.00	120.00			
	XHP	内部	inside	mm				196.08						
		外部	outside	mm				200.00						

带Ω带轮配置的 V 版最小直径皮带：请寻求技术支持。
Minimum diameter belt version V with omega pulley configuration: please call for technical support.

自动化机械手
专用同步皮带



带轮直径 Pulley diameters
HTD 3M / HTD 5M

装有JAGDFALKE®皮带的传动装置带轮的凸齿数、节距和外径见表 7 至表 13（第15页至第18页）。

Number of teeth, pitch and outside diameter of pulleys for drives fitted with JAGDFALKE®OPEN-END TIMING belts are contained in Tables 7 to 13 (pages 15 to 18).

JAGDFALKE® HTD同步传动带带轮
Pulleys for JAGDFALKE® HTD OPEN-END TIMING belts

3mm齿距，3M 齿型 / 3 mm tooth pitch, 3M profile Tab. 7

齿数 Number of teeth z	节径 (单位：mm) Pitch diameter mm d_w	外径 (单位：mm) Outside diameter mm d_a	齿数 Number of teeth z	节径 (单位：mm) Pitch diameter mm d_w	外径 (单位：mm) Outside diameter mm d_a	齿数 Number of teeth z	节径 (单位：mm) Pitch diameter mm d_w	外径 (单位：mm) Outside diameter mm d_a
20	19.10	18.34	38	36.29	35.53	56	53.48	52.72
21	20.05	19.29	39	37.24	36.48	57	54.43	53.67
22	21.01	20.25	40	38.20	37.44	58	55.39	54.63
23	21.96	21.20	41	39.15	38.39	59	56.34	55.58
24	22.92	22.16	42	40.11	39.35	60	57.30	56.54
25	23.87	23.11	43	41.06	40.30	61	58.25	57.49
26	24.83	24.07	44	42.02	41.26	62	59.21	58.45
27	25.78	25.02	45	42.97	42.21	63	60.16	59.40
28	26.74	25.98	46	43.93	43.17	64	61.12	60.36
29	27.69	26.93	47	44.88	44.12	65	62.07	61.31
30	28.65	27.89	48	45.84	45.08	66	63.03	62.27
31	29.60	28.84	49	46.79	46.03	67	63.98	63.22
32	30.56	29.80	50	47.75	46.99	68	64.94	64.18
33	31.51	30.75	51	48.70	47.94	69	65.89	65.13
34	32.47	31.71	52	49.66	48.90	70	66.85	66.09
35	33.42	32.66	53	50.61	49.85	71	67.80	67.04
36	34.38	33.62	54	51.57	50.81	72	68.75	67.99
37	35.33	34.57	55	52.52	51.75			

5mm 齿距，5M 齿型 / 5 mm tooth pitch, 5M profile Tab. 8

齿数 Number of teeth z	节径 (单位：mm) Pitch diameter mm d_w	外径 (单位：mm) Outside diameter mm d_a	齿数 Number of teeth z	节径 (单位：mm) Pitch diameter mm d_w	外径 (单位：mm) Outside diameter mm d_a	齿数 Number of teeth z	节径 (单位：mm) Pitch diameter mm d_w	外径 (单位：mm) Outside diameter mm d_a
12	19.10	17.96	32	50.93	49.79	52	82.76	81.62
13	20.69	19.55	33	52.52	51.38	53	84.35	83.21
14	22.28	21.14	34	54.11	52.97	54	85.94	84.80
15	23.87	22.73	35	55.70	54.56	55	87.54	86.40
16	25.46	24.32	36	57.30	56.16	56	89.13	87.99
17	27.06	25.92	37	58.89	57.75	57	90.72	89.58
18	28.65	27.51	38	60.48	59.34	58	92.31	91.17
19	30.24	29.10	39	62.07	60.93	59	93.90	92.76
20	31.83	30.69	40	63.66	62.52	60	95.49	94.35
21	33.42	32.28	41	65.25	64.11	61	97.08	95.94
22	35.01	33.87	42	66.85	65.71	62	98.68	97.54
23	36.61	35.47	43	68.44	67.30	63	100.27	99.13
24	38.20	37.06	44	70.03	68.89	64	101.86	100.72
25	39.79	38.65	45	71.62	70.48	65	103.45	102.31
26	41.38	40.24	46	73.21	72.07	66	105.04	103.90
27	42.97	41.83	47	74.80	73.66	67	106.63	105.49
28	44.56	43.42	48	76.39	75.25	68	108.23	107.09
29	46.15	45.01	49	77.99	76.85	69	109.82	108.68
30	47.75	46.61	50	79.58	78.44	70	111.41	110.27
31	49.34	48.20	51	81.17	80.03	71	113.00	111.86
						72	114.59	113.45

带轮直径 Pulley diameters
HTD 8M / HTD 14M

JAGDFALKE® **HTD** 同步传动带带轮
Pulleys for JAGDFALKE® **HTD** OPEN-END TIMING belts

8mm 齿距，8M 齿型 / 8 mm tooth pitch, 8M profile Tab. 9

齿数 Number of teeth z	节径 (单位：mm) Pitch diameter mm d_w	外径 (单位：mm) Outside diameter mm d_a	齿数 Number of teeth z	节径 (单位：mm) Pitch diameter mm d_w	外径 (单位：mm) Outside diameter mm d_a	齿数 Number of teeth z	节径 (单位：mm) Pitch diameter mm d_w	外径 (单位：mm) Outside diameter mm d_a
16	40.74	39.37	36	91.67	90.30	56	142.60	141.23
17	43.29	41.92	37	94.22	92.85	57	145.15	143.78
18	45.84	44.47	38	96.77	95.40	58	147.70	146.33
19	48.38	47.01	39	99.31	97.94	59	150.24	148.87
20	50.93	49.56	40	101.86	100.49	60	152.79	151.42
21	53.48	52.11	41	104.41	103.04	61	155.34	153.97
22	56.02	54.65	42	106.95	105.58	62	157.88	156.51
23	58.57	57.20	43	109.50	108.13	63	160.43	159.06
24	61.12	59.75	44	112.05	110.68	64	162.97	161.60
25	63.66	62.29	45	114.59	113.22	65	165.52	164.15
26	66.21	64.84	46	117.14	115.77	66	168.07	166.70
27	68.75	67.38	47	119.68	118.31	67	170.61	169.24
28	71.30	69.93	48	122.23	120.86	68	173.16	171.79
29	73.85	72.48	49	124.78	123.41	69	175.71	174.34
30	76.39	75.02	50	127.32	125.95	70	178.25	176.88
31	78.94	77.57	51	129.87	128.50	71	180.80	179.43
32	81.49	80.12	52	132.42	131.05	72	183.35	181.98
33	84.03	82.66	53	134.96	133.59			
34	86.58	85.21	54	137.51	136.14			
35	89.13	87.76	55	140.06	138.69			

14mm 齿距，14M 齿型 / 14 mm tooth pitch, 14M profile Tab. 10

齿数 Number of teeth z	节径 (单位：mm) Pitch diameter mm d_w	外径 (单位：mm) Outside diameter mm d_a	齿数 Number of teeth z	节径 (单位：mm) Pitch diameter mm d_w	外径 (单位：mm) Outside diameter mm d_a	齿数 Number of teeth z	节径 (单位：mm) Pitch diameter mm d_w	外径 (单位：mm) Outside diameter mm d_a
18	80.21	77.41	38	169.34	166.54	58	258.47	255.67
19	84.67	81.87	39	173.80	171.00	59	262.92	260.12
20	89.13	86.33	40	178.25	175.45	60	267.38	264.58
21	93.58	90.78	41	182.71	179.91	61	271.83	269.03
22	98.04	95.24	42	187.16	184.36	62	276.29	273.49
23	102.50	99.70	43	191.62	188.82	63	280.75	277.95
24	106.95	104.15	44	196.08	193.28	64	285.20	282.40
25	111.41	108.61	45	200.53	197.73	65	289.66	286.86
26	115.86	113.06	46	204.99	202.19	66	294.12	291.32
27	120.32	117.52	47	209.45	206.65	67	298.57	295.77
28	124.78	121.98	48	213.90	211.10	68	303.03	300.23
29	129.23	126.43	49	218.36	215.56	69	307.48	304.68
30	133.69	130.89	50	222.82	220.02	70	311.94	309.14
31	138.15	135.35	51	227.27	224.47	71	316.40	313.60
32	142.50	139.80	52	231.73	228.93	72	320.85	318.05
33	147.06	144.26	53	236.18	233.38			
34	151.52	148.71	54	240.64	237.84			
35	155.97	153.17	55	245.10	242.30			
36	160.43	157.63	56	249.55	246.75			
37	164.88	162.08	57	254.01	251.21			

带轮直径 Pulley diameters
STD 3M / STD 5M

JAGDFALKE® 同步传动带带轮
Pulleys for JAGDFALKE® STD OPEN-END TIMING belts

3mm 齿距，3M 齿型 / 3 mm tooth pitch, 3M profile Tab. 11

齿数 Number of teeth z	节径 (单位：mm) Pitch diameter mm d_w	外径 (单位：mm) Outside diameter mm d_a	齿数 Number of teeth z	节径 (单位：mm) Pitch diameter mm d_w	外径 (单位：mm) Outside diameter mm d_a	齿数 Number of teeth z	节径 (单位：mm) Pitch diameter mm d_w	外径 (单位：mm) Outside diameter mm d_a
20	19.10	18.34	38	36.29	35.53	56	53.48	52.72
21	20.05	19.29	39	37.24	36.48	57	54.43	53.67
22	21.01	20.25	40	38.20	37.44	58	55.39	54.63
23	21.96	21.20	41	39.15	38.39	59	56.34	55.58
24	22.92	22.16	42	40.11	39.35	60	57.30	56.54
25	23.87	23.11	43	41.06	40.3	61	58.25	57.49
26	24.83	24.07	44	42.02	41.26	62	59.21	58.45
27	25.78	25.02	45	42.97	42.21	63	60.16	59.40
28	26.74	25.98	46	43.93	43.17	64	61.12	60.36
29	27.69	26.93	47	44.88	44.12	65	62.07	61.31
30	28.65	27.89	48	45.84	45.08	66	63.03	62.27
31	29.60	28.84	49	46.79	46.03	67	63.98	63.22
32	30.56	29.80	50	47.75	46.99	68	64.94	64.18
33	31.51	30.75	51	48.70	47.94	69	65.89	65.13
34	32.47	31.71	52	49.66	48.9	70	66.85	66.09
35	33.42	32.66	53	50.61	49.85	71	67.80	67.04
36	34.38	33.62	54	51.57	50.81	72	68.75	67.99
37	35.33	34.57	55	52.52	51.75			

5mm 齿距，5M 齿型 / 5 mm tooth pitch, 5M profile Tab. 12

齿数 Number of teeth z	节径 (单位：mm) Pitch diameter mm d_w	外径 (单位：mm) Outside diameter mm d_a	齿数 Number of teeth z	节径 (单位：mm) Pitch diameter mm d_w	外径 (单位：mm) Outside diameter mm d_a	齿数 Number of teeth z	节径 (单位：mm) Pitch diameter mm d_w	外径 (单位：mm) Outside diameter mm d_a
12	19.10	18.14	32	50.93	49.97	52	82.76	81.80
13	20.69	19.73	33	52.52	51.56	53	84.35	83.39
14	22.28	21.32	34	54.11	53.15	54	85.94	84.98
15	23.87	22.91	35	55.70	54.74	55	87.54	86.58
16	25.46	24.50	36	57.30	56.34	56	89.13	88.17
17	27.06	26.10	37	58.89	57.93	57	90.72	89.76
18	28.65	27.69	38	60.48	59.52	58	92.31	91.35
19	30.24	29.28	39	62.07	61.11	59	93.90	92.94
20	31.83	30.87	40	63.66	62.70	60	95.49	94.53
21	33.42	32.46	41	65.25	64.29	61	97.08	96.12
22	35.01	34.05	42	66.85	65.89	62	98.68	97.72
23	36.61	35.65	43	68.44	67.48	63	100.27	99.31
24	38.20	37.24	44	70.03	69.07	64	101.86	100.90
25	39.79	38.83	45	71.62	70.66	65	103.45	102.49
26	41.38	40.42	46	73.21	72.25	66	105.04	104.08
27	42.97	42.01	47	74.80	73.84	67	106.63	105.67
28	44.56	43.60	48	76.39	75.43	68	108.23	107.27
29	46.15	45.19	49	77.99	77.03	69	109.82	108.86
30	47.75	46.79	50	79.58	78.62	70	111.41	110.45
31	49.34	48.38	51	81.17	80.21	71	113.00	112.04
						72	114.59	113.63

带轮直径 Pulley diameters
STD 8M

JAGDFALKE® **STD** 同步传动带带轮

Pulleys for JAGDFALKE® STD OPEN-END TIMING belts

8mm 齿距，8M 齿型 / 8 mm tooth pitch, 8M profile Tab. 13

齿数 Number of teeth z	节径 (单位：mm) Pitch diameter mm d_w	外径 (单位：mm) Outside diameter mm d_a	齿数 Number of teeth z	节径 (单位：mm) Pitch diameter mm d_w	外径 (单位：mm) Outside diameter mm d_a	齿数 Number of teeth z	节径 (单位：mm) Pitch diameter mm d_w	外径 (单位：mm) Outside diameter mm d_a
16	40.74	39.37	36	91.67	90.30	56	142.60	141.23
17	43.29	41.92	37	94.22	92.85	57	145.15	143.78
18	45.84	44.47	38	96.77	95.40	58	147.70	146.33
19	48.38	47.01	39	99.31	97.94	59	150.24	148.87
20	50.93	49.56	40	101.86	100.49	60	152.79	151.42
21	53.48	52.11	41	104.41	103.04	61	155.34	153.97
22	56.02	54.65	42	106.95	105.58	62	157.88	156.51
23	58.57	57.20	43	109.50	108.13	63	160.43	159.06
24	61.12	59.75	44	112.05	110.68	64	162.97	161.60
25	63.66	62.29	45	114.59	113.22	65	165.52	164.15
26	66.21	64.84	46	117.14	115.77	66	168.07	166.70
27	68.75	67.38	47	119.68	118.31	67	170.61	169.24
28	71.30	69.93	48	122.23	120.86	68	173.16	171.79
29	73.85	72.48	49	124.78	123.41	69	175.71	174.34
30	76.39	75.02	50	127.32	125.95	70	178.25	176.88
31	78.94	77.57	51	129.87	128.50	71	180.80	179.43
32	81.49	80.12	52	132.42	131.05	72	183.35	181.98
33	84.03	82.66	53	134.96	133.59			
34	86.58	85.21	54	137.51	136.14			
35	89.13	87.76	55	140.06	138.69			

带轮直径 Pulley diameters
XL / L

JAGDFALKE® 同步传动带带轮
Pulleys for JAGDFALKE® OPEN-END TIMING belts

0.200 英寸=5.080mm 齿距，XL 齿型 / 0.200 Inch = 5.080 mm tooth pitch, XL profile Tab. 14

齿数 Number of teeth z	节径 (单位：mm) Pitch diameter mm d_w	外径 (单位：mm) Outside diameter mm d_a	齿数 Number of teeth z	节径 (单位：mm) Pitch diameter mm d_w	外径 (单位：mm) Outside diameter mm d_a	齿数 Number of teeth z	节径 (单位：mm) Pitch diameter mm d_w	外径 (单位：mm) Outside diameter mm d_a
10	16.17	15.66	32	51.74	51.24	54	87.32	86.81
11	17.79	17.28	33	53.36	52.85	55	88.94	88.43
12	19.40	18.90	34	54.98	54.47	56	90.55	90.04
13	21.02	20.51	35	56.60	56.09	57	92.17	91.66
14	22.64	22.13	36	58.21	57.70	58	93.79	93.28
15	24.26	23.75	37	59.83	59.32	59	95.40	94.90
16	25.87	25.36	38	61.45	60.94	60	97.02	96.51
17	27.49	26.98	39	63.06	62.56	61	98.64	98.13
18	29.11	28.60	40	64.68	64.17	62	100.25	99.75
19	30.72	30.22	41	66.30	65.79	63	101.87	101.36
20	32.34	31.83	42	67.91	67.41	64	103.49	102.98
21	33.96	33.45	43	69.53	69.02	65	105.11	104.60
22	35.57	35.07	44	71.15	70.64	66	106.72	106.21
23	37.19	36.68	45	72.77	72.26	67	108.34	107.83
24	38.81	38.30	46	74.38	73.87	68	109.96	109.45
25	40.43	39.92	47	76.00	75.49	69	111.57	111.07
26	42.04	41.53	48	77.62	77.11	70	113.19	112.68
27	43.66	43.15	49	79.23	78.73	71	114.81	114.30
28	45.28	44.77	50	80.85	80.34	72	116.43	115.92
29	46.89	46.39	51	82.47	81.96			
30	48.51	48.00	52	84.08	83.58			
31	50.13	49.62	53	85.70	85.19			

0.375 英寸=9.525mm 齿距，L齿型 / 0.375 Inch = 9,525 mm tooth pitch, L profile Tab. 15

齿数 Number of teeth z	节径 (单位：mm) Pitch diameter mm d_w	外径 (单位：mm) Outside diameter mm d_a	齿数 Number of teeth z	节径 (单位：mm) Pitch diameter mm d_w	外径 (单位：mm) Outside diameter mm d_a	齿数 Number of teeth z	节径 (单位：mm) Pitch diameter mm d_w	外径 (单位：mm) Outside diameter mm d_a
12	36.38	35.62	33	100.05	99.29	54	163.72	162.96
13	39.41	38.65	34	103.08	102.32	55	166.75	165.99
14	42.45	41.68	35	106.12	105.35	56	169.79	169.02
15	45.48	44.72	36	109.15	108.39	57	172.82	172.06
16	48.51	47.75	37	112.18	111.42	58	175.85	175.09
17	51.54	50.78	38	115.21	114.45	59	178.88	178.12
18	54.57	53.81	39	118.24	117.48	60	181.91	181.15
19	57.61	56.84	40	121.28	120.51	61	184.95	184.18
20	60.64	59.88	41	124.31	123.55	62	187.98	187.22
21	63.67	62.91	42	127.34	126.58	63	191.01	190.25
22	66.70	65.94	43	130.37	129.61	64	194.04	193.28
23	69.73	68.97	44	133.40	132.64	65	197.07	196.31
24	72.77	72.00	45	136.44	135.67	66	200.11	199.34
25	75.80	75.04	46	139.47	138.71	67	203.14	202.38
26	78.83	78.07	47	142.50	141.74	68	206.17	205.41
27	81.86	81.10	48	145.53	144.77	69	209.20	208.44
28	84.89	84.13	49	148.56	147.80	70	212.23	211.47
29	87.93	87.16	50	151.60	150.83	71	215.27	214.50
30	90.96	90.20	51	154.63	153.86	72	218.30	217.53
31	93.99	93.23	52	157.66	156.90			
32	97.02	96.26	53	160.69	159.93			

带轮直径 Pulley diameters

H

JAGDFALKE® 同步传动带带轮

Pulleys for JAGDFALKE® OPEN-END TIMING belts

0.500 英寸=12.700 mm 齿距，H 齿型 / 0.500 Inch = 12.700 mm tooth pitch, H profile Tab. 16

齿数 Number of teeth z	节径 (单位：mm) Pitch diameter mm d_w	外径 (单位：mm) Outside diameter mm d_a	齿数 Number of teeth z	节径 (单位：mm) Pitch diameter mm d_w	外径 (单位：mm) Outside diameter mm d_a	齿数 Number of teeth z	节径 (单位：mm) Pitch diameter mm d_w	外径 (单位：mm) Outside diameter mm d_a
14	56.60	55.20	34	137.45	136.07	54	218.30	216.92
15	60.64	59.27	35	141.49	140.12	55	222.34	220.97
16	64.68	63.31	36	145.53	144.16	56	226.38	225.01
17	68.72	67.35	37	149.57	148.20	57	230.42	229.05
18	72.77	71.39	38	153.62	152.24	58	234.47	233.10
19	76.81	75.44	39	157.66	156.29	59	238.51	237.14
20	80.85	79.48	40	161.70	160.33	60	242.55	241.18
21	84.89	83.52	41	165.74	164.37	61	246.59	245.22
22	88.94	87.56	42	169.79	168.41	62	250.64	249.27
23	92.98	91.61	43	173.83	172.46	63	254.68	253.31
24	97.02	95.65	44	177.87	176.50	64	258.72	257.35
25	101.06	99.69	45	181.91	180.54	65	262.76	261.39
26	105.11	103.73	46	185.96	184.58	66	266.81	265.44
27	109.15	107.78	47	190.00	188.63	67	270.85	269.48
28	113.19	111.82	48	194.04	192.67	68	274.89	273.52
29	117.23	115.86	49	198.08	196.71	69	278.93	277.56
30	121.28	119.90	50	202.13	200.75	70	282.98	281.61
31	125.32	123.95	51	206.17	204.80	71	287.02	285.65
32	129.36	127.99	52	210.21	208.84	72	291.06	289.69
33	133.40	132.03	53	214.25	212.88			

公差 olerances

外径公差 / Outside diameter tolerance Tab. 17

外径 Outside diameter d_a in mm	公差 Tolerance in mm
达 / up to 25	+ 0.05
26 – 50	+ 0.08
51 – 100	+ 0.10
101 – 175	+ 0.13
176 – 300	+ 0.15
301 – 500	+ 0.18
大于 / above 500	+ 0.20

轴向跳动公差 / Axial runout tolerance Tab. 18

外径 Outside diameter d_a in mm	公差 Tolerance in mm	
达 / up to 100	0.1	
101 – 250	0.001	每mm外径 per mm outside diameter
大于 / above 250	0.25 + 0.0005	每mm外径 per mm outside diameter

径向跳动公差 / Radial runout tolerance Tab. 19

外径 Outside diameter d_a in mm	公差 Tolerance in mm	
达 / up to 200	0.13	
大于 / above 200	0.13 + 0.0005	je mm Außendurchmesser per mm outside diameter

夹板 Clamp plates

用作开口型动力传输部件的 JAGDFALKE® 同步传动带两端必须以紧密配合的方式夹紧。 夹板必须具有相应的齿型。夹紧螺钉应位于皮带两侧，并均匀紧固。

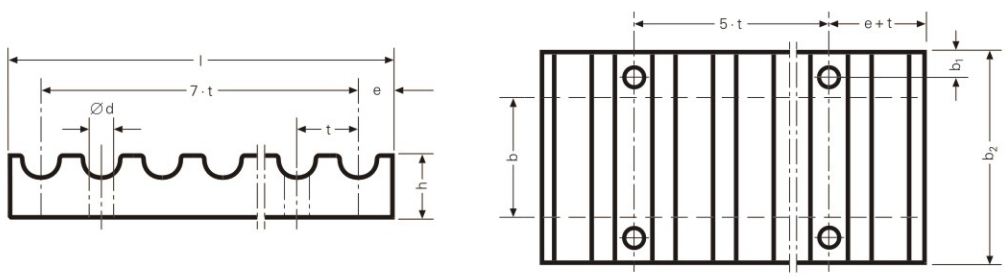
图2显示了所用的夹板。标准型式的夹板尺寸见表20。JAGDFALKE® 同步传动带用夹板可以从传动部件经销商处购买。

JAGDFALKE®OPEN-END TIMING belts that are used as openended power transmission components must be clamped with a positive fit at their ends. Clamp plates must have the corresponding tooth profile.
The clamping screws should be positioned on both sides of the belt, and tightened in a uniform fashion.

Fig. 2 shows the type of clamp plate used. Dimensions for the standard type are given in Table 20.
Clamp plates for JAGDFALKE®OPEN-END TIMING belts are available from drive component dealers.

夹板——布局原理 **Clamp plate – layout principle**

图 Fig. 2



夹板尺寸（单位：mm）/ Clamp plate dimensions in mm Tab. 20

齿型 Tooth Profile		HTD				STD			Trapez		
		3M*	5M	8M	14M	S 3M*	S 5M	S 8M	XL	L	H
t			5.0	8.0	14.0		5.0	8.0	5.080	9.525	12.700
l			41.4	66.0	116.0		41.4	66.0	42.5	76.6	106.9
e			3.2	5.0	9.0		3.2	5.0	3.5	5.0	9.0
h			8.0	15.0	22.0		8.0	15.0	8.0	15.0	22.0
d			5.5	9.0	11.0		5.5	9.0	5.5	9.0	11.0
b_1			6.0	8.0	10.0		6.0	8.0	6.0	8.0	10.0
b_2 同步传动带宽度 for synchronous drive belt width b in mm	6.35								25.5		
	9.53								28.5		
	10.00		28.0					28.0			
	12.70									39.0	45.0
	15.00		34.0	40.0			34.0	40.0			
	20.00			45.0				45.0			
	25.00		44.0				44.0				
	25.40									51.5	57.5
	30.00			55.0				55.0			
	40.00				71.0						
	50.00			75.0				75.0			
	55.00				86.0						
	85.00			110.0	116.0			110.0			
	100.00				131.0						
	115.00				146.0						
	120.00				151.0						
	150.00				181.0						

*可按客户要求生产 STD S 3M 和 HTD 3M 用夹板。 *Clamp plates for STD S 3M and HTD 3M are available on request.*
*请一起用于 HS 和 XHP 2 夹板。 *Please use for version HS and XHP 2 clamp plates in line.*

T5

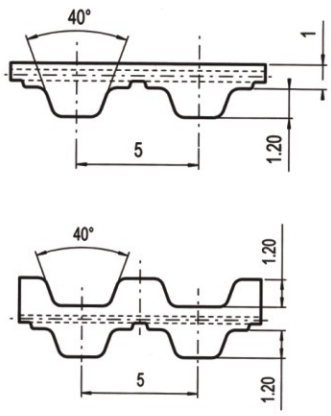
技术参数

带宽 b [mm]	允许拉伸载荷 M型 F_{Tzul} [N]	允许拉伸载荷 V型 F_{Tzul} [N]	断裂载荷 M型 F_{Br} [N]	弹性刚度比 C_{Spez} [N]	重量 [Kg/m]
10	320	160	1250	80000	0,021
16	540	270	2125	135000	0,034
25	900	450	3500	225000	0,053
32	1150	575	4500	287500	0,067
50	1860	930	7250	465000	0,105
75	2820	1410	11000	705000	0,158
100	3780	1890	14750	945000	0,210

根据要求可提供其它宽度。

带齿剪切强度

rpm	F_{Uspez} [N/cm]	rpm	F_{Uspez} [N/cm]	rpm	F_{Uspez} [N/cm]	rpm	F_{Uspez} [N/cm]
0	24,70	800	17,02	1900	14,21	4500	11,25
20	24,07	900	16,65	2000	14,03	5000	10,88
40	23,53	1000	16,32	2200	13,71	5500	10,55
60	23,05	1100	16,01	2400	13,42	6000	10,24
80	22,64	1200	15,73	2600	13,14	6500	9,96
100	22,28	1300	15,47	2800	12,89	7000	9,70
200	20,90	1400	15,22	3000	12,65	7500	9,46
300	19,89	1440	15,13	3200	12,43	8000	9,23
400	19,10	1500	15,00	3400	12,22	8500	9,01
500	18,45	1600	14,78	3600	12,03	9000	8,81
600	17,91	1700	14,58	3800	11,84	9500	8,62
700	17,44	1800	14,39	4000	11,66	10000	8,44



传动带特性

- 带有钢制带芯的聚氨酯同步带
- 符合DIN 7721 T1标准的梯形齿形
- 公制节距5mm
- 非常适合高柔性的传动应用
- 广泛用于输送、线性传动和轻载动力传输应用
- 可提供双面带齿的产品

- 宽度公差：±0.5[mm]
- 长度公差：±0.5[mm/n]
- 厚度公差：±0.5[mm]

载荷率F_{Uspez}是指在各种工作条件下1cm宽的单个带齿的最大载荷。该力与传动转速有关。

传动装置中的传动带总传输载荷Fu 计算公式为：

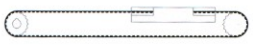
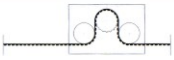
$$Fu\,[N]=F_{Uspez}\cdot ze\cdot b$$

Fu [N]	=周向力
F_{Uspez}[N/cm]	=载荷率
ze	=与小带轮啮合的齿数
zemax	=在传动计算中需要考虑的最大啮合齿数
zemax	= M为12个
zemax	=V为6个
b [cm]	=带宽

特性

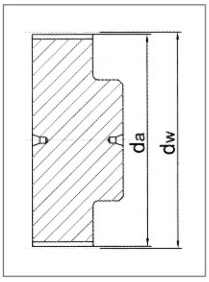
PROFILE	带宽 b[mm]	芳纶带芯	
		F_{Tzul} [N] M 型	F_{Br} [N]
T5	010	840	3.360
	016	1.190	4.760
	025	1.960	7.840
	032	2.520	10.080
	050	4.060	16.240
	075	6.160	24.640
	100	8.260	33.040

柔性

带轮最小齿数与惰轮最小直径			
T5		带芯类型	
		标准	芳纶
无反向弯曲的传动	同步带轮 Z_{min}	10	12
	在带齿上运转的惰轮 d_{min}	30mm	30mm
有反向弯曲的传动	同步带轮 Z_{min}	15	15
	在传动带背面上运转的惰轮 d_{min}	30mm	30mm

同步带轮

z	da	dw	z	da	dw	z	da	dw	z	da	dw
10	15,05	15,92	39	61,25	62,09	68	107,40	108,26	97	153,55	154,42
11	16,65	17,51	40	62,85	63,66	69	109,00	109,85	98	155,15	156,02
12	18,25	19,10	41	64,40	65,27	70	110,60	111,44	99	156,75	157,61
13	19,85	20,70	42	66,00	66,86	71	112,20	113,03	100	158,35	159,20
14	21,45	22,29	43	67,70	68,46	72	113,75	114,62	101	159,95	160,79
15	23,05	23,88	44	69,20	70,05	73	115,35	116,22	102	161,55	162,38
16	24,60	25,47	45	70,80	71,64	74	11695	117,81	103	163,10	163,97
17	26,20	27,06	46	72,40	73,23	75	118,55	119,40	104	164,70	165,57
18	27,80	28,65	47	73,95	74,82	76	120,15	120,99	105	166,30	167,16
19	29,40	30,25	48	75,55	76,42	77	121,75	122,58	106	167,90	168,75
20	31,00	3183	49	77,15	78,01	78	123,30	124,18	107	169,50	170,34
21	32,70	33,43	50	78,75	79,60	79	124,90	125,77	108	171,10	171,94
22	34,25	35,02	51	80,35	81,19	80	126,50	127,36	109	172,65	173,53
23	35,85	36,62	52	81,95	82,78	81	128,10	128,95	110	174,25	175,12
24	37,40	38,21	53	83,50	84,38	82	129,70	130,54	111	175,85	176,71
25	39,00	39,80	54	85,10	85,97	83	131,30	132,14	112	177,45	178,30
26	40,60	41,39	55	86,70	87,54	84	132,85	133,73	113	179,05	179,84
27	42,20	42,98	56	88,30	89,15	85	134,45	135,32	114	180,65	181,49
28	43,75	44,58	57	89,90	90,74	86	136,05	136,91	115	182,23	183,08
29	45,35	46,17	58	91,50	92,34	87	137,65	138,50	116	183,82	184,67
30	46,95	47,76	59	93,05	93,93	88	139,25	140,10	117	185,42	186,26
31	48,55	49,35	60	94,65	95,52	89	140,85	141,69	118	187,01	187,86
32	50,10	50,94	61	96,25	97,11	90	142,45	143,28	119	188,61	189,45
33	51,70	52,54	62	97,85	98,70	91	144,00	144,87	120	190,21	191,04
34	53,25	54,13	63	99,45	100,30	92	145,60	146,46			
35	54,85	55,72	64	101,05	101,89	93	147,20	148,06			
36	56,45	57,31	65	102,65	103,48	94	148,80	149,65			
37	58,05	58,90	66	104,20	105,07	95	150,40	151,24			
38	59,65	60,50	67	105,80	106,66	96	152,00	152,83			



T10

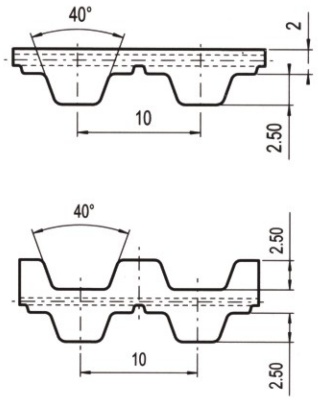
技术参数

带宽 b [mm]	允许拉伸载荷 M型 F_{Tzul} [N]	允许拉伸载荷 V型 F_{Tzul} [N]	断裂载荷 M型 F_{Br} [N]	弹性刚度比 C_{Spez} [N]	重量 [Kg/m]
10	920	460	3360	230000	0,05
16	1610	805	5880	402500	0,07
25	2650	1325	9660	662500	0,11
32	3450	1725	12600	862500	0,15
50	5520	2760	20160	1380000	0,23
75	8400	4200	30660	2100000	0,34
100	11270	5635	41160	2817500	0,45
150	17020	8510	62160	4255000	0,68
200	11270	5635	41160	2817500	0,60

根据要求可提供其它宽度。

带齿剪切强度

rpm	F_{Uspez} [N/cm]	rpm	F_{Uspez} [N/cm]	rpm	F_{Uspez} [N/cm]	rpm	F_{Uspez} [N/cm]
0	51,80	800	33,34	1900	26,53	4500	19,40
20	50,32	900	32,44	2000	26,12	5000	18,51
40	49,04	1000	31,63	2200	25,34	5500	17,71
60	47,92	1100	30,89	2400	24,63	6000	16,97
80	46,95	1200	30,21	2600	23,97	6500	16,29
100	46,11	1300	29,58	2800	23,36	7000	15,66
200	42,75	1400	28,99	3000	22,78	7500	15,07
300	40,28	1440	28,76	3200	22,25	8000	14,52
400	38,36	1500	28,44	3400	21,74	8500	14,00
500	36,80	1600	27,92	3600	21,27	9000	13,51
600	35,49	1700	27,43	3800	20,81	9500	13,05
700	34,35	1800	26,97	4000	20,39	10000	12,61



传动带特性

- 带有钢制带芯的聚氨酯同步带
- 符合DIN 7721 T1标准的梯形齿形
- 公制节距10mm
- 非常适合高柔性的传动应用
- 广泛用于输送、线性传动和轻载动力传输应用
- 可提供双面带齿的产品

- 宽度公差：±0.5[mm]
- 长度公差：±0.5[mm/n]
- 厚度公差：±0.2[mm]

载荷率F_{Uspez}是指在各种工作条件下1cm宽的单个带齿的最大载荷。该力与传动转速有关。

传动装置中的传动带总传输载荷Fu 计算公式为：

$$Fu\,[N] = F_{Uspez} \cdot ze \cdot b$$

Fu [N]	=周向力
F_{Uspez}[N/cm]	=载荷率
ze	=与小带轮啮合的齿数
zemax	=在传动计算中需要考虑的最大啮合齿数
zemax	= M为12个
zemax	=V为6个
b [cm]	=带宽

特性

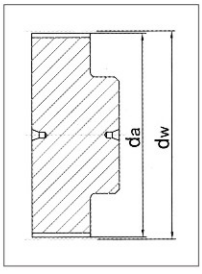
PROFILE	带宽 b[mm]	芳纶带芯		STAAINLESS STEEL		HPL High perfomance		HFE High fexibility	
		F_{Tzul} [N] M 型	F_{Br} [N]	F_{Tzul} [N] M 型	F_{Br} [N]	F_{Tzul} [N] M 型	F_{Br} [N]	F_{Tzul} [N] M 型	F_{Br} [N]
T10	010	880	3600	600	2400			960	3440
	016	1540	6300	1050	4200	2210	8550	1680	6020
	025	2530	10350	1730	6900	3750	14540	2760	9890
	032	3300	13500	2250	9000	4850	18810	3600	12900
	050	5280	21600	3600	14400	7720	29930	5760	20640
	075	8030	32850			11690	45620	8760	31390
	100	10780	44100			15660	60710	11760	42140
	150	16280	66600						
	200	10780	44100						

柔性

带轮最小齿数与惰轮最小直径						
T10		带芯类型				
		标准	芳纶	不锈钢	HPL	HFE
无反向弯曲的传动	同步带轮 z_{min}	12	15	12	15	12
	在带齿上运转的惰轮 d_{min}	60mm	60mm	60mm	100mm	50mm
有反向弯曲的传动	同步带轮 z_{min}	20	20	20	30	15
	在传动带背面上运转的惰轮 d_{min}	60mm	60mm	60mm	100mm	50mm

同步带轮

z	da	dw	z	da	dw	z	da	dw	z	da	dw
10	30,05	31,84	39	122,30	124,14	68	214,60	216,44	97	306,90	308,75
11	33,25	35,02	40	125,45	127,32	69	217,75	219,63	98	310,10	311,93
12	36,35	38,20	41	128,65	130,50	70	220,95	222,81	99	313,25	315,12
13	39,50	41,38	42	131,85	133,69	71	224,15	225,99	100	316,45	318,30
14	42,70	44,56	43	135,00	136,87	72	227,30	229,18	101	319,65	321,48
15	45,90	47,75	44	138,20	140,05	73	230,50	232,36	102	322,80	324,66
16	49,05	50,93	45	141,40	143,24	74	233,70	235,54	103	326,00	327,85
17	52,25	54,11	46	144,60	146,42	75	236,90	238,72	104	329,20	331,03
18	55,45	57,29	47	147,75	149,60	76	240,05	241,94	105	332,35	334,21
19	58,65	60,48	48	150,95	152,78	77	243,25	245,09	106	335,55	337,40
20	61,80	63,66	49	154,10	155,97	78	246,40	248,27	107	338,75	340,58
21	65,00	66,84	50	157,30	159,15	79	249,60	251,46	108	341,95	343,76
22	68,15	70,03	51	160,50	162,33	80	252,80	254,64	109	345,15	346,95
23	71,35	73,20	52	163,65	165,52	81	256,00	257,82	110	345,30	350,13
24	74,55	76,39	53	166,85	168,70	82	259,15	261,00	111	351,45	353,31
25	77,70	79,58	54	170,05	171,88	83	262,30	264,19	112	354,65	356,50
26	80,90	82,76	55	173,20	175,06	84	265,50	267,37	113	357,80	359,68
27	84,10	85,95	56	176,40	178,25	85	268,70	270,55	114	361,00	362,86
28	87,25	89,12	57	179,60	181,43	86	271,90	273,74	115	364,19	366,04
29	90,45	92,21	58	182,75	184,61	87	275,05	276,92	116	367,39	369,23
30	93,65	95,49	59	185,95	187,80	88	278,25	280,10	117	370,56	372,41
31	96,85	98,67	60	189,10	190,98	89	281,45	283,28	118	373,76	375,59
32	100,00	101,86	61	192,30	194,16	90	284,60	286,47	119	376,93	378,78
33	103,20	105,04	62	195,50	197,35	91	287,80	289,65	120	380,11	381,96
34	106,40	108,22	63	198,65	200,53	92	291,00	292,84			
35	109,55	111,41	64	201,85	203,71	93	294,20	296,02			
36	112,75	114,59	65	205,05	206,90	94	297,35	299,20			
37	115,90	117,77	66	208,20	210,08	95	300,55	302,39			
38	119,10	120,95	67	211,40	213,26	96	303,75	305,57			



T20

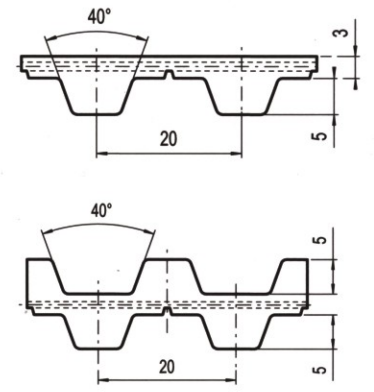
技术参数

带宽 b [mm]	允许拉伸载荷 M型 F_{Tzul} [N]	允许拉伸载荷 V型 F_{Tzul} [N]	断裂载荷 M型 F_{Br} [N]	弹性刚度比 C_{Spez} [N]	重量 [Kg/m]
25	4170	2085	16150	1042500	0,18
32	5390	2695	20900	1347500	0,24
50	8580	4290	33250	2145000	0,37
75	12990	6495	50350	3247500	0,55
100	17400	8700	67450	4350000	0,73
150	25480	12740	98800	6370000	1,10

根据要求可提供其它宽度。

带齿剪切强度

rpm	F_{Uspez} [N/cm]	rpm	F_{Uspez} [N/cm]	rpm	F_{Uspez} [N/cm]	rpm	F_{Uspez} [N/cm]
0	104,50	800	62,15	1900	46,88	4500	30,92
20	101,10	900	60,13	2000	45,94	5000	28,93
40	98,15	1000	58,31	2200	44,20	5500	27,14
60	95,58	1100	56,64	2400	42,61	6000	25,49
80	93,35	1200	55,11	2600	41,13	6500	23,97
100	91,41	1300	53,70	2800	39,77		
200	83,50	1400	52,38	3000	38,49		
300	77,84	1440	51,87	3200	37,29		
400	73,49	1500	51,14	3400	36,16		
500	69,96	1600	49,98	3600	35,10		
600	66,98	1700	48,89	3800	34,09		
700	64,41	1800	47,86	4000	33,13		



传动带特性

- 带有钢制带芯的聚氨酯同步带
- 符合DIN 7721 T1标准的梯形齿形
- 公制节距10mm
- 非常适合高柔性的传动应用
- 广泛用于输送、线性传动和轻载动力传输应用
- 可提供双面带齿的产品

- 宽度公差：±1.0[mm]
- 长度公差：±0.5[mm/n]
- 厚度公差：±0.4[mm]

载荷率F_{Uspez}是指在各种工作条件下1cm宽的单个带齿的最大载荷。该力与传动转速有关。

传动装置中的传动带总传输载荷Fu 计算公式为：

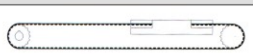
$$Fu\,[N] = F_{Uspez} \cdot ze \cdot b$$

Fu [N]	=周向力
F_{Uspez}[N/cm]	=载荷率
ze	=与小带轮啮合的齿数
zemax	=在传动计算中需要考虑的最大啮合齿数
zemax	= M为12个
zemax	=V为6个
b [cm]	=带宽

特性

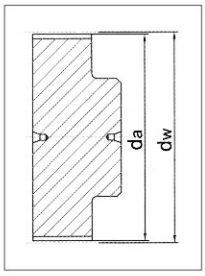
PROFILE	带宽 b[mm]	芳纶带芯		不锈钢		HFE 高弹性	
		F_{Tzul} [N] M 型	F_{Br} [N]	F_{Tzul} [N] M 型	F_{Br} [N]	F_{Tzul} [N] M 型	F_{Br} [N]
T20	025	3230	13430	3060	12750	3400	14450
	032	4180	17380	3960	16500	4400	18700
	050	6650	27650	6300	26250	7000	29750
	075	10070	41870			10600	45050
	100	13490	56090			14200	60350
	150	19760	82160				

柔性

带轮最小齿数与惰轮最小直径					
T20		带芯类型			
		标准	芳纶	不锈钢	HFE
无反向弯曲的传动	同步带轮 z_{min}	15	15	15	15
	在带齿上运转的惰轮 d_{min}	120mm	120mm	130mm	100mm
有反向弯曲的传动	同步带轮 z_{min}	25	25	20	25
	在传动带背面上运转的惰轮 d_{min}	120mm	120mm	130mm	100mm

同步带轮

z	da	dw	z	da	dw	z	da	dw	z	da	dw
15	92,65	95,49	44	277,25	280,10	73	461,85	46,473	102	646,50	649,34
16	99,00	101,86	45	283,60	286,47	74	468,25	47,108	103	652,85	655,71
17	105,40	108,22	46	289,95	292,84	75	474,60	47,745	104	659,20	662,06
18	111,75	114,59	47	296,35	299,21	76	480,95	48,382	105	665,60	668,43
19	118,10	120,96	48	302,70	305,58	77	487,35	49,019	106	671,95	674,80
20	124,50	127,32	49	309,10	311,93	78	493,70	49,656	107	678,30	681,17
21	130,75	133,69	50	315,45	318,30	79	500,05	50,291	108	684,70	687,54
22	137,20	140,06	51	321,80	324,67	80	506,45	50,928	109	691,05	693,89
23	143,55	146,43	52	328,15	331,03	81	512,80	51,565	110	697,40	700,26
24	149,95	152,78	53	334,50	337,40	82	519,15	52,202	111	703,80	706,63
25	156,30	159,15	54	340,90	343,76	83	525,55	52,839	112	710,15	712,99
26	162,65	165,52	55	347,25	350,13	84	531,90	53,474	113	716,50	719,36
27	169,00	171,89	56	353,60	356,50	85	538,25	541,11	114	722,90	725,73
28	175,40	178,25	57	360,00	362,86	86	544,60	547,48	115	729,24	732,09
29	181,75	184,62	58	366,35	369,23	87	551,00	553,85	116	735,61	738,46
30	188,10	190,99	59	372,75	375,59	88	557,35	560,22	117	741,96	744,83
31	194,50	197,35	60	379,10	381,96	89	563,70	566,57	118	748,34	751,19
32	200,85	203,72	61	385,45	388,33	90	571,10	572,94	119	754,70	757,56
33	207,20	210,09	62	391,85	394,70	91	576,45	579,31	120	761,07	763,93
34	213,60	216,44	63	398,20	401,06	92	582,85	585,67			
35	219,95	222,81	64	404,55	407,43	93	589,20	592,04			
36	226,35	22918	65	410,95	413,80	94	595,55	598,41			
37	232,70	235,54	66	417,30	420,17	95	601,90	604,77			
38	239,05	241,91	67	423,65	426,52	96	608,30	611,14			
39	245,40	248,28	68	430,05	432,89	97	614,65	617,51			
40	251,75	254,65	69	436,40	439,26	98	621,00	623,88			
41	258,15	261,02	70	442,80	445,63	99	627,35	630,25			
42	264,50	267,37	71	449,15	451,99	100	633,75	636,60			
43	270,85	273,74	72	455,60	458,36	101	640,10	642,97			



AT5

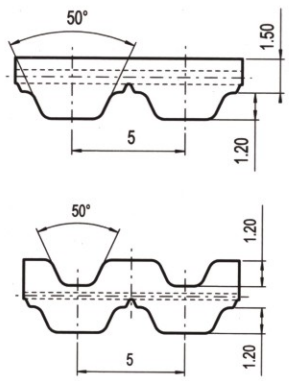
技术参数

带宽 b [mm]	允许拉伸载荷 M型 F_{Tzul} [N]	允许拉伸载荷 V型 F_{Tzul} [N]	断裂载荷 M型 F_{Br} [N]	弹性刚度比 C_{Spez} [N]	重量 [Kg/m]
10	640	320	2160	160000	0,03
16	1120	560	3780	280000	0,05
25	1840	920	6210	460000	0,09
32	2400	1200	8100	600000	0,11
50	3840	1920	12960	960000	0,17
75	5840	2920	19710	1460000	0,26
100	7840	3920	26460	1960000	0,34

根据要求可提供其它宽度。

带齿剪切强度

rpm	F_{Uspez} [N/cm]	rpm	F_{Uspez} [N/cm]	rpm	F_{Uspez} [N/cm]	rpm	F_{Uspez} [N/cm]
0	36,40	800	27,69	1900	22,73	4500	17,18
20	35,88	900	27,06	2000	22,42	5000	16,47
40	35,40	1000	26,49	2200	21,82	5500	15,83
60	34,97	1100	25,96	2400	21,28	6000	15,24
80	34,59	1200	25,47	2600	20,77	6500	14,69
100	34,24	1300	25,01	2800	20,29	7000	14,18
200	32,92	1400	24,57	3000	19,85	7500	13,71
300	31,92	1440	24,41	3200	19,43	8000	13,26
400	30,89	1500	24,16	3400	19,03	8500	12,85
500	29,95	1600	23,78	3600	18,66	9000	12,45
600	29,12	1700	23,41	3800	18,30	9500	12,07
700	28,37	1800	23,07	4000	17,96	10000	11,72



传动带特性

- 带有钢制带芯的聚氨酯同步带
- 公制节距5mm
- 齿形与尺寸均经过优化，可保证载荷均匀分布且变形最小。
- 高耐受性与低延展性钢制带芯可保证高稳定性与低延长率。
- 特别适合轴向与角度定位精度较高的线性传动装置与轻载动力传输应用。
- 可提供双面带齿的产品
- 根据要求可提供负长度公差

- 宽度公差：±0.5[mm]
- 长度公差：±0.5[mm/n]
- 厚度公差：±0.2[mm]

载荷率F_{Uspez}是指在各种工作条件下1cm宽的单个带齿的最大载荷。该力与传动转速有关。
传动装置中的传动带总传输载荷Fu 计算公式为：

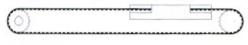
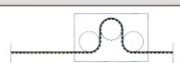
$$Fu\,[N] = F_{Uspez} \cdot ze \cdot b$$

Fu [N]	=周向力
F_{Uspez}[N/cm]	=载荷率
ze	=与小带轮啮合的齿数
zemax	=在传动计算中需要考虑的最大啮合齿数
zemax	= M为12个
zemax	=V为6个
b [cm]	=带宽

特性

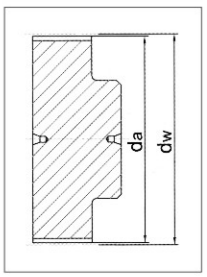
PROFILE	带宽 b[mm]	芳纶带芯		不锈钢	
		F_{Tzul} [N] M 型	F_{Br} [N]	F_{Tzul} [N] M 型	F_{Br} [N]
AT5	010	880	3600	600	2400
	016	1540	6300	1050	4200
	025	2530	10350	1730	6900
	032	3300	13500	2250	9000
	050	5280	21600	3600	14400
	075	8030	32850		
	100	10780	44100		

柔性

带轮最小齿数与惰轮最小直径				
AT5		带芯类型		
		标准	芳纶	不锈钢
无反向弯曲的传动	同步带轮 z_{min}	15	15	15
	在带齿上运转的惰轮 d_{min}	30mm	30mm	65mm
有反向弯曲的传动	同步带轮 z_{min}	25	25	25
	在传动带背面上运转的惰轮 d_{min}	60mm	60mm	65mm

同步带轮

z	da	dw	z	da	dw	z	da	dw	z	da	dw
15	22,65	23,88	44	68,80	70,05	73	114,95	116,22	102	161,15	162,38
16	24,20	25,47	45	70,40	71,64	74	116,55	117,81	103	162,70	163,97
17	25,80	27,06	46	72,00	73,23	75	118,15	119,40	104	164,30	165,57
18	27,40	28,65	47	73,55	74,82	76	119,75	120,99	105	165,90	167,16
19	29,00	30,25	48	75,15	76,42	77	121,35	122,58	106	167,50	168,75
20	30,60	31,83	49	76,75	78,01	78	122,90	124,18	107	169,10	170,34
21	32,20	33,43	50	78,35	79,60	79	124,50	125,77	108	170,70	171,94
22	33,80	35,02	51	79,95	81,19	80	126,10	127,36	109	172,25	173,53
23	35,40	36,62	52	81,55	82,78	81	127,70	128,95	110	173,85	175,12
24	37,00	38,21	53	83,10	84,38	82	129,30	130,54	111	175,45	176,71
25	38,60	39,80	54	84,70	85,97	83	130,90	132,14	112	177,05	178,30
26	40,20	41,39	55	86,30	87,54	84	132,45	133,73	113	178,65	179,84
27	41,80	42,98	56	87,90	89,15	85	134,05	135,32	114	180,25	181,49
28	43,35	44,58	57	89,50	90,74	86	135,65	136,91	115	181,85	183,08
29	44,95	46,17	58	91,10	92,34	87	137,25	138,50	116	183,45	184,67
30	46,55	47,76	59	92,65	93,93	88	138,85	140,10	117	185,00	186,26
31	48,15	49,35	60	94,25	95,52	89	140,45	141,69	118	186,60	187,86
32	49,70	50,94	61	95,85	97,11	90	142,05	143,28	119	188,20	189,45
33	51,30	52,94	62	97,45	98,70	91	143,60	144,87	120	189,80	191,04
34	52,85	54,13	63	99,05	100,30	92	145,20	146,46			
35	54,45	55,72	64	100,65	101,89	93	146,80	148,06			
36	56,05	57,31	65	102,25	103,48	94	148,40	149,65			
37	57,65	58,90	66	103,80	105,07	95	150,00	151,24			
38	59,25	60,50	67	105,40	106,66	96	151,60	152,83			
39	60,85	62,09	68	107,00	108,26	97	153,15	154,42			
40	62,45	63,66	69	108,60	109,85	98	154,75	156,02			
41	64,00	65,27	70	110,20	111,44	99	156,35	157,61			
42	65,60	66,86	71	111,80	113,03	100	157,95	159,20			
43	67,30	68,46	72	113,35	114,62	101	159,55	160,79			



AT10

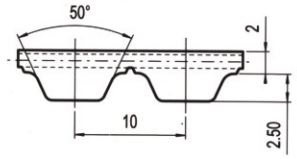
技术参数

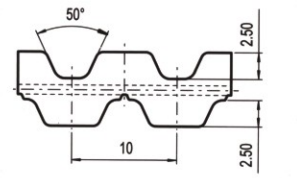
带宽 b [mm]	允许拉伸载荷 M型 F_{Tzul} [N]	允许拉伸载荷 V型 F_{Tzul} [N]	断裂载荷 M型 F_{Br} [N]	弹性刚度比 C_{Spez} [N]	重量 [Kg/m]
16	2450	1225	9500	612500	0,09
25	4170	2085	16150	1042500	0,15
32	5390	2695	20900	1347500	0,19
50	8580	4290	33250	2145000	0,30
75	12990	6495	50350	3247500	0,44
100	17400	8700	67450	4350000	0,59
150	26220	13110	101650	6555000	0,74

根据要求可提供其它宽度。

带齿剪切强度

rpm	F_{Uspez} [N/cm]	rpm	F_{Uspez} [N/cm]	rpm	F_{Uspez} [N/cm]	rpm	F_{Uspez} [N/cm]
0	75,70	800	57,30	1900	42,02	4500	29,13
20	74,59	900	52,21	2000	41,28	5000	27,50
40	73,55	1000	50,85	2200	39,89	5500	26,01
60	72,57	1100	49,59	2400	38,62	6000	24,65
80	71,65	1200	48,43	2600	37,44	6500	23,40
100	70,78	1300	47,34	2800	36,33	7000	22,23
200	67,13	1400	46,32	3000	35,30	7500	21,14
300	64,18	1440	45,93	3200	34,33	8000	20,12
400	61,53	1500	45,36	3400	33,41	8500	19,15
500	59,21	1600	44,46	3600	32,55	9000	18,24
600	57,16	1700	43,60	3800	31,72	9500	17,38
700	55,34	1800	42,79	4000	30,94	10000	16,56





传动带特性

- 带有钢制带芯的聚氨酯同步带
- 公制节距10mm
- 齿形与尺寸均经过优化，可保证载荷均匀分布且变形最小。
- 高耐受性与低延展性钢制带芯可保证高稳定性与低延长率。
- 减少多边形影响和传动振动。
- 特别适合轴向与角度定位精度较高的线性传动装置与轻载动力传输应用。
- 可提供双面带齿的产品
- 根据要求可提供负长度公差

- 宽度公差：±0.5[mm]
- 长度公差：±0.5[mm/n]
- 厚度公差：±0.3[mm]

载荷率F_{Uspez}是指在各种工作条件下1cm宽的单个带齿的最大载荷。该力与传动转速有关。

传动装置中的传动带总传输载荷Fu 计算公式为：

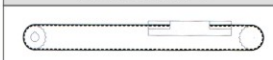
$$Fu\,[N] = F_{Uspez} \cdot ze \cdot b$$

Fu [N]	=周向力
F_{Uspez}[N/cm]	=载荷率
ze	=与小带轮啮合的齿数
zemax	=在传动计算中需要考虑的最大啮合齿数
zemax	= M为12个
zemax	=V为6个
b [cm]	=带宽

特性

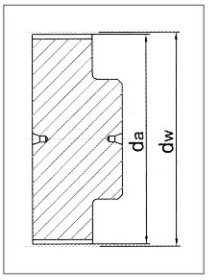
PROFILE	带宽 b[mm]	芳纶带芯		不锈钢		HFE 高弹性	
		F_{Tzul} [N] M 型	F_{Br} [N]	F_{Tzul} [N] M 型	F_{Br} [N]	F_{Tzul} [N] M 型	F_{Br} [N]
AT10	016	1900	7900	1800	7500	2000	8500
	025	3230	13430	3060	12750	3400	14450
	032	4180	17380	3960	16500	4400	18700
	050	6650	27650	6300	26250	7000	29750
	075	10070	41870			10600	45050
	100	13490	56090			14200	60350
	150	20330	84530				

柔性

带轮最小齿数与惰轮最小直径					
AT10		带芯类型			
		标准	芳纶	不锈钢	HFE
无反向弯曲的传动 	同步带轮 Z_{min}	15	15	18	15
	在带齿上运转的惰轮 d_{min}	50mm	50mm	100mm	50mm
有反向弯曲的传动 	同步带轮 Z_{min}	25	20	25	15
	在传动带背面上运转的惰轮 d_{min}	120mm	120mm	100mm	80mm

同步带轮

z	da	dw	z	da	dw	z	da	dw	z	da	dw
18	55,45	57,29	47	147,75	149,60	76	240,05	241,94	105	332,35	334,21
19	58,60	60,48	48	150,95	152,78	77	243,25	245,09	106	335,55	337,40
20	61,80	63,66	49	154,10	155,97	78	246,40	248,24	107	338,75	340,58
21	65,00	66,84	50	157,30	159,15	79	249,60	251,46	108	341,90	343,76
22	68,15	70,03	51	165,50	162,33	80	252,80	254,64	109	345,10	346,95
23	71,35	73,20	52	163,65	165,52	81	255,95	257,82	110	348,30	350,13
24	74,55	76,39	53	166,85	168,70	82	259,15	261,00	111	351,45	353,31
25	77,70	79,58	54	170,05	171,88	83	262,30	264,19	112	354,65	356,50
26	80,90	82,76	55	173,20	175,06	84	265,50	267,37	113	357,80	359,68
27	84,10	85,95	56	176,40	178,25	85	268,70	270,52	114	361,00	362,86
28	87,25	89,12	57	179,60	181,43	86	271,90	273,74	115	364,19	366,04
29	90,45	92,21	58	182,75	184,61	87	275,05	276,92	116	367,39	369,23
30	93,65	95,49	59	185,95	187,80	88	285,25	280,10	117	370,56	372,41
31	96,80	98,67	60	189,10	190,98	89	281,45	283,28	118	373,74	375,59
32	100,00	101,86	61	192,30	194,16	90	284,60	286,47	119	376,93	378,78
33	103,20	105,04	62	195,50	197,35	91	287,80	289,65	120	380,11	381,96
34	106,40	108,19	63	198,65	200,53	92	291,00	292,84			
35	109,55	111,41	64	201,85	203,71	93	294,20	296,02			
36	112,75	114,59	65	205,05	206,90	94	297,35	299,20			
37	115,90	117,77	66	208,20	210,08	95	300,55	302,39			
38	119,10	120,95	67	211,40	213,26	96	303,70	305,57			
39	122,30	124,14	68	214,60	216,44	97	306,90	308,75			
40	125,45	127,32	69	217,75	219,63	98	310,10	300,93			
41	128,65	130,50	70	220,95	222,81	99	313,25	315,12			
42	131,85	133,69	71	224,15	225,99	100	316,45	318,30			
43	135,00	136,87	72	227,30	229,18	101	319,65	321,48			
44	138,20	140,05	73	230,50	232,33	102	322,80	324,66			
45	141,40	143,24	74	233,70	235,54	103	326,00	327,85			
46	144,55	146,42	75	236,90	238,72	104	329,20	33103			



AT20

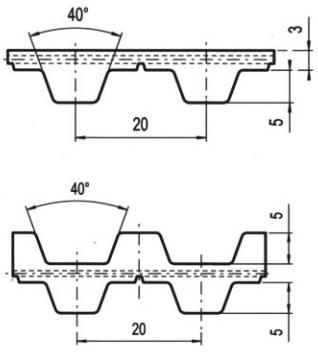
技术参数

带宽 b [mm]	允许拉伸载荷 M型 F_{Tzul} [N]	允许拉伸载荷 V型 F_{Tzul} [N]	断裂载荷 M型 F_{Br} [N]	弹性刚度比 C_{Spez} [N]	重量 [Kg/m]
25	5280	2640	19250	1320000	0,24
32	7200	3600	26250	1800000	0,31
50	11520	5760	42000	2880000	0,48
75	17280	8640	63000	4320000	0,73
100	23520	11760	85750	5880000	0,97
150	35520	17760	129500	8880000	1,45

根据要求可提供其它宽度。

带齿剪切强度

rpm	F_{Uspez} [N/cm]	rpm	F_{Uspez} [N/cm]	rpm	F_{Uspez} [N/cm]	rpm	F_{Uspez} [N/cm]
0	15140	800	9744	1900	6996	4500	3972
20	14856	900	9343	2000	6822	5000	3590
40	14589	1000	9073	2200	6497	5500	3242
60	14338	1100	8777	2400	6198	6000	2923
80	14101	1200	8502	2600	5920	6500	2629
100	13878	1300	8247	2800	5662		
200	12943	1400	8007	3000	5420		
300	12228	1440	7916	3200	5192		
400	11596	1500	7782	3400	4977		
500	11045	1600	7570	3600	4774		
600	10561	1700	7369	3800	4580		
700	10131	1800	7177	4000	4396		



传动带特性

- 带有钢制带芯的聚氨酯同步带
- 公制节距20mm
- 齿形与尺寸均经过优化，可保证载荷均匀分布且变形最小。
- 高耐受性与低延展性钢制带芯可保证高稳定性与低延长率。
- 减少多边形影响和传动振动。
- 特别适合轴向与角度定位精度较高的线性传动装置与轻载动力传输应用。
- 可提供双面带齿的产品
- 根据要求可提供负长度公差

- 宽度公差：±1.0[mm]
- 长度公差：±0.5[mm/n]
- 厚度公差：±0.4[mm]

载荷率F_{Uspez}是指在各种工作条件下1cm宽的单个带齿的最大载荷。该力与传动转速有关。

传动装置中的传动带总传输载荷Fu 计算公式为：

$$Fu\,[N] = F_{Uspez} \cdot ze \cdot b$$

Fu [N]	=周向力
F_{Uspez}[N/cm]	=载荷率
ze	=与小带轮啮合的齿数
zemax	=在传动计算中需要考虑的最大啮合齿数
zemax	= M为12个
zemax	=V为6个
b [cm]	=带宽

3 同步带传动装置的计算
Calculation of Timing Belt Drives

- 符号、单位和术语表
- 计算文件
- 设计程序实例
  - 步骤：提升传动装置
  - 步骤：线性传动装置
- 张紧力测试仪

- Glossary of symbols, units and terms
- Calculation documentation
- Examples of design procedure
  - steps: Lifting drive
  - steps: Linear drive
- Pretension gauges

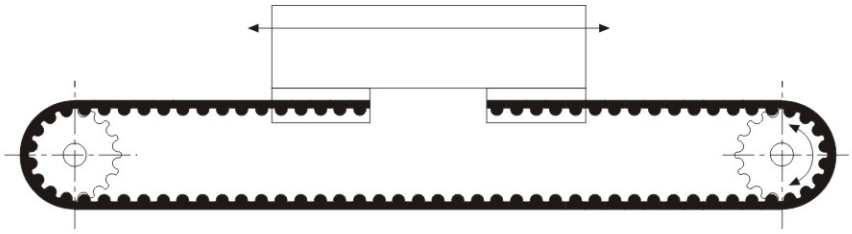
符号、单位和术语表
Glossary of symbols, units and terms

根据装有 JAGDFALKE® 同步传动带的传动装置进行计算。传动装置设计数据见以下图表。影响皮带性能的因素有很多，建议复杂传动装置的设计师向应用工程师咨询。

Calculations are based on drives fitted with JAGDFALKE® OPEN-END TIMING belts. Drive design data are given in the following diagrams and tables. As so many factors influence belt performance, it is suggested that designers of complicated drives consult application engineers for advice.

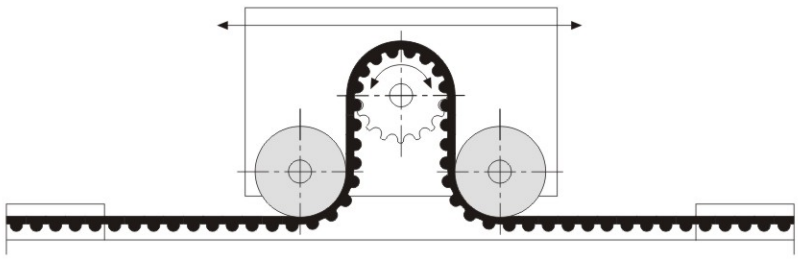
带有2个带轮，不带反向惰轮的同步皮带线性传动装置
Synchronous belt linear drive with 2 pulleys and no deflection

图 Fig. 3



带有1个带轮和偏转惰轮的同步皮带线性传动装置
Synchronous belt linear drive with 1 pulley and deflection idlers

图 Fig. 4



符号 Symbol	公制单位 Unit dt.	英制单位 Unit en.	定义 Definition	
a	毫米	mm	中心距	Centre distance
Δa	毫米	mm	收缩余量	Take up allowance
a_b	米/平方秒	m/s^2	加速	Acceleration
a_v	米/平方秒	m/s^2	制动减速	Braking deceleration
b	毫米	mm	带宽	Belt width
b_{err}	毫米	mm	计算带宽	Calculated belt width
c_{spez}	牛/毫米	N/mm	每mm带长和每mm带宽的比弹簧常数	Specific spring constant per mm of belt length and mm of width
c_0			总使用系数	Overall service factor
c_1			啮合凸齿系数	Teeth in mesh factor
$c_{1\ max}$			啮合凸齿系数最大值	Maximum value for teeth in mesh factor
c_2			负荷系数	Load factor
c_3			加速系数	Acceleration factor
d	毫米	mm	带轮/惰轮直径	Pulley/idler diameter
d_a	毫米	mm	带轮外径	Outside diameter of pulley
d_F	毫米	mm	特定设计的精制孔	Design-specific finished bore

符号 Symbol	公制单位 Unit dt.	英制单位 Unit en.	定义 Definition	
d_{min}	毫米	mm	最小惰轮直径	Minimum diameter of idler
d_w	毫米	mm	带轮节径	Pitch diameter of pulley
d_{w1}	毫米	mm	主动轮节径	Pitch diameter of driver pulley
d_{w2}	毫米	mm	从动带轮节径	Pitch diameter of driven pulley
f	赫兹	Hz	固有频率	Natural frequency
F_R	牛	N	摩擦力	Friction force
F_T	牛	N	静态跨度张力	Static span tension
$F_{T\ max}$	牛	N	最大动态皮带张力	Maximum belt tension dynamic
F_u	牛	N	有效拉力	Effective pull
$F_{u\ max}$	牛	N	最大有效拉力	Maximum effective pull
$F_{u\ spez}$	牛	N	齿面单位负荷	Specific load on tooth flank
F_v	牛	N	皮带安装张力	Belt installation tension
F_{zul}	牛	N	抗拉层容许负荷	allowable load on tension member
g	9.81 米/平方秒	9.81 m/s^2	重力加速度	Gravitational acceleration
i			传动比	Transmission ratio
L_f	毫米	mm	振动激励的自由跨度长度	Free span length for vibration excitation
L_w	毫米	mm	皮带节线长度	Pitch length of belt
$L_{w\ max}$	毫米	mm	最大皮带节线长度	Maximum pitch length of belt
m_{ges}	千克	kg	总重	Total weight
m_R	千克	kg	带重	Weight of belt
m_S	千克	kg	运输重量	Weight of carriage
m_{Sch}	千克	kg	每m长和每mm宽的皮带比重	Specific belt weight per m length and mm width
$m_{Sch\ red}$	千克	kg	带轮减轻重量	Reduced weight of pulley
m_{spez}	千克/米	kg/m	每m长和每mm宽的皮带比重	Specific gravity of belt per m of length and mm of width
m_U	千克	kg	偏转惰轮重量	Weight of deflection idler
$m_{U\ red}$	千克	kg	偏转惰轮减轻重量	Reduced weight of deflection idler
M	牛米	Nm	扭矩	Torque
n	转/分	rpm	带轮转速	Speed of pulley
n_1	转/分	rpm	主动轮转速	Speed of driver pulley
n_2	转/分	rpm	从动带轮转速	Speed of driven pulley
P	千瓦	kW	功率	Power
s_b	米	m	加速距离	Acceleration distance
s_c	米	m	匀速时的行程	Travel at v_{const}
s_{ges}	米	m	总行程	Total travel
s_v	米	m	制动距离	Braking distance
t	毫米	mm	节距	Pitch
t_c	秒	s	匀速时的行程时间	Travel time at vconst
U_w	毫米	mm	带轮节圆周长	Pitch circumference of pulley
v	米/秒	m/s	带速	Belt speed
z			带轮上齿数	Number of teeth on the pulley
z_e			啮合齿数	Number of meshing teeth
z_g			大带轮齿数	Number of teeth on the large pulley
z_k			小带轮齿数	Number of teeth on the small pulley
z_{min}			最低齿数	Minimum number of teeth
z_1			主动轮齿数	Number of teeth on the driver pulley
z_2			从动带轮齿数	Number of teeth on the driven pulley
β	°(度)	°(degrees)	小带轮周围的接触弧	Arc of contact around the small pulley
μ			摩擦系数	Coefficient of friction

计算文件 Calculation Documentation

以下页面包含了设计装有 JAGDFALKE® 的新型同步传动带时所需的数据、公式和表格。此处省略了可利用公式轻计算出数值的表格。
若观察到最大值且负荷均匀，则扭矩和要传输的拉力不需要任何安全系数。在出现波动负荷和交变负荷以及在加速或制动过程中必须利用相应的系数。

The following pages contain all the data, formulae and tables needed when designing a new drive fitted with a JAGDFALKE® OPEN-END TIMING belt.
Tables for values which can easily be calculated using the formulae provided have been omitted.
The torques and effective pulls to be transmitted do not require any safety factors providing the maximum values are observed and the load is uniform. Corresponding factors must be applied in the event of fluctuating and alternating loads as well as with accelerating or braking processes.

总使用系数 c_0
总使用系数c_0考虑了特殊运行条件下所出现的负荷，是负荷系数c_2 与加速系数c_3之和。

$$c_0 = c_2 + c_3$$

啮合凸齿系数 c_1
啮合凸齿系数c_1考虑了与皮带啮合的小齿形带轮z_k的齿数z_e。

$$z_e = z_k \cdot \frac{\beta}{360}$$

带轮包角 β 的计算见第 28 页说明。啮合凸齿系数 c_1 的值与啮合凸齿数 z_e 相对应。

以下最大值适用：

$c_{1\ max} = 12$ für JAGDFALKE® M 型同步传动带
$c_{2\ max} = 6$ für JAGDFALKE® V 型同步传动带

设计传动装置时需考虑的带轮最低齿数 z_{min} 见表6（第14页）。

Overall service factor c_0
The overall service factor c_0 takes into consideration the loads occurring under special operating conditions, and is the sum of load factor c_2 and acceleration factor c_3.

$$c_0 = c_2 + c_3$$

Teeth in mesh factor c_1
The teeth in mesh factor c_1 takes account of the number of teeth z_e of the small toothed pulley z_k that mesh in the belt.

$$z_e = z_k \cdot \frac{\beta}{360}$$

Calculation of the arc of contact is explained on page 28. The value for teeth in mesh factor c_1 corresponds to the number of teeth in mesh z_e.

The following maximum values apply:

$c_{1\ max} = 12$ für JAGDFALKE® synchronous drive belts, type M
$c_{2\ max} = 6$ für JAGDFALKE® synchronous drive belts, type V

The minimum numbers of teeth z_{min} for pulleys that are to be taken into consideration when designing a drive are contained in Table 6 (on page 14).

负荷系数 c_2

负荷系数 c_2 用于补偿运行条件。以下系数仅为参考值。

Load factor c_2

Load factor c_2 is used to compensate for operating conditions. The factors given below are indicative values only.

负荷系数 c_2 / Load factor c_2 Tab. 21

运行条件 Operation conditions		Load factor Load factor c_2
稳定负荷 Steady load		1.0
波动负荷 Fluctuating load	低 low	1.4
	平均 average	1.7
	高 high	2.0

加速系数 c_3

如果增速传动比 > 1.24，则适用加速系数 c_3。

Acceleration factor c_3

The acceleration factor c_3 is applied if the step-up transmission ratio is > 1.24.

加速系数 c_3 / Acceleration factor c_3 Tab. 22

传动比 Transmission ratio 1/i	加速系数 Acceleration factor c_3
1.00 – 1.24	–
1.25 – 1.74	0.1
1.75 – 2.49	0.2
2.50 – 3.49	0.3
≥ 3.50	0.4

传动比 i

传动比 i 为带轮转速 n_1 与 n_2 之比，或齿数 z_2 与 z_1 之比，或带轮节径 d_{w2} 与 d_{w1} 之比。

$$i = \frac{n_1}{n_2} = \frac{z_2}{z_1} = \frac{d_{w2}}{d_{w1}}$$

Transmission ratio i

Transmission ratio i is obtained from the ratio of pulley speeds n_1 and n_2 or the number of teeth z_2 and z_1 or the pitch diameters of pulleys d_{w2} and d_{w1}.

$$i = \frac{n_1}{n_2} = \frac{z_2}{z_1} = \frac{d_{w2}}{d_{w1}}$$

计算文件 Calculation Documentation

带轮齿数 z 和
节径 d_w
带轮齿数 z 和节径 dw 通过所选齿型的节距 t 确定。

$$z = \frac{\pi \cdot d_w}{t} \qquad d_w = \frac{z \cdot t}{\pi} \quad [mm]$$

带轮齿数、节距和外径如表 7 至 16 所示（第 15 至 20 页）。

Number of teeth z and
pitch diameter d_w of the pulleys
The number of teeth z and the pitch diameter d_w of the pulleys are determined by means of pitch t of the chosen tooth profile:

$$z = \frac{\pi \cdot d_w}{t} \qquad d_w = \frac{z \cdot t}{\pi} \quad [mm]$$

Numbers of teeth, pitch and outside diameters of pulleys are contained in Tables 7 to 16 (on pages 15 to 20).

包角 β
对于两个带轮的驱动装置，小带轮周围的接触弧 β 计算如下：

$$\beta = 2 \cdot \arccos \left[\frac{t \cdot (z_g - z_k)}{2 \cdot \pi \cdot a} \right] ° (Grad)$$

对于多个带轮的传动装置，包角 β 必须按给定的几何体进行计算。

Arc of contact β
For two-pulley drives, the arc of contact β around the small pulley is calculated as follows:

$$\beta = 2 \cdot \arccos \left[\frac{t \cdot (z_g - z_k)}{2 \cdot \pi \cdot a} \right] ° (degree)$$

For multiple-pulley drives, the arc of contact β has to be calculated in accordance with the given geometry.

皮带转速 v
皮带转速 v 通过转速 n（单位r.p.m）、齿数 z 和节距 t（单位：mm）或节径 d_w 导出。

$$v = \frac{n \cdot z \cdot t}{60 \cdot 10^3} = \frac{n \cdot d_w \cdot \pi}{60 \cdot 10^3} \quad [m/s]$$

Belt speed v
Belt speed v is derived from speed n in r.p.m., number of teeth z and pitch t in mm or pitch diameter d_w.

$$v = \frac{n \cdot z \cdot t}{60 \cdot 10^3} = \frac{n \cdot d_w \cdot \pi}{60 \cdot 10^3} \quad [m/s]$$

中心距 a
对于带两个带轮的循环路径传动装置，中心距计算如下，其中传动比 i=1：

$$a = \frac{L_W - z \cdot t}{2} \quad [mm]$$

其中 i 不等于1，中心距 a 近似值如下：

$$a \approx \frac{1}{4} \cdot \left[L_W - \frac{t}{2} \cdot (z_g + z_k) + \sqrt{\left[L_W - \frac{t}{2} \cdot (z_g + z_k) \right]^2 - 2 \cdot \left[\frac{t}{\pi} \cdot (z_g - z_k) \right]^2} \right] \quad [mm]$$

Centre distance a
Centre distance is calculated as follows for circular path drives with two pulleys and where transmission ratio i = 1:

$$a = \frac{L_W - z \cdot t}{2} \quad [mm]$$

Where i does not equal 1, centre distance a is approximated as below:

节线长度 L_W

对于两个带轮的传动装置，同步传动带的节线长度 L_W 近似值如下：

$$L_W \approx 2 \cdot a + \frac{t}{2} \cdot (z_g + z_k) + \frac{\left[\frac{t}{\pi} \cdot (z_g - z_k)\right]^2}{4 \cdot a} \quad [mm]$$

精确计算如下：

$$L_W = 2 \cdot a \cdot \sin\frac{\beta}{2} + \frac{t}{2} \cdot \left[z_g + z_k + \left(1 - \frac{\beta}{180}\right) \cdot (z_g - z_k)\right] \quad [mm]$$

对于线性和多带轮传动装置，节线长度 L_W 按给定的几何体确定。

有效拉力 F_u、扭矩 M 和功率 P

以下方程用于计算有效拉力 F_u、转矩 M 和功率 P。

$$F_u = \frac{P \cdot 10^3}{v} = \frac{M \cdot 2 \cdot 10^3}{d_w} \quad [N] \qquad M = \frac{P \cdot 9.55 \cdot 10^3}{n} = \frac{F_u \cdot d_w}{2 \cdot 10^3} \quad [Nm] \qquad P = \frac{M \cdot n}{9.55 \cdot 10^3} = \frac{F_u \cdot v}{10^3} \quad [kW]$$

带宽 b

带宽 b 根据传输的有效拉力 F_u、齿面单位负荷 $F_{u\,spez}$ 以及使用系数 c_0 和啮合凸齿系数 c_1 进行计算。

$$b_{err} = \frac{F_u \cdot c_0 \cdot 10}{F_{u\,spez} \cdot c_1} \quad [mm]$$

齿面单位负荷值 $F_{u\,spez}$ 可以从图 5 至图 6 中（第31和32页）中获得。

一旦确定标准带宽 b 后，就需要检查抗拉层的负荷了。

标准带宽的同步传动带的抗拉层容许负荷 F_{zul} 见表 23 至 25（第 33 和 35 页）。

适用于以下规则:

$$F_{zul} \geqq F_{T\,max} \cdot c_0 \quad [N]$$

下一节将讲述如何确定动态皮带张力 $F_{T\,max}$。

Pitch length L_W

For a two-pulley drive, pitch length L_w of the synchronous drive belt is approximated as below:

$$L_W \approx 2 \cdot a + \frac{t}{2} \cdot (z_g + z_k) + \frac{\left[\frac{t}{\pi} \cdot (z_g - z_k)\right]^2}{4 \cdot a} \quad [mm]$$

and calculated precisely as follows:

For linear and multiple-pulley drives, pitch length L_w is determined in accordance with the given geometry.

Effective pull F_u, torque M, power P

The following equations are used to calculate effective pull F_u, torque M and power P:

$$F_u = \frac{P \cdot 10^3}{v} = \frac{M \cdot 2 \cdot 10^3}{d_w} \quad [N] \qquad M = \frac{P \cdot 9.55 \cdot 10^3}{n} = \frac{F_u \cdot d_w}{2 \cdot 10^3} \quad [Nm] \qquad P = \frac{M \cdot n}{9.55 \cdot 10^3} = \frac{F_u \cdot v}{10^3} \quad [kW]$$

Belt width b

Belt width b is calculated from the effective pull F_u to be transmitted, the specific load on tooth flank $F_{u\,spez}$ as well as the service factor c_0 and the teeth in mesh factor c_1.

$$b_{err} = \frac{F_u \cdot c_0 \cdot 10}{F_{u\,spez} \cdot c_1} \quad [mm]$$

Values for the specific load on tooth flank $F_{u\,spez}$ can be taken from Figs. 5 to 6 (on pages 31 and 32).

Once the belt standard width b has been determined, it is necessary to check the tension member load.

Permissible tension member loads F_{zul} for synchronous drive belts with standard widths are contained in Tables 23 and 25 (on pages 33 and 35).

The following rule applies:

$$F_{zul} \geqq F_{T\,max} \cdot c_0 \quad [N]$$

The next section explains how to determine the dynamic belt tension $F_{T\,max}$.

计算文件 Calculation Documentation

皮带安装张力 F_V

皮带张紧是影响同步带传动装置可靠性、性能和使用寿命的决定性因素。

计算：

对于线性传动装置，安装张力计算为皮带张力。以下规则适用于静态皮带张力F_T：

$$F_T \geqq F_{u\,max}\ [N]$$

动态下的最大皮带张力 $F_{T\,max}$ 可通过以下公式导出：

$$F_{T\,max} = F_T + F_{u\,max}\ [N]$$

对于环形的传动装置，安装张力通常作为轴负荷F_V给出。以下方程适用：

$$F_v = F_u \cdot \sin\frac{\beta}{2}\ [N]$$

通过收缩余量调整安装张力 F_T

在线性传动装置上，可以通过皮带伸长对安装张力进行调整。收缩余量 Δa（单位：mm）可通过皮带张力 F_T、皮带尺寸 L_W 和 b 以及弹簧常数 c_{spez} 导出。

对于线性传动装置，如图3（第24页）所示

$$\Delta a = \frac{F_T \cdot L_W}{2 \cdot c_{spez} \cdot b}\ [mm]$$

对于线性传动装置，如图4（第24页）所示

$$\Delta a = \frac{F_T \cdot L_W}{c_{spez} \cdot b}\ [mm]$$

弹簧常数值cspez可以从表24、26和28中获得（第33、35和37页）。

通过频率测量法调整安装张力

也可以通过测量振动皮带跨度的固有频率来调整线性传动装置的安装张力。这一数值可以利用张紧力测试仪精确确定（见第46页）。但是，必须记住只有通过特定长度的自由跨度 L_f 才能获得可测量的振动。

另请参见我公司的计算实例。

$$f = \sqrt{\frac{F_T}{4 \cdot m \cdot L_f^2}}$$

Belt installation tension F_V

Tensioning of the belt is a decisive factor affecting the reliability, performance and life of a synchronous belt drive.

Calculation:

For linear drives, installation tension is calculated as the belt tension. The following rule applies to the static belt tension F_T:

$$F_T \geqq F_{u\,max}\ [N]$$

Maximum belt tension $F_{T\,max}$ occurring in the dynamic state is derived from

$$F_{T\,max} = F_T + F_{u\,max}\ [N]$$

With circular path drives, installation tension is usually given as shaft load F_v. The following equation applies:

$$F_v = F_u \cdot \sin\frac{\beta}{2}\ [N]$$

Adjusting installation tension F_T via the takeup allowance

On linear drives, installation tension is adjusted via belt elongation. The takeup allowance Δa in mm is derived from the belt tension F_T, the belt dimensions L_W and b as well as the spring constants c_{spez}.

For linear drives as shown in Fig. 3 (on page 24)

$$\Delta a = \frac{F_T \cdot L_W}{2 \cdot c_{spez} \cdot b}\ [mm]$$

For linear drives as shown in Fig. 4 (on page 24)

$$\Delta a = \frac{F_T \cdot L_W}{c_{spez} \cdot b}\ [mm]$$

The values for the spring constants c_{spez} can be taken from Tables 24, 26 and 28 (on pages 33, 35 and 37).

Adjusting installation tension via the frequency measurement method

Installation tension on linear drives can also be adjusted by measuring the natural frequency of a vibrating belt span. This value can be determined with a pretension gauge very exactly (see page 46). It must be remembered, however, that measurable vibrations are only obtainable from a free span length L_f up to a certain length.

See also our calculation examples.

$$f = \sqrt{\frac{F_T}{4 \cdot m \cdot L_f^2}}$$

选择齿型

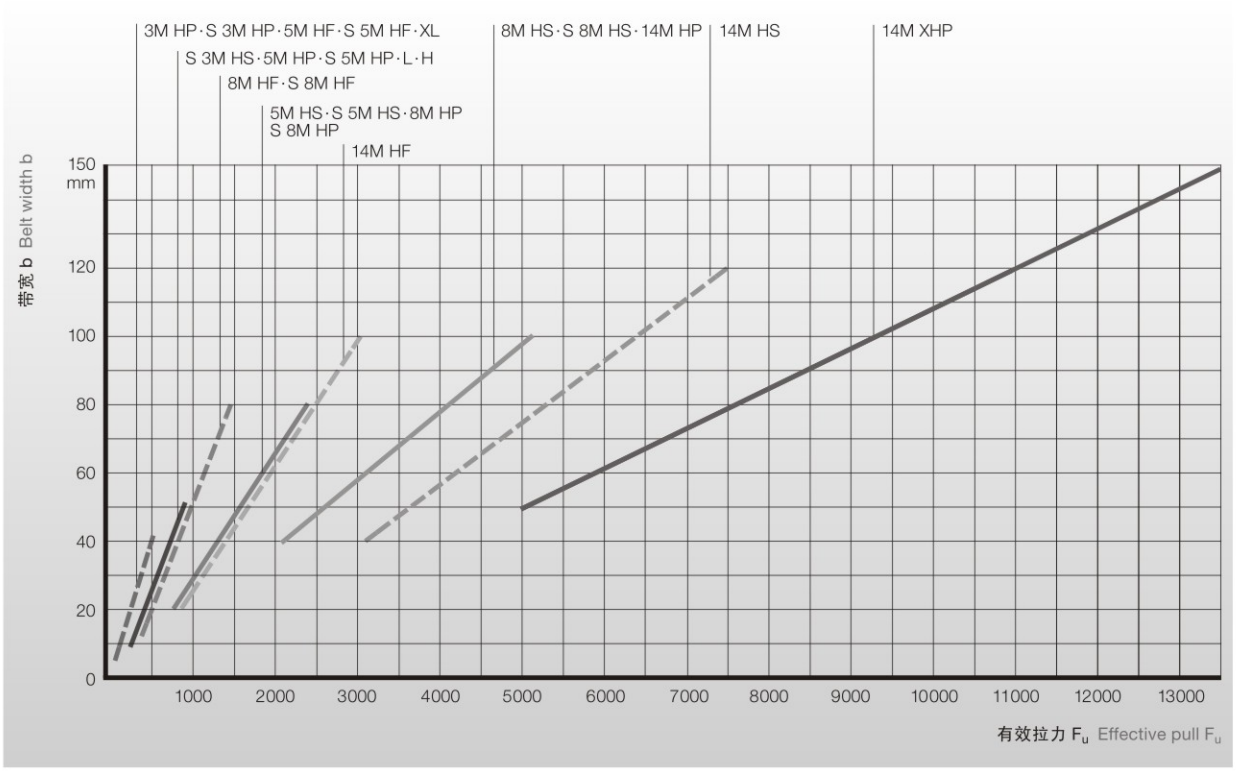
通过确定传输的有效拉力与可能的带宽相交叉的位置，便可以从图 5 中选择合适的齿型。应选择功率传输能力最强的皮带。在出现边界线的情况下，建议以较小的齿型作为传动装置设计计算的依据。

Selecting the tooth profile

A suitable tooth profile is selected from Fig. 5 by locating the point at which the effective pull to be transmitted intersects with the possible belt width. The belt with the greatest power transmitting capacity should be selected. In borderline cases, it is recommended that the smaller profile is taken as a basis for drive design calculation.

图 Fig. 5

选择同步传动带图 Diagram for selecting synchronous drive belts



齿面单位负荷 $F_{u\,spez}$
抗拉层负荷 F_{zul}
弹簧比常数 c_{spez}

为达到传动装置的精确设计，可以从下列页面的图表中获得齿面单位负荷、抗拉层负荷和弹簧比常数所需的值。根据给定的皮带转速 v（单位：m/s）和相应齿型的带轮直径 dw（单位：mm）计算出速度 n（单位r.p.m）后，可以从图6、7和8中获得齿面单位负荷 $F_{u\,spez}$。抗拉层负荷F_{zul}（单位：N）如表23、25和27所示。表24、26和28显示了计算收缩余量 Δa 所需的弹簧比常数 c_{spez}（单位：N/mm）。

Specific load on tooth flank $F_{u\,spez}$
Tension member load F_{zul}
Specific spring constant c_{spez}

The values required for the specific load on tooth flank, tension member load and specific spring constant in order to arrive at a precise drive design can be taken from the diagrams and tables on the following pages.
The specific load on tooth flank $F_{u\,spez}$ can be taken from Figs. 6, 7 and 8 after calculating speed n in r.p.m. from the given belt speed v in m/s and the pulley diameter d_w in mm for the corresponding profile.
Tension member load F_{zul} in N is given in Tables 23, 25 and 27. Tables 24, 26 and 28 show the specific spring constant c_{spez} in N/mm for calculating takeup allowance Δa.

计算文件 Calculation Documentation

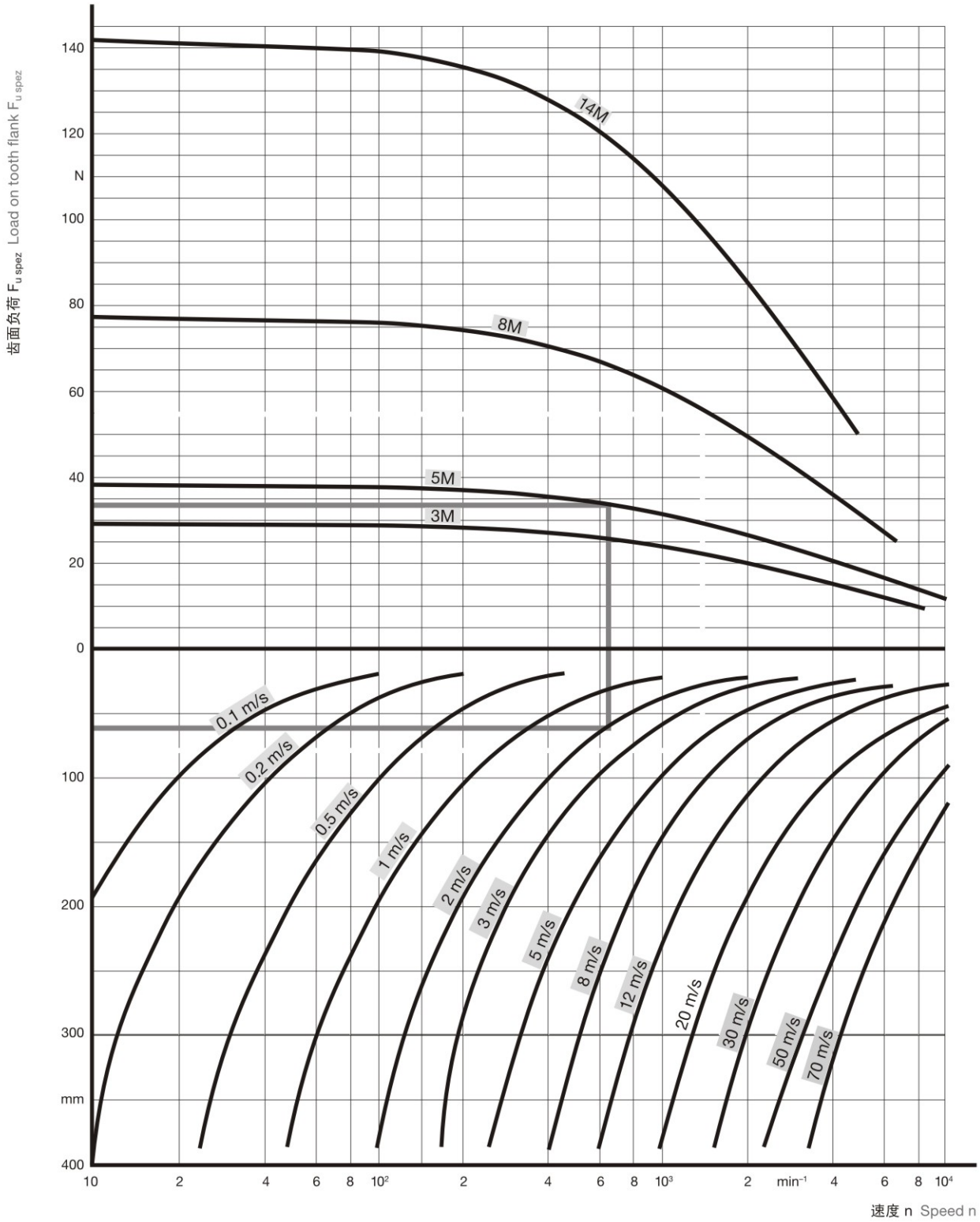
HTD 同步传动带 3M, 5M, 8M, 14M

HTD synchronous drive belts 3M, 5M, 8M, 14M

每 10mm 带宽和每一啮合凸齿的齿面单位负荷 $F_{u\,spez}$（单位：N）

Specific load on tooth flank $F_{u\,spez}$ in N per 10 mm belt width and per meshing tooth

图 Fig. 6



提升传动装置实例
Example for a lifting drive

线性传动装置实例
Example for a linear drive

伸长率为 0.4% 时的抗拉层容许负荷 F_{zul} / Allowable tension member load* F_{zul} in N at 0.4% elongation** Tab. 23

齿型/版本 Tooth Profile Type/Version		HTD 3M		HTD 5M			HTD 8M				HTD 14M				
		HP	HF	HP	HS	V-HF	HF	HP	HS	V-HF	HF	HP	HS	XHP	V-HF
带宽 b（单位：mm） Belt width b mm	5	150	150												
	10	300	300	650	1200		650	1200							
	15	450	450	975	1800		975	1800	3150						
	20	600	600	1300	2400	300	1300	2400	4200		2400				
	25	750	750	1625	3000	375	1625	3000	5250	750	3000	5250			
	30	900	900	1950	3600	450	1950	3600	6300	900	3600	6300	7500		1800
	40	1200	1200	2600	4800	600	2600	4800	8400	1200	4800	8400	10000	19000	2400
	50	1500	1500	3250	6000	750	3250	6000	10500	1500	6000	10500	12500	23800	3000
	55						3575	6600	11550	1650	6600	11550	13750	26100	3300
	85						5525	10200	17850	2550	10200	17850	21250	40400	5100
	100						6500	12000	21000	3000	12000	21000	25000	47600	6000
	115											24150	28750	54700	
	120											25200	30000	57100	
	150													71400	

* 断裂负荷约为抗拉层上容许负荷的 4 倍。
* The breaking load equals about factor 4 in relation to the admissible load on the tension members.

弹簧比常数 c_{spez} **（单位：N/mm）/ Specific spring constant** c_{spez} **in N/mm** Tab. 24

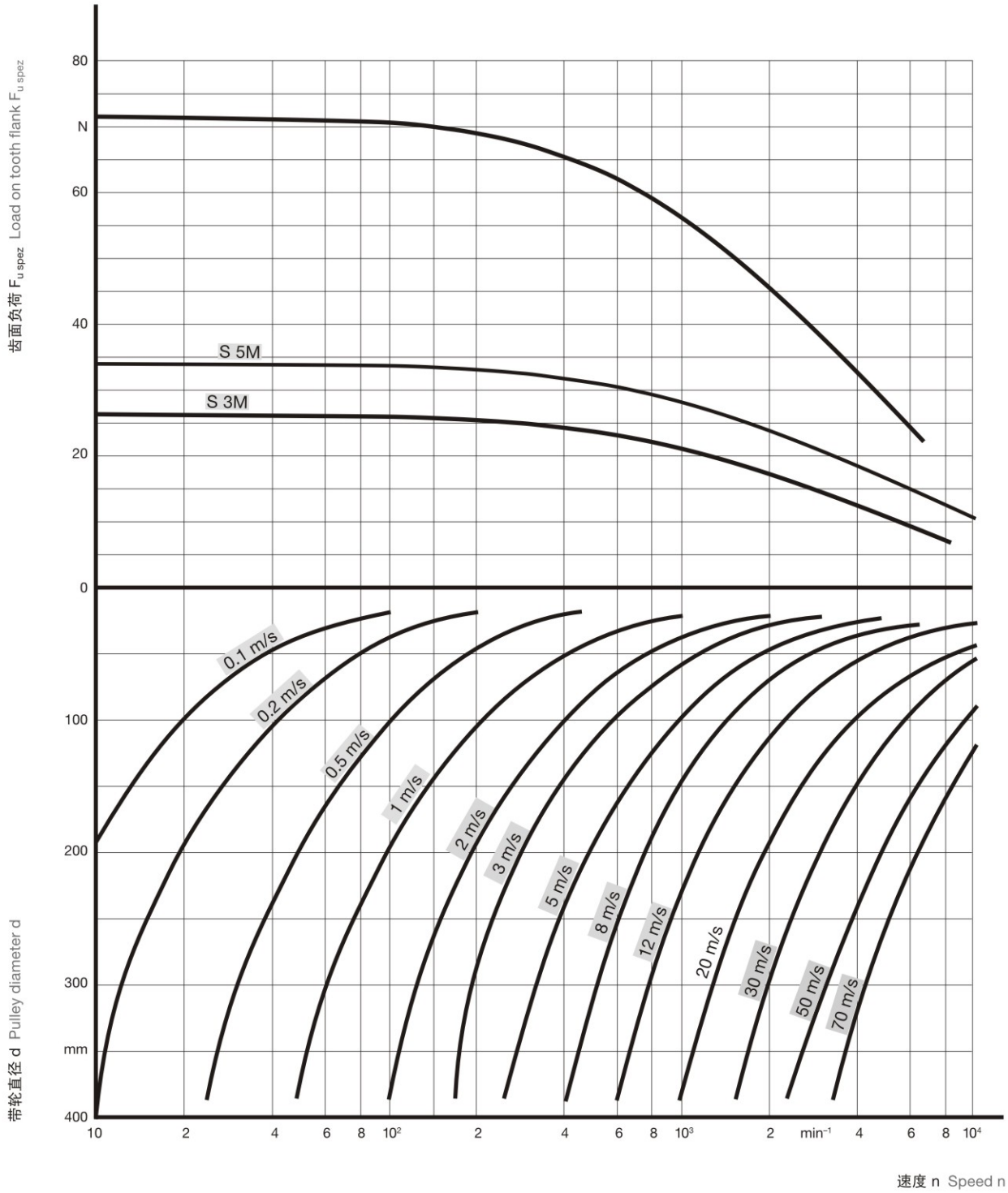
齿型/版本 Tooth Profile Type/Version		HTD 3M	HTD 5M			HTD 8M			HTD 14M			
		M HP	M HF	M HP	M HS	M HF	M HP	M HS	M HF	M HP	M HS	M XHP
C_{spez}	N/mm	$7.5 \cdot 10^3$	$7.5 \cdot 10^3$	$20 \cdot 10^3$	$35 \cdot 10^3$	$20 \cdot 10^3$	$35 \cdot 10^3$	$53 \cdot 10^3$	$35 \cdot 10^3$	$53 \cdot 10^3$	$63 \cdot 10^3$	$120 \cdot 10^3$

计算文件 Calculation Documentation

JAGDFALKE® STD 同步传送带 S 3M、S 5M 和 S 8M
JAGDFALKE® STD OPEN-END TIMING belts S 3M, S 5M, S 8M

每 10mm 带宽和每一啮合凸齿的齿面单位负荷 $F_{u\,spez}$（单位：N）
Specific load on tooth flank $F_{u\,spez}$ in N per 10 mm belt width and per meshing tooth

图 Fig. 7



伸长率为 0.4% 时的抗拉层容许负荷* F_{zul} / Allowable tension member load* F_{zul} in N at 0.4% elongation Tab. 25

齿型/版本 Tooth Profile Type/Version		STD S 3M	STD S 5M				STD S 8M			
		HP	HF	HP	HS	V-HF	HF	HP	HS	V-HF
带宽 b（单位：mm） Belt width b mm	5	150	150							
	10	300	300	650	1200		650			
	15	450	450	975	1800		975	1800	3150	
	20	600	600	1300	2400	300	1300	2400	4200	
	25	750	750	1625	3000	375	1625	3000	5250	750
	30	900	900	1950	3600	450	1950	3600	6300	900
	50	1500	1500	3250	6000	750	3250	6000	10500	1500
	85						5525	10200	17850	2550
	100						6500	12000	21000	3000
	115								24150	
	120								25200	

* 断裂负荷约为抗拉层上容许负荷的 4 倍。
* The breaking load equals about factor 4 in relation to the admissible load on the tension members.

弹簧比常数 c_{spez}（单位：N/mm）/ Specific spring constant c_{spez} in N/mm Tab. 26

齿型/版本 Tooth Profile Type/Version		STD S 3M	STD S 5M			STD S 8M		
		HP	HF	HP	HS	HF	HP	HS
C_{spez}	N/mm	$7.5 \cdot 10^3$	$7.5 \cdot 10^3$	$20 \cdot 10^3$	$35 \cdot 10^3$	$20 \cdot 10^3$	$35 \cdot 10^3$	$53 \cdot 10^3$

计算文件 Calculation Documentation

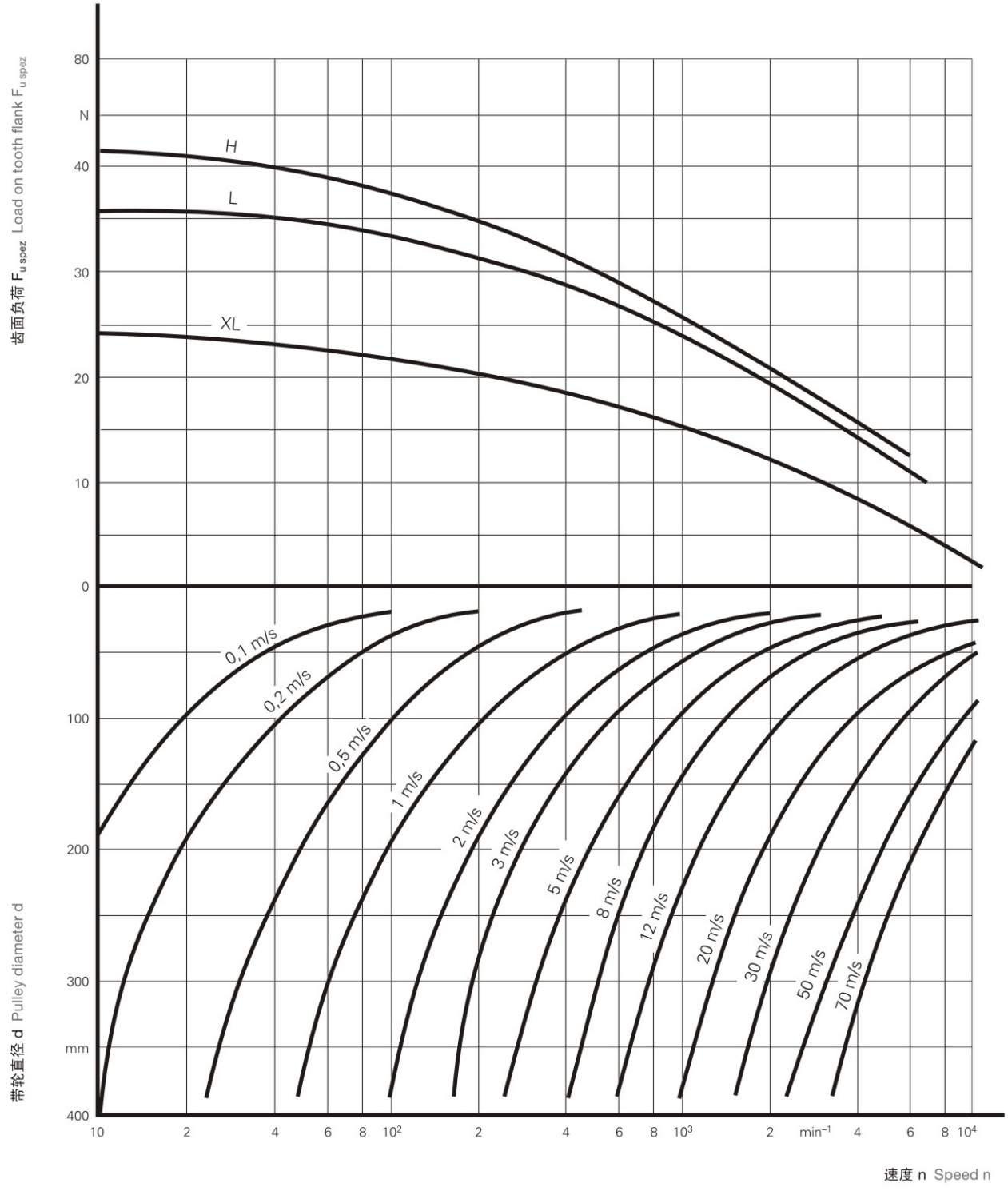
JAGDFALKE® **同步传送带 XL、L、H**

JAGDFALKE® **Open-end belts XL,L,H**

每 10mm 带宽和每一啮合凸齿的齿面单位负荷 $F_{u\,spez}$（单位：N）

Specific load on tooth flank $F_{u\,spez}$ in N per 10 mm belt width and per meshing tooth

Abb. Fig. 8



伸长率为 0.4% 时抗拉层的容许负荷* F_{zul}（单位：N） / Allowable tension member load* F_{zul} in N at 0.4% elongation Tab. 27

齿型/版本 Tooth Profile Type/Version		XL		L		H	
		M-HF	V-HF	M-HF	V-HF	M-HF	V-HF
带宽 b（单位：mm） Belt width b mm	6.35	200					
	9.53	300		650		650	
	12.70	400		850		850	
	19.10	600	300	1300		1300	
	25.40	750	375	1625	750	1625	750
	38.10	1200	600	2600	1200	2600	1200
	50.80	1500	750	3250	1500	3250	1500

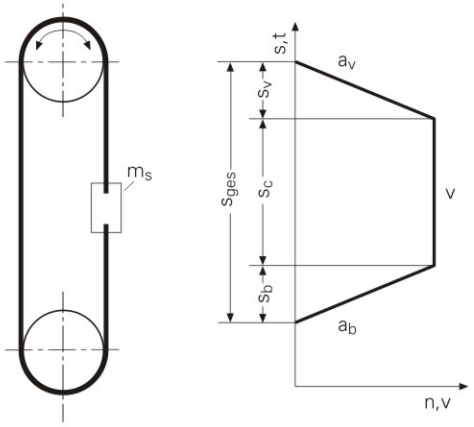
* 断裂负荷约为抗拉层上容许负荷的 4 倍。
* The breaking load equals about factor 4 in relation to the admissible load on the tension members.

弹簧比常数 c_{spez}（单位：N/mm） / Specific spring constant c_{spez} in N/mm Tab. 28

齿型/版本 Tooth Profile Type/Version		XL	L	H
		M-HF	M-HF	M-HF
C_{spez}	N/mm	$7.5 \cdot 10^3$	$20 \cdot 10^3$	$20 \cdot 10^3$

设计程序步骤示例：提升传动装置
Examples of design procedure steps: Lifting drive

提升传动装置——原理与运动图 Lifting drive – principle and motion diagram 图 Fig. 9



示例
利用以下规格确定线性传动装置所需的 JAGDFALKE® 同步传送带：

Example
Determine the JAGDFALKE®OPEN-END TIMING belt needed for a linear drive with the following specification:

皮带节线长度	Pitch length of the belt	L_w = 12 000 mm
带轮节径	Pitch diameter of the pulleys	d_w = 80 mm
提升质量	Mass of the carriage	m_s = 55 kg
摩擦力	Friction force	F_R = 50 N
匀速时的行程	Travel at v_{const}	s_c = 2.0 m
移动速度	Travel speed	v = 6 m/s
加速度	Acceleration	a_b = 8.0 m/s²
制动减速度	Braking deceleration	a_v = 8.0 m/s²

计算线性动量	**Calculate linear momentum**	
加速距离	Acceleration distance	
$s_b = \frac{v^2}{2 \cdot a_b}$		$s_b = \frac{6^2}{2 \cdot 8} = 2.25$ m
制动距离	Braking distance	
$s_v = \frac{v^2}{2 \cdot a_v}$		$s_v = \frac{6^2}{2 \cdot 8} = 2.25$ m
总行程	Total travel	
$s_{ges} = s_b + s_c + s_v$		s_{ges} = 2 + 2.25 + 2.25 = 6.5 m

选择齿型	**Select tooth profile**	
$F_u = m_s \cdot b + m_s \cdot g$		$F_u = 55 \cdot 8 + 55 \cdot 9.81 = 979.6$ N
选择齿型	Select profile	选择/selected:
（第 31 页图 5）	(Diagram Fig. 5, page 31)	JAGDFALKE®OPEN-END TIMING 同步传动带/synchronous drive belt 齿型/Profile 8M 宽度/Width 30 mm 型/Type M HP
带轮	**Pulleys**	选择/selected:
节径 d_w	Pitch diameter d_w	$d_w = 81.49$ mm
（第 16 页表 9）	(Tab. 9, page 16)	$z = 32$
特定设计的精制孔	Design-specific finished bore	$d_F = 40$ mm
根据制造商规格确定的带轮质量	Mass of the pulleys according to manufacturer's specification	$m_{Sch} = 1.53$ kg
带轮标识	Pulley designation	HTD 带轮/HTD pulley P 32 – 8M – 30
准确确定传输的最大有效拉力	**Precisely determine the maximum effective pull to be transmitted**	
运输质量 m_s	Mass of carriage m_s	$m_s = 55$ kg
皮带质量 m_R $m_R = m_{spez} \cdot b_w \cdot L$	Mass of belt m_R	$m_R = 6.32 \cdot 10^{-3} \cdot 30 \cdot 2 = 2.28$ kg
（重量见第 9 页表 1）	(Weight from table 1, page 9)	
带轮折合质量	Reduced mass of the pulleys	Reduzierte Masse der Zahnscheiben
$m_{Sch\,red} = \frac{m_{Sch}}{2} \cdot \left(1 + \frac{d_F^2}{d_a^2}\right)$		$m_{Sch\,red} = \frac{1.53}{2} \cdot \left(1 + \frac{40^2}{80{,}12^2}\right) = 0.96$ kg
总质量 $m_{ges} = m_s + m_R + M_{Sch\,red}$	Total mass	Gesamtmasse $m_{ges} = 55 + 2\,28 + 0.96 = 58.24$
最大有效传输拉力 $F_{u\,max} = m_{ges} \cdot b + m_s \cdot g + F$	Maximum effective pull to be transmitted	Maximal zu übertragende Umfangskraft $F_{u\,max} = 58.24 \cdot 8 + 55 \cdot 9.81 + 50 = 1055$ N
计算因子	**Calculation factors**	
啮合凸齿轮系数 c_1（第26页）	Tooth in mesh factor c_1 (Page 26)	$c_1 = 12$
平均波动负荷系数 c_2（第 27 页表 21）	Load factor for average fluctuation load c_2 (Tab. 21, page 27)	$c_2 = 1.4$
加速系数 c_3（第 27 页 表 22）	Acceleration factor c_3 (Tab. 22, page 27)	$c_3 = 0$
总使用系数 $c_0 = c_2 + c_3$	Overall service factor	$c_0 = 1.4 + 0 = 1.4$

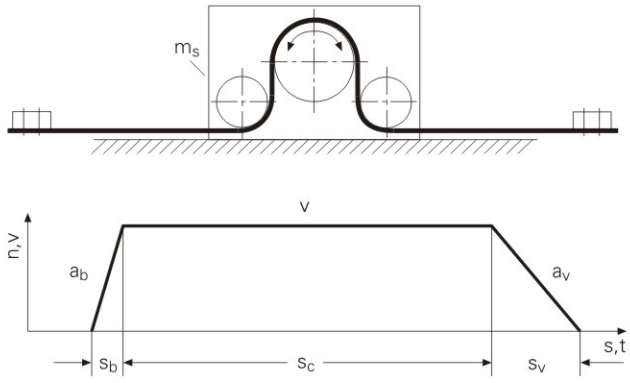
设计程序步骤示例：提升传动装置
Examples of design procedure steps: Lifting drive

根据容许齿面负荷确定带宽 $b_{err} = \frac{F_{u\,max} \cdot c_0 \cdot 10}{F_{u\,spez} \cdot c_1}$	**Determine belt width in accordance with allowable flank load**	$b_{err} = \frac{1055 \cdot 1.4 \cdot 10}{55 \cdot 12} = 22.38$ mm
$F_{u\,spez}$（第 32 页图 6）	$F_{u\,spez}$ (Fig. 6, page 32)	
要求 $b > b_{err}$	Requirement $b > b_{err}$	
第二大带宽 b （第 9 页表 2）	Next greater belt width b (Tab. 2, page 9)	选择/selected: b = 30 mm
皮带安装张力	**Belt installation tension**	
以下数值适用于线性传动装置 $F_T \geq F_{u\,max}$	The following applies for linear drives	选择/selected: F_T = 1100 N > 1055 N
最大动态皮带张力 $F_{T\,max} = F_T + F_{u\,max}$	max. belt tension dynamic	$F_{T\,max}$ = 1100 + 1055 = 2155 N
线性传动装置收缩余量 $\Delta a = \frac{F_T \cdot L_W \cdot 10^3}{2 \cdot c_{spez} \cdot b}$	Takeup allowance for linear drives	$\Delta a = \frac{1100 \cdot 12000}{2 \cdot 35 \cdot 10^3 \cdot 30} = 6.29$ mm
c_{spez}（第 33 页表 24）	c_{spez} (Tab. 24, page 33)	
此外，还可以通过频率测量法设置初拉力。因此需要将附近的夹持端向偏移点移动大约 1m。可以使用自由选择的跨长 L_f 来进行计算和测量。 另请参见第 30 页。	Alternatively it is possible to install the pretension via frequency measurement method. Therefore it is necessary to move the clamp end nearby (about 1 m) to the deflection point. This freely chosen span length L_f can be used for calculation and measurements. See also page 30.	
自由跨长	Free span length	选择/selected: L_f = 1 m
每米长的重量 m $m = m_{spez} \cdot b$ m_{spez}（第 9 页表 1）	Weight m per m length m_{spez} (Tab. 1, page 9)	$m = 6.32 \cdot 10^{-3} \cdot 30 = 0.19 \frac{kg}{m}$

皮带张紧频率 $f = \sqrt{\frac{F_T}{4 \cdot m \cdot L_f^2}}$	Belt tension frequency	$f = \sqrt{\frac{1100}{4 \cdot 0.19 \cdot 1^2}} = 38\ Hz$ 当测得的频率与计算出的频率相同时，则说明皮带预紧设置正确。 The belt has the correct pretension when the measured frequency is the same as the calculated frequency.
检查抗拉层容许负荷 F_{zul}（第 33 页表 23） 要求 $F_{zul} \geq F_{T\ max} \cdot {}_0c$	Check allowable tension member load F_{zul} (Tab. 23, page 33) Requirement	$F_{zul} = 3600\ N$ $3600 > 2155 \cdot 1{,}4$ $3600 > 3017$ 满足要求，即抗拉层容许负荷大于满足安全系数情况下的皮带最大张力。 Requirement is fulfilled, i.e. the allowable tension member load is greater than the maximum belt tension taking the service factor into consideration.
设计选择	Design choice	同步传动带/synchronous drive belt M 6 – 8M – 30 HP

设计程序步骤示例：提升传动装置
Examples of design procedure steps: Linear drive

提升传动装置——原理与运动图 Linear drive – principle and motion diagram 图 Fig. 9



示例

利用以下规格确定线性传动装置所需的 JAGDFALKE® 同步传送带：

Example

Determine the JAGDFALKE®OPEN-END TIMING belt needed for a linear drive with the following specification:

皮带节线长度	Pitch length of the belt	L_w = 8000 mm
带轮节径	Pitch diameter of the pulleys	d_w < 80 mm
惰轮直径	Idler diameter	d < 60 mm
运输质量	Mass of the carriage	m_s = 28 kg
摩擦系数	Coefficient of friction	μ = 0.6
行程时间	Travel time	t_c = 2.5 s
匀速时的行程	Travel at v_{const}	s_c = 5.0 m
加速距离	Acceleration distance	s_b = 0.5 m
制动距离	Braking distance	s_v = 1.5 m

计算加速度和制动减速度	**Calculate acceleration and braking deceleration**	
移动速度	Travel speed	
$v = \frac{s_c}{t_c}$		$v = \frac{5}{2.5} = 2$ m/s
加速度	Acceleration	
$a_b = \frac{v^2}{2 \cdot s_b}$		$a_b = \frac{2^2}{2 \cdot 0.5} = 4$ m/s²
制动减速度	Braking deceleration	
$a_v = \frac{v^2}{2 \cdot s_v}$		$a_v = \frac{2^2}{2 \cdot 1.5} = 1.33$ m/s²

选择齿型	**Select tooth profile**	
有效传输拉力的近似计算	Approximate calculation of effective pull to be transmitted	
$F_u = m_s \cdot a_b + m_s \cdot g \cdot \mu$		$F_u = 28 \cdot 4 + 28 \cdot 9.81 \cdot 0.6 = 277$ N
选择齿型	Select profile	选择/selected:
（第 31 页图 5）	(Diagram Fig. 5, page 31)	JAGDFALKE®OPEN-END TIMING 同步传动带/synchronous drive belt 齿型 /Profile 5M 宽度 /Width 30 mm 型/Type M HP
带轮	**Pulleys**	选择/selected:
节径 d_w	Pitch diameter d_w	$d_w = 60.48$ mm
（第 15 页表 8）	(Tab. 8, page 15)	$z = 38$
特定设计 精制孔	Design-specific finished bore	$d_F = 30$ mm
按照制造商的规格 确定的带轮质量	Mass of the pulleys according to manufacturer’s specification	$m_{Sch} = 0.47$ kg
带轮标识	Pulley designation	HTD 带轮/HTD pulley P 38 – 5M – 15
偏转惰轮	**Deflector idlers**	选择/selected:
直径	Diameter	$d_a = 55$ mm
精制孔	Finished bore	$d_f = 30$ mm
按照制造商的规格确定的 偏转惰轮质量	Mass of deflectors idlers according to maufacturer’s specification	$m_U = 0.43$ kg
准确确定最大 有效传输拉力	**Precisely determine the maximum effective pull to be transmitted**	
惰轮折合质量	Reduced mass of the idlers	
$m_{U\,red} = \frac{m_U}{2} \cdot \left(1 + \frac{d_F^2}{d^2}\right)$		$m_{U\,red} = \frac{0.43}{2} \cdot \left(1 + \frac{30^2}{55^2}\right) = 0.28$ kg
$F_{u\,max} = (m_s + m_{Sch} + 2 \cdot m_U) \cdot a_b + 2 \cdot m_{U\,red} \cdot a_b + (m_s + m_{Sch} + 2 \cdot m_U) \cdot g \cdot \mu$		$F_{u\,max} = (28 + 0.47 + 2 \cdot 0.43) \cdot 4 + 2 \cdot 0.27 \cdot 4 + (28 + 0.47 + 2 \cdot 0.43) \cdot 9.81 \cdot 0.6 = 292$ N
计算系数	**Calculation factors**	
啮合齿轮系数 c_1（第 26 页）	Tooth in mesh factor c_1 (Page 26)	$c_1 = 12$
平均波动负荷的 负荷系数 c_2（第 27 页表 21）	Load factor for average fluctuation load c_2 (Tab. 21, page 27)	$c_2 = 1.4$
加速系数 c_3（第 27 页表 22）	Acceleration factor c_3 (Tab. 22, page 27)	$c_3 = 0$
总使用系数 $c_0 = c_2 + c_3$	Overall service factor	$c_0 = 1.4 + 0 = 1.4$

设计程序步骤示例　提升传动装置
Examples of design procedure steps: Lifting drive

按照齿面容许负荷确定带宽 $b_{err} = \frac{F_{u\,max} \cdot c_0 \cdot 10}{F_{u\,spez} \cdot c_1}$	**Determine belt width in accordance with allowable flank load**	$b_{err} = \frac{292 \cdot 1.4 \cdot 10}{34 \cdot 12} = 10.02$ mm
$F_{u\,spez}$（第 32 页表 6）	$F_{u\,spez}$ (Table 6, page 32)	
要求 $b > b_{err}$	Requirement $b > b_{err}$	
第二大带宽 b （第 9 页表 2）	Next grater belt width b (Tab. 2, page 9)	选择/selected: b = 15 mm
皮带安装张力	**Belt installation tension**	
以下数值适用于线性传动装置的皮带 $F_T \geq F_{u\,max}$	The following applies for linear drives	选择/selected: F_T = 300 N > 292 N
最大动态张力 $F_{T\,max} = F_T + F_{u\,max}$	max. belt tension dynamic	$F_{T\,max}$ = 300 + 292 = 592 N
线性传动装置的收缩余量 $\Delta a = \frac{F_T \cdot L_W}{c_{spez} \cdot b}$	Takeup allowance for linear drives	$\Delta a = \frac{300 \cdot 8000}{20 \cdot 10^3 \cdot 15} = 8.0$ mm
c_{spez}（第 33 页表 24）	c_{spez} (Tab. 24, page 33)	
此外，还可以通过频率测量法设置初拉力。因此需要向附近的夹持端向偏移点移动大约1m。可以使用自由选择的跨长 L_f 进行计算和测量。 另请参见第 30 页。	Alternatively it is possible to install the pretension via frequency measurement method. Therefore it is necessary to move the clamp end nearby (about 1 m) to the deflection point. This freely chosen span length L_f can be used for calculation and measurements. See also page 30.	
自由跨长	Free span length	选择/selected: L_f = 1 m
每米长的重量 m $m = m_{spez} \cdot b$	Weight m per m length	
m_{spez}（第 9 页表 1）	m_{spez} (Tab. 1, page 9)	$m = 4.06 \cdot 10^{-3} \cdot 15 = 0.0609 \frac{kg}{m}$

皮带张紧频率 $f = \sqrt{\frac{F_T}{4 \cdot m \cdot L_f^2}}$	Belt tension frequency	$f = \sqrt{\frac{300}{4 \cdot 0.0609 \cdot 1^2}} = 35\ Hz$ 当测得的频率与计算出的频率相同时，则说明皮带预紧设置正确。 The belt has the correct pretension when the measured frequency is the same as the calculated frequency.
检查抗拉层容许负荷 F_{zul}（第 33 页表 23） 要求 $F_{zul} \geq F_{T\ max} \cdot {}_0c$	Check allowable tension member load F_{zul} (Tab. 23, page 33) Requirement	$F_{zul} = 975\ N$ $975 > 592 \cdot 1.4$ $975 > 828.8$ 满足要求，即抗拉层容许负荷大于虑及使用系数的皮带最大张力。 Requirement is fulfilled, i.e. the allowable tension member load is greater than the maximum belt tension taking the service factor into consideration.
设计选择	Design choice	JAGDFALKE® 同步传动带/ JAGDFALKE® OPEN-END Timing belte M 8 – 5M – 15 HP

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