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# HUTCHINSON BELT DRIVE SYSTEMS CATALOGUE

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Hutchinson is **partnered with the largest manufacturers** in the household electrical appliance, automotive and industry sectors

## a. ABOUT HUTCHINSON

Hutchinson is the world's leading provider of rubber and thermoplastic elastomer products for industry

- 41,185 employees
- 95 industrial sites in 25 countries
- Turnover 2016 €4.040 bn
- 5% of turnover invested in R&D

### OUR AREAS OF EXPERTISE

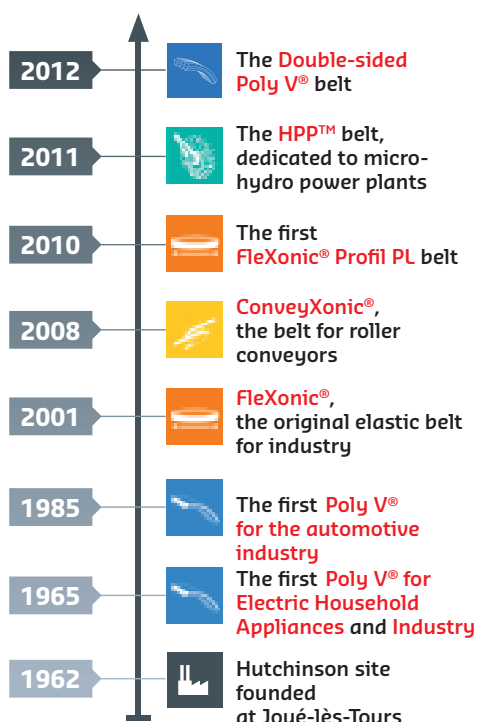
- Sealing systems
- Vibration, acoustic and thermal insulation
- Fluid transfer systems
- Transmission and Mobility.

Hutchinson's research center excels in a range of disciplines including physical characterisation, chemical analysis, material formulations, digital simulation, vibratory and acoustic analysis, etc.

### HUTCHINSON BELT DRIVE SYSTEMS



### CONSTANT INNOVATION



A leading Manufacturer, specializing in ribbed belt transmissions (Poly V®, FleXonic®, ConveyXonic®, HPP™).

**275,000 Poly V® belts manufactured per day.**

Our expertise is renowned in the field of converting V-belt transmission systems to a Poly V® or Flexonic® ribbed belt solution.

Our difference: technical support and a local partnership.

- Made-to-measure co-design
- Prototypes, measurements/characterisation.
- Validation process
- Local support: technical-commercial offices throughout the world.

The Hutchinson partnership is the guarantee of both technical and commercial monitoring.

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HVAC  
AEROSPACE  
AGRICULTURE & GARDENING  
CONSTRUCTION  
CONVEYING / HANDLING  
ENERGY  
FITNESS, SPORT & LEISURE  
PAPER INDUSTRY  
MINING / QUARRYING  
INDUSTRIAL ENGINES  
FLOOR CARE  
POWER TOOLS  
MILITARY VEHICLES  
...

## b. OUR EXPERTISE

We work with **the largest OEMs** in various sectors.

We find **the most appropriate solution which adds the greatest economic and technical values!**

- **Reduced direct costs:** product range standardisation, removal of tensioning elements, compact transmission.
- **Reduced indirect costs:** transmission optimisation, fast assembly, reduced energy consumption, reduced maintenance intervals.
- **Spare parts market.**

Market survey

Building on our experience

Support for your project

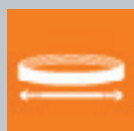
Characterisation

Prototype

Tests / Validations

Validated process

Development of test benches



Flexonic®



Timing belts



HPP™



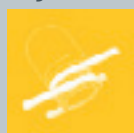
Poly V®



V-belts



Idlers



ConveyXonic®



Tensioners

## A WIDE PRODUCT RANGE

- The most **comprehensive Poly V®** product range in the world (from PH 130 mm to PM 15 metres).
- Highest Quality Materials used in our **Exclusive Molding process**.
- **Specific structures** available: aramid, resistance to oil, coatings, resistance to cold, etc.
- **Innovative products:** the specialist in **Flexonic®** and **ConveyXonic®** elastic belts.
- **Specialized assembly tools and tension setting accessories.**
- A large selection of **idlers** and **tensioners** (comprehensive system supplier).
- An **extended catalog of belts: V-belts, timing belts.**

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### CERTIFIED AND HIGH-QUALITY PRODUCTION

- High-quality manufacture at all production sites (France, Poland, China, Brazil, Mexico).

### OUR DISTRIBUTION NETWORK

Our distributors are **real, qualified partners**.

We provide them with:

- ongoing training
- technical support
- local commercial presence
- marketing support.

Our products are available from our distributors **in more than 30 countries**.

Our distributors are our local expertise representatives and provide you with technical support.








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## a. OUR RANGE OF RIBBED BELTS

	 Poly V®	 Flexonic®	 ConveyXonic®	 Double-sided	 HPP™
Profiles	PH, PJ, PK, PL, PM	PH, PJ, PK, PL	PJ, PK	PK, PL	PL, PM
Cord*	polyester, aramid	polyamide	polyamide	polyester	aramid
Rubber*	BR, CR, EPDM	BR, CR, EPDM	BR, CR	BR, CR	BR, CR
Lengths*	127 mm > 15,000 mm	132 mm > 3 400 mm	206 mm > 851 mm	1,000 mm > 2,300 mm	2,000 mm > 15,000 mm
Examples of equipment	fitness equipment	floor cleaners	accumulation conveyors	cereal crushers	hydroelectric power plants
	mechanised farming	hand power tools	straight/curved conveyors	bakery equipment	
	industrial ventilation	fitness	pallet conveyors	textile machine	
	paper industry	small electric household appliances	cold room conveyors	garden equipment	
	industrial engines	cement mixers			
	mines and quarries	compressors			
	pumps	internal combustion engines			
	timber industry	ventilation			

\* May vary according to the profile

## b. POLY V®

### THE BELT FOR ALL APPLICATIONS

The Poly V® is a power transmission belt featuring multiple longitudinal ribs.

It transmits the torque by contact of the belt rib flanks and the pulley grooves.



Its monobloc design guarantees:

- Compactness
- Noise reduction
- Tension stability and reliability
- High power transmission.

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The **FleXonic®** is a power transmission elastic belt featuring multiple longitudinal ribs.



## c. FLEXONIC®

### THE ORIGINAL ELASTIC BELT FOR INDUSTRY

Each **FleXonic®** belt is custom sized for your application. Our technical teams calculate and decide what belt size you need.

The **FleXonic®** belt can be installed on **a fixed center distance**. Its **elastic polyamide cord** gives it unrivalled advantages:

- Reliability and high quality transmission
- Absorption of vibrations and noise reduction
- No need for a belt tensioner device
- Reduced costs
- Stable tension.

## d. CONVEYXONIC®

### THE REVOLUTION IN ROLLER CONVEYORS

The **ConveyXonic®** is an elastic belt designed for roller conveyors.



It has been specifically developed for roller conveyors. It is the only technology capable of transporting parcels weighing from 1 kg to 2 tonnes.

- Cost savings
- Ease of use
- Technical performance
- Customer confidence.

## e. HPP™

### THE BELT DESIGNED FOR MICRO HYDRO POWER PLANTS

The **HPP™** (Hydro Power Plant) is designed especially for the small hydro power plant market.



The **HPP™** belt combines ease-of-use and high performance.

- Power transmission capacity increased by 15%
- Reduced packaging
- Extended lifetime
- Noise reduction
- Reduced maintenance costs
- Wide range of applications.

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**Double-Sided Poly V®**  
**Double Face**  
**is a power transmission**  
**belt with lengthways**  
**ribbing on both sides.**



## f. DOUBLE-SIDED POLY V®

### DOUBLE POWER TRANSMISSION BY BELT

It enables power to be transmitted on each side of the belt and drive pulleys in both directions.

- Increased contact surface
- Absorbs sudden spikes and blockages.

## g. SPECIAL POLY V® BELTS

### A BROAD RANGE OF SPECIFIC BELTS:

The problem	The solution	Poly V®	Flexonic®	ConveyXonic®	HPP™	Double-sided Poly V®	Examples
Hydrocarbons present or splashed on the belt	Especially strong specific elastomers	★					machine tools, machining lathes, etc.
High temperatures (up to 120°C continuously)	Specific elastomers (EPDM)	★	★				pumps, industrial motors, compressors, sanders, etc.
Low temperatures (down to -30°C continuously)	Specific elastomers	★	★	★			cold room conveyors, special vehicles, etc.
Explosive atmospheres (ATEX)	Conducting elastomers that meet the ISO 1813 standard	★	★	★	★	★	Mines, silos, etc.
High torques, capable of transmitting high powers	Aramid cord	★			★		micro hydroelectric power plants, crushers, pulpers, etc.
Low tension to reduce the loads on the shafts	Polyester or polyamide cord	★	★				aspirators, printers, etc.
Reduced vibrations	Polyamide cord		★	★			compressors, fitness equipment, etc.
Need for a stain-free rubber (the paper is conveyed on the back of the belt)	Special coating on the back (elastomer or fabric)	★					paper conveyors
Friction drive on the back of the belt	Layer of elastomer on the back of the belt (up to 8mm)	★					cable pullers, skid conveyors, luggage carousels, compressors, etc.
Drives two pulleys in opposite directions of rotation	Double-ribbed belt					★	grain crushers
Installation on fixed center distance	Polyamide cord for high elongation		★	★			roller conveyors, small tools, compressors, etc.
Need for belts of exactly the same length	Belts from the same sleeve	★			★	★	test benches, machine tools, etc.
Insulating belt	Insulating elastomers	★	★				washing machines

The aramid cord can handle greater tension and increase power transfer by around 30% compared to polyester cord .

Our belts are available with different types and thicknesses of coatings on demand.

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**Hutchinson hydraulic tensioners are heavy duty products.**



**The linear tensioners without shock absorption are suited to applications that do not require automatic tension regulation.**

**The on/off idler is a tensioner system designed specifically for the Flexonic® belt on multi-shaft installation.**



## h. TENSIONER IDLERS

### HYDRAULIC TENSIONERS FOR PK PROFILES

Hydraulic tensioners are suited to applications that demand a precise tension and impose severe dynamic conditions.

- Long service life in heavy duty environments thanks to the rubber parts (sealing and shock absorption)
- High-performance asymmetrical shock absorption (100:1)
- Designed and approved by Hutchinson engineering.

### HUTCHINSON LINEAR TENSIONER FOR PK PROFILES

With its simple design, this tensioner can be installed in compact environments.

- Easy to install: factory pre-stressed tensioner for quick tensioning
- A solution compact: the linear movement allows for installation between two pulleys
- Designed and approved by our staff.

### ON/OFF IDLER

Quick installation, adapted to the tension of the belt, which remains unchanged.

Can replace costly front surface definitions.

#### **Idler made of steel on steel plate or matrix aluminium**

The on/off idler is designed for Flexonic® K profile belts with up to 12 ribs.

- Simplified installation: no tools required, simplified service interventions
- Maintain belt position and tension
- Aftermarket controls (Concept Flexonic®)
- Patented system.

**APPLICATIONS: ALL OFF-ROAD INTERNAL COMBUSTION ENGINES**

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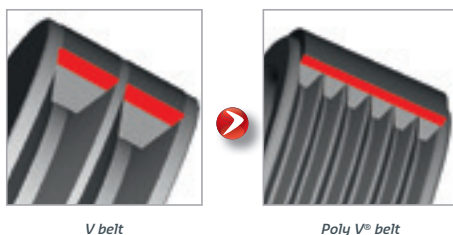
## a. TWO TYPES OF POWER TRANSMISSION

	TRANSMISSION BY SYNCHRONISM			TRANSMISSION BY FRICTION		
	Gears	Chains	Synchronous belts	Flat belts	V belts	Ribbed belts
Power transmission	High	High	High	Low	Medium	High
Linear speed	High	Medium	High	High	Medium	High
Tolerance of torque spikes	Low	Low	Low	High	High	High
Transmissible power/torque	High	High	Medium	Low	Medium	High
Noise	High	High	High	Medium	Medium	Low
Sale price	High	Medium	Medium	Low	Low	Medium
Maintenance costs	High	High	Medium	High	Medium	Low
Service life	High	Medium	Medium	Low	Low	Medium
TCO of the transmission	High	High	Medium	High	Medium	Low

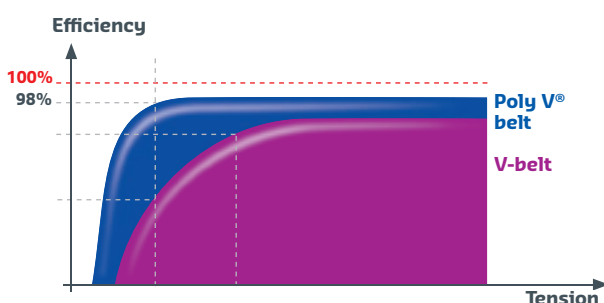
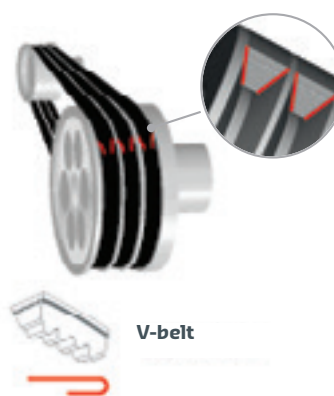
## b. WHY SWITCH FROM V BELT TRANSMISSION TO RIBBED BELT TRANSMISSION?

### b.1 THE EFFICIENCY OF THE TRANSMISSION

- Higher **power transmission** by continuous and uniform cord.



- A larger contact surface than V belts.



- Technical studies have revealed that at the same tension and with the same geometry the Poly V® has an **upper yield** : it is situated on average around 98 %, a fact that reduces electricity consumption and the size of the motor.

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## b.2 THE COMPACTNESS OF THE TRANSMISSION

- **Higher transmission ratio**

Ribbed belt 1: 60 vs V belt 1: 20.

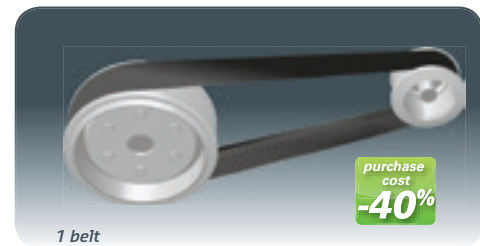
Avoids the need for staged pulleys.

- **Reduced diameter of the pulleys**

The minimum diameters of ribbed profiles are smaller than those of V profiles.

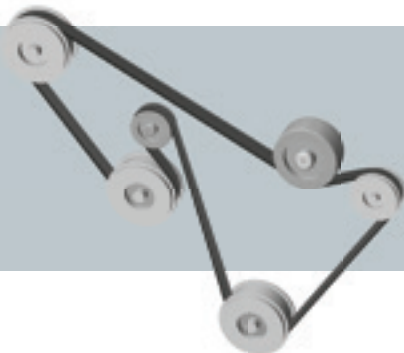
- **Reduced weight of the transmission**

No need for a tensioner.



1 belt  
2 standard pulleys

- **Reduced belt width** for a given geometry and the same power transfer (small ribbed pulley).



Moreover, the Poly V® can operate in **flexion and counter flexion** with the following benefits:

- **A single belt** can drive several accessories: serpentine belt installation.
- **Driving accessories from the back of the belt.**

## b.3 EFFICIENCY

Stable tension: no need for matching thanks to the monobloc belt and no differential flapping.

The aging of the belt does not result in any loss of power.

## b.4 COST REDUCTIONS

### **PURCHASE:**

- **Reduced diameter and pulley width.**

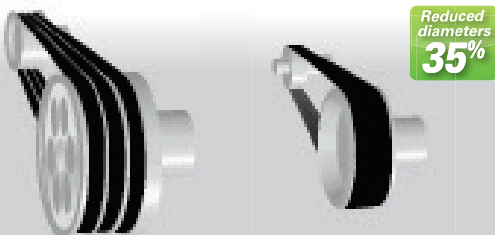
No need for a tensioner with the FleXonic®.

- **Lighter transmission**

- **Reduced belt length**

- **No need for inertia flywheels in some cases**

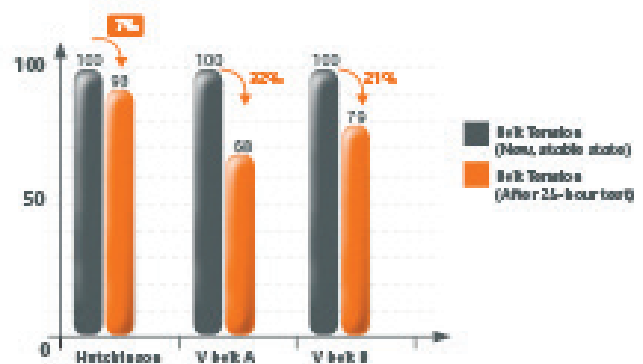
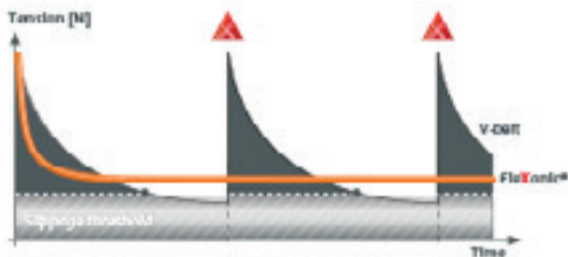
- **Machining of pulleys is facilitating:** the Poly V® can be used on smooth pulleys (receivers).



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#### MAINTENANCE:

- **Rapid set up** : 1 PM Poly V® can replace up to 25 SPB V belts.
- **No need for matching**
- **Increased lifespan**
- **No need for re-tensioning and verification operations on the range of elastic belts**
- **The tension of the FleXonic®** can be stabilised after just a few minutes in dynamic performance mode. Tension will not change throughout the lifetime of the belt.



#### TIME AND PRODUCTIVITY:

Simpler factory installation of the FleXonic®: time savings and productivity gains.

- **Installed on fixed center distance with standard grooved pulleys**
- **Automatic tensioning.**

#### OPERATIONS:

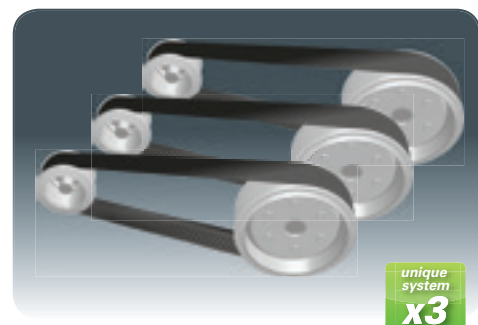
- **Reduced energy costs** (better transmission efficiency)
- **Increased lifespan of the belt.**

#### STORAGE:

- **Standardisation and rationalisation of references.**



3 V-belt transmissions  
3 different sets of 3 belts  
2 pulleys / 1 tensioning device



1 single belt  
2 "standard" pulleys

unique  
system  
**x3**

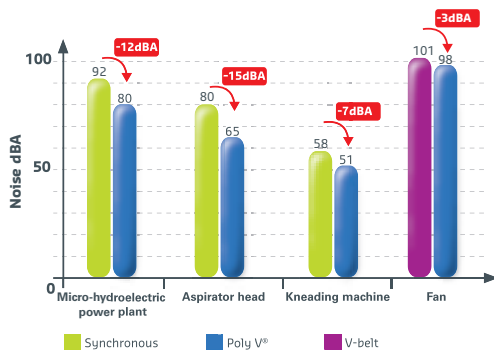
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## c. WHY SWITCH FROM SYNCHRONOUS TRANSMISSION TO RIBBED BELT TRANSMISSION?

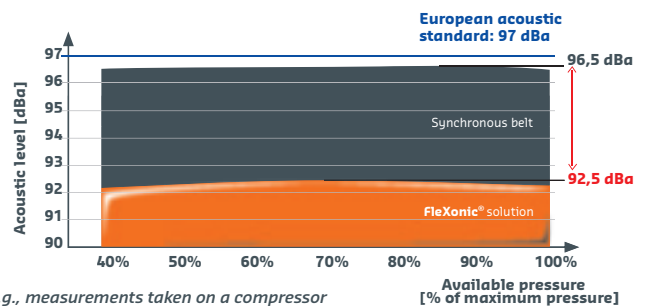
The Poly V® and FleXonic® belts are moulded. The profile is regular and the thickness is constant.

### c.1 NOISE REDUCTION

The properties of the cord in the ribbed belts allow for good vibration absorption and eliminate the noise (whistling) that is characteristic of synchronous belt transmissions.



Noise  
-4 dBA



### c.2 PROTECTION OF THE INSTALLATION

In the event of jamming or spikes, the synchronous belts **do not slip**, preventing deterioration and/or damage to other mechanical parts of the positive transmission.

With a **ribbed belt**, high **torques do not damage the transmission**. The geometry of the belt can tolerate transient slippage, thereby protecting the installation.

## d. THE BENEFITS OF RIBBED BELTS VERSUS DIRECT DRIVE

### d.1 EASE OF INSTALLATION AND REMOVAL

Unlike direct drive transmissions, ribbed belt transmissions allow for easy access to all the main mechanical parts of the application. **The belt can be installed and removed quickly and easily.**

### d.2 PROTECTION OF THE INSTALLATION IN THE EVENT OF JAMMING

Often, when the machine jams, **the belt can act like a "fuse"**, avoiding any damage to the more fragile and costly mechanical parts.

### d.3 COST AND TIME SAVINGS

The **cost of acquiring** a ribbed belt transmission is **significantly lower** than that of direct drives.

Ribbed belt transmissions take less time to design and build.

**Reduced maintenance costs** (no greasing).



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## e. CONVERSION OF OTHER TRANSMISSIONS (FLAT BELT / CHAIN, ETC.)

### e.1 NOISE REDUCTIONS OF ABOUT 5 DBA\*

**Flat belt or gear train** transmissions are **particularly noisy**, due to the flapping of the strands, sliding belts or metal-on-metal friction.

The **Hutchinson production process by moulding** guarantees that the profile of the ribbed belt is **perfectly straight**, **avoiding the risk of any unpleasant noise**.

### e.2 COMPACT DIMENSIONS OF THE TRANSMISSION FOR MICRO POWER PLANTS

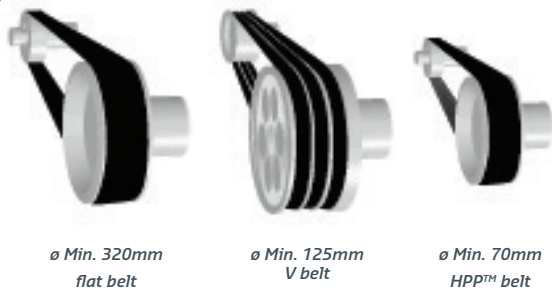
Rigid and thick **flat belts** cannot be used with **pulley diameters of less than 320mm, or even 450mm, for powers in excess of 100kW**. Their operating range is limited to low transmission ratios or demands the use of very large and very expensive pulleys. With a **contact surface between the pulley and the belt up to 1.25 times larger than flat belts**, an HPP™ belt of the same width can be used on pulleys with diameters up to **35% smaller**.

### e.3 REDUCTION OF ROLLER CONVEYOR COSTS

Thanks to the outstanding mechanical properties of the ConveyXonic® belt, **a single driven roller can drive up to 50 rollers**, i.e., **savings of at least 30% on every module**. Low acquisition costs: immediate savings.

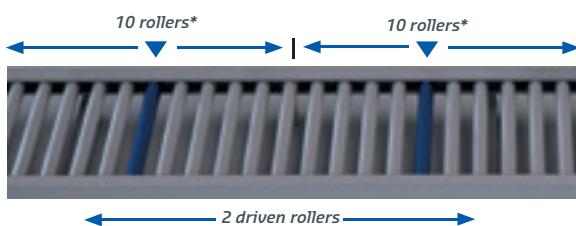
### e.4 EASE OF MAINTENANCE

Unlike chain transmissions, ribbed belt transmissions do not require greasing and keep the working environment clean.



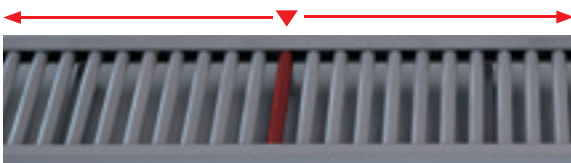
**The ConveyXonic®  
belt versus a round PU belt**

**Round belts = 2 modules**



**ConveyXonic® = 1 module**

50 rollers\*



Only 1 driven roller

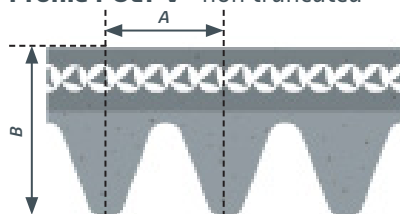
\*50 mm diameter rollers- Power: 55 W -  
Speed: 100 rpm - Load: 50 kg

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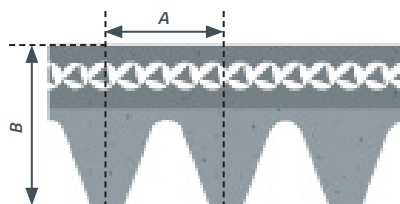
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## a. CHARACTERISTICS OF THE PROFILES

Profile POLY V® non truncated



Profile POLY V® truncated



	Poly V PH	Poly V PJ	Poly V PK	Poly V PL	Poly V PM
Pitch (A)	1.6 mm	2.34 mm	3.56 mm	4.7 mm	9.4 mm
Thickness (B)*	2.6 mm	3.3 mm	4.9 mm	7 mm	12 mm
Linear density <sup>*/**</sup>	0.0043 kg/m/rib	0.0083 kg/m/rib	0.019 kg/m/rib	0.029 kg/m/rib	0.101 kg/m/rib
Max. linear speed	80 mps	60 mps	55 mps	50 mps	40 mps
Min. diameter in flexion	9 mm	18 mm	50 mm	70 mm	180 mm
Min. diameter in counter flexion (back of the belt)	15 mm	40 mm	65 mm	120 mm	280 mm
Installation tension	25 to 35 N/rib/ strand	35 to 50 N/rib/ strand	90 to 110 N/rib/ strand	135 to 200 N/rib/ strand	450 to 550 N/rib/ strand

\*Values for reference only.

\*\*The linear density is the weight of the belt divided by the length and by rib.

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## b. CHOICE OF SERVICE FACTOR (FS)

MOTOR CLASS	CLASS A			CLASS B		
RECEIVER CATEGORY	DC motors	Shunt coil			Compound coil Serial coil	
	Internal combustion engines	Medium torque Synchronous Asynchronous			High torque Vector control Reluctance	
	Other	Multi-cylinder Engine speeds > 700 rpm			Single-cylinder Engine speeds < 700 rpm	
	Service rate					
	Intermittent <10h	Normal 10 to 16h	Continuous > 16h	Intermittent <10h	Normal 10 to 16h	Continuous > 16h
Category 1: Low uniform torque						
<ul style="list-style-type: none"><li>Centrifugal fans</li><li>Light conveyors</li><li>Aspirators</li><li>Magnetic stirrers</li><li>Air extractors</li></ul>						
Category 2: Medium uniform torque						
<ul style="list-style-type: none"><li>Machine-tools</li><li>Conveyor belts</li><li>Generators</li><li>Industrial washing machines</li><li>Rotary pumps</li><li>Rotary compressors</li></ul>						
Category 3: Irregular torque						
<ul style="list-style-type: none"><li>Axial fans</li><li>Kneading and mixing machines</li><li>Exercise bikes</li><li>Wood machines</li><li>Concrete saws</li><li>Printer rollers</li></ul>						
Category 4: Very irregular torque						
<ul style="list-style-type: none"><li>Winches, cranes</li><li>Hammer crushers</li><li>Piston pumps</li><li>Piston compressors</li><li>Forklifts</li><li>Bucket elevators</li></ul>						
Category 5: Very irregular torque with severe spikes						
<ul style="list-style-type: none"><li>Agricultural machines (combine harvesters, etc.)</li><li>Industrial rubber (extruders, calenders, etc.)</li><li>Drilling equipment</li><li>Dredging equipment</li><li>Crushers</li><li>Excavators</li></ul>						

Note: A service factor of 2 is necessary for all equipment on which the receiving machine may become clogged or jam.

We make it **possible**

## c. DETERMINING THE OUTER DIAMETER OF THE SMALL PULLEY

Engine speed (rpm)

	100	300	500	750	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500	9,000	9.5K	10k	15k	20k
0.25	45	40	35.5	35	31.5	30	30	25	25	25	25	25	20	20	20	20	20	20	20	20	20	20	20	12	9
0.5	60	50	45	45	40	35.5	35	31.5	31.5	30	30	30	25	25	25	25	25	25	25	25	20	20	20	12	9
0.75	67	60	56	50	45	40	40	40	35.5	35	31.5	31.5	31.5	30	30	30	30	25	25	25	25	25	25	15	10
1	75	63	60	56	50	45	45	40	40	35.5	35.5	35	35	31.5	31.5	31.5	30	30	30	30	25	25	25	15	10
2	95	80	75	67	63	60	56	50	50	45	45	45	40	40	40	40	35.5	35.5	35	35	31.5	31.5	31.5	18	
3	112	95	85	80	75	67	60	60	56	50	50	50	45	45	45	40	40	40	40	40	35.5	35.5	35.5		
4	125	106	95	85	80	71	67	63	60	56	56	56	50	50	50	45	45	45	45	40	40	40	40		
5	140	112	100	90	85	80	71	67	63	60	60	56	56	50	50	50	50	45	45	45	45	40	40		
7.5	160	125	118	106	100	90	80	75	71	71	67	63	60	60	56	56	56	50	50	50	50	45	45		
10	180	140	125	118	106	95	90	85	80	75	71	71	67	63	63	60	60	56	56	56	56	50	50		
12.5	190	150	140	125	118	106	95	90	85	80	75	75	71	71	67	63	63	60	60	60	56	56			
15	200	160	150	132	125	112	100	95	90	85	80	80	75	71	71	67	67	63	60	60	60	60			
20	224	180	160	150	132	118	112	106	100	95	90	85	80	80	75	75	71	71	63	67	63	63			
25	250	200	170	160	150	132	118	112	106	100	95	90	85	85	80	80	75	75	67	71					
30	250	212	180	170	150	140	125	118	112	106	100	95	90	90	85	85	80	80	71	75					
35	280	224	190	180	160	140	132	125	118	112	106	100	95	95	90	85	85	80	75	75					
40	280	236	200	180	170	150	140	125	118	118	112	106	100	95	95	90	90	85	80	80					
45	315	236	212	190	180	160	140	132	125	118	112	106	106	100	95	95	90	90	85						
50	315	250	224	200	180	160	150	140	132	125	118	112	106	106	100	95	95	90	85						
60		250	236	212	190	170	160	150	140	132	125	118	112	112	106	100	100	95	90						
70		280	250	224	200	180	160	150	140	140	132	125	118	112	112	106	106	100	95						
80		280	250	236	212	190	170	160	150	140	132	132	125	118	118	112	106								
90		315	280	236	224	200	180	170	160	150	140	132	125	125	118	118									
100		315	280	250	224	200	180	170	160	150	140	140	132	125	125	118									
125		355	315	280	250	212	200	180	170	160	150	150	140	132	132	125									
150		355	315	280	250	224	212	190	180	170	160	160	150	140	140	132									
175		400	355	315	280	236	224	200	190	180	170	160	160	150	140	140									
200		400	355	315	280	250	224	212	200	190	180	170	160	160	150										
250		400	375	355	315	280	250	212	212	200	190	180													
300			400	355	315	280	250	236	224	212	200	190													
350			400	355	355	315	280	250	236																
400				400	355	315	280	250																	
450				400	355	315	280	280																	
500				400	355	315	280																		

Corrected power  $P_c$  (kW) (see 5d)

(excluding specific calculations by our teams)

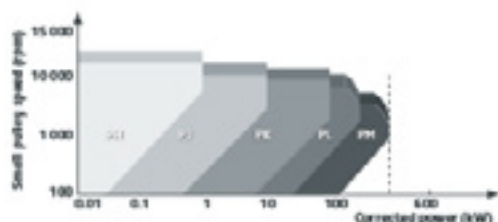
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## d. SELECTING THE PROFILE / POWER

The corrected power is calculated using the following formula:

$$P_{\text{corrected}} = P_{\text{application}} \times F_s$$

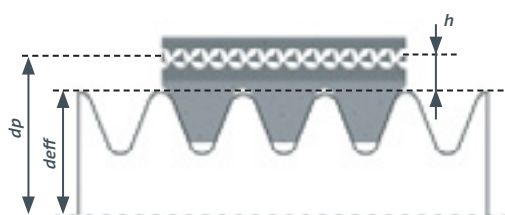
The application power is the sum total of the power consumed by the receivers (mechanical power). If only the electric power of the motor is known, then its yield must be taken into consideration to fine-tune the sizing of the transmission as precisely as possible.



Polyester cord

## e. EFFECTIVE / PRIMITIVE DIAMETER

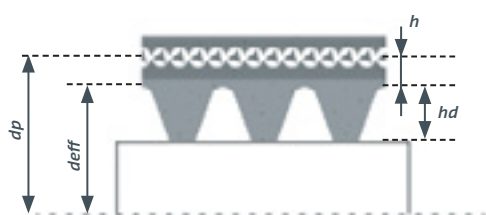
**The effective diameter (deff)** is measured at the base of the ribs of the belt. It is used to calculate the effective length of the belt. For ribbed belts, it is considered to be the same as the outer diameter (dext).



### Ribbed pulleys

Effective diameter (deff) =  
Outer diameter (dext)

Primitive diameter (dp) =  
Effective diameter (deff) + (2 x h)



### Smooth pulleys

Effective diameter (deff) =  
Outer diameter (dext) + (2 x hd)

Primitive diameter (dp) =  
Effective diameter (deff) + (2 x h)

BELT PROFILE	PH	PJ	PK	PL	PM
h (mm)	0.85	0.90	1.25	2	2
hd (mm)*	1.15	1.7	2.4	3.8	7.5

\*Values for reference only

**The primitive diameter (dp)** is measured at the axis of the cord in the belt. It is used to calculate the linear speed and the transmission ratio.

The value of the transmission ratio that we show in our calculations is based on the position of the cord in the belt and not on the diameter of the pulley. This is because the power is transmitted by the cord in the belt.

An example of an application with an M-profile belt is shown below. Add 4mm (2 x h) to the diameter of each ribbed pulley to determine the primitive diameter, then calculate the transmission ratio:

$$R_t = 1394 / 274 = 5.09$$

PULLEY	Nature	Outer diameter (mm)	Primitive diameter (mm)	Ratio
Turbine	Etched	1,390.00	1,394.00	1.00
Generator	Etched	270.00	274.00	5.09

We make it **possible**



## a. POLY V® BELTS

See below the list of Poly V® part numbers (polyester cord) by profile.

Poly V® are available as cut belts and as complete sleeves.

Please contact us for any other lengths.

These options below can also be adapted to the profiles, lengths, etc.

- oil-resistant rubbers
- aramid cord
- heat- and cold-resistant rubber
- special coatings
- other options available - contact Hutchinson for details.

EFFECTIVE LENGTH PH	
mm	ins
197	7.8
207	8.2
222	8.7
234	9.2
285	11.2
307	12.1
425	16.7
432	17.0
457	18.0
483	19.0
529	20.8

▲  
**280-ribbed sleeve,**  
subject to change

EFFECTIVE LENGTH PJ			
mm	ins	mm	ins
197	7.8	1,143	45.0
207	8.2	1,150	45.3
234	9.2	1,168	46.0
254	10.0	1,200	47.2
267	10.5	1,210	47.6
274	10.8	1,222	48.1
305	12.0	1,233	48.5
330	13.0	1,244	49.0
356	14.0	1,262	49.7
381	15.0	1,270	50.0
406	16.0	1,280	50.4
432	17.0	1,295	51.0
457	18.0	1,301	51.2
483	19.0	1,315	51.8
508	20.0	1,321	52.0
533	21.0	1,333	52.5
559	22.0	1,355	53.3
584	23.0	1,372	54.0
610	24.0	1,397	55.0
635	25.0	1,428	56.2
660	26.0	1,473	58.0
711	28.0	1,549	61.0
723	28.5	1,600	63.0
762	30.0	1,651	65.0
787	31.0	1,663	65.5
813	32.0	1,752	69.0
838	33.0	1,854	73.0
864	34.0	1,895	74.6
889	35.0	1,910	75.2
914	36.0	1,956	77.0
938	36.9	1,992	78.4
960	37.8	2,019	79.5
995	39.2	2,083	82.0
1,016	40.0	2,155	84.8
1,041	41.0	2,210	87.0
1,059	41.7	2,286	90.0
1,080	42.5	2,337	92.0
1,092	43.0	2,413	95.0
1,110	43.7	2,489	98.0
1,118	44.0	3,154	124.2
1,126	44.3	3,500	137.8
1,130	44.5		

▲  
**190-ribbed sleeve,**  
subject to change

EFFECTIVE LENGTH PK					
mm	ins	mm	ins	mm	ins
526	20.7	1,222	48.1	2,145	84.4
560	22.0	1,230	48.4	2,170	85.4
575	22.6	1,253	49.3	2,205	86.8
582	22.9	1,272	50.1	2,225	87.6
597	23.5	1,295	51.0	2,257	88.9
633	24.9	1,330	52.4	2,330	91.7
648	25.5	1,345	53.0	2,385	93.9
655	25.8	1,360	53.5	2,440	96.1
673	26.5	1,387	54.6	2,460	96.9
682	26.9	1,397	55.0	2,480	97.6
698	27.5	1,425	56.1	2,515	99.0
710	28.0	1,435	56.5	2,530	99.6
730	28.7	1,460	57.5	2,585	101.8
740	29.1	1,479	58.2	2,612	102.8
755	29.7	1,496	58.9	2,680	105.5
775	30.5	1,520	59.8	2,835	111.6
790	31.1	1,530	60.2	2,967	116.8
805	31.7	1,560	61.4	4,122	162.3
818	32.2	1,570	61.8		
830	32.7	1,580	62.2		
841	33.1	1,601	63.0		
865	34.0	1,626	64.0		
875	34.5	1,658	65.3		
884	34.8	1,682	66.2		
888	35.0	1,700	66.9		
903	35.6	1,725	67.9		
915	36.0	1,760	69.3		
926	36.5	1,775	69.9		
938	36.9	1,795	70.7		
954	37.6	1,815	71.5		
970	38.2	1,830	72.0		
990	38.0	1,854	73.0		
1,000	39.4	1,863	73.3		
1,015	40.0	1,885	74.2		
1,030	40.6	1,900	74.8		
1,037	40.8	1,930	76.0		
1,050	41.3	1,949	76.7		
1,080	42.5	1,980	78.0		
1,095	43.1	2,030	79.9		
1,110	43.7	2,050	80.7		
1,125	44.3	2,080	81.9		
1,146	45.1	2,100	82.7		
1,165	45.9	2,115	83.3		
1,194	47.0	2,120	83.5		

▲  
**132-ribbed sleeve,**  
subject to change

EFFECTIVE LENGTH PL	
mm	ins
954	37.6
991	39.0
1,075	42.3
1,270	50.0
1,333	52.5
1,371	54.0
1,397	55.0
1,422	56.0
1,480	58.3
1,562	61.5
1,613	63.5
1,664	65.5
1,715	67.5
1,764	69.4
1,803	71.0
1,841	72.5
1,943	76.5
1,981	78.0
2,020	79.5
2,070	81.5
2,096	82.5
2,134	84.0
2,197	86.5
2,235	88.0
2,324	91.5
2,362	93.0
2,476	97.5
2,515	99.0
2,705	106.5
2,743	108.0
2,845	112.0
2,895	114.0
2,921	115.0
2,997	118.0
3,086	121.5
3,124	123.0
3,289	129.5
3,327	131.0
3,492	137.5
3,696	145.5
4,051	159.5

▲  
**48-ribbed sleeve,**  
subject to change

▲  
**100-ribbed sleeve,**  
subject to change



We make it **possible**



## b. FLEXONIC® BELTS

FleXonic® belts are not in the catalogue because every belt is specially dimensioned and designed for a particular application.

Please contact us if you are interested in the FleXonic® belt.

## c. CONVEYXONIC® BELTS



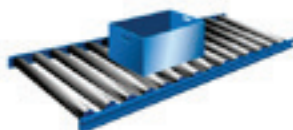
The elastic ribbed ConveyXonic® belts are specially designed for roller conveyors.

These belts are available in sleeves or as cut belts:

- with 2, 3, 4, 6 and 8 ribs for the PJ profile
- with 6, 8 and 10 ribs for the PK profile

Please contact us for a complete list, or any special queries.

**Light loads**  
PJ ConveyXonic®



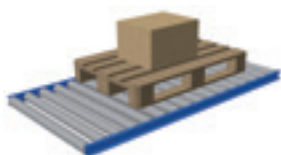
36 MM DIAMETER OF THE RIBBED PULLEY			
2 ribs 1 to 200 kg	3 ribs 201 to 300 kg	4 ribs 301 to 400 kg	Nominal center distance (mm)
	PJ206		45 to 47
	PJ214		51 to 53

43 MM DIAMETER OF THE RIBBED PULLEY			
2 ribs 1 to 200 kg	3 ribs 201 to 300 kg	4 ribs 301 to 400 kg	Nominal center distance (mm)
	PJ236		50
	PJ246		53 to 56
	PJ256		60 to 63
	PJ265		64 to 65
	PJ270		66 to 67
	PJ282		71 to 72
	PJ286		73 to 75
	PJ290		76 to 78
	PJ302		80 to 84
	PJ314		87 to 91
	PJ316		92 to 95
	PJ336		97 to 101
	PJ346		103 to 107
	PJ372		115 to 118
	PJ376		119 to 121
	PJ388		123 to 128
	PJ416		129 to 134
	PJ436		142 to 147
	PJ442		150 to 156
	PJ456		157 to 161
	PJ 486		170 to 176
	PJ 536		196 to 202
	PJ 570		208 to 215
	PJ 636		254 to 258
	PJ 746		305 to 310
	PJ 746		305 to 310



We make it **possible**

**Medium loads**  
PJ ConveyXonic®



56 MM DIAMETER OF THE RIBBED PULLEY			
4 ribs 400 kg	6 ribs	8 ribs 1200 kg	Nominal center distance (mm)
	PJ290		56 to 57
	PJ302		60 to 63
	PJ314		67 to 70
	PJ316		71 to 74
	PJ336		77 to 80
	PJ346		83 to 87
	PJ372		94 to 99
	PJ376		100 to 101
	PJ388		103 to 107
	PJ416		109 to 114
	PJ436		122 to 127
	PJ442		130 to 135
	PJ456		136 to 141
	PJ 486		150 to 156
	PJ 536		175 to 182
	PJ 570		188 to 195
	PJ 636		234 to 238
	PJ 746		285 to 289

**Heavy loads**  
PJ ConveyXonic®



80 MM DIAMETER OF THE RIBBED PULLEY			
6 ribs 1000 kg	8 ribs 1501 to 2000 kg	10 ribs more than 2,000 kg	Nominal center distance (mm)
	PK541		143 to 145
	PK573		161 to 163
	PK589		168 to 170
	PK611		180 to 182
	PK651		198 to 200
	PK701		223 to 226
	PK751		250 to 253
	PK851		298 to 302

*The loads carried are given for information only and may vary according to the types of boxes and their dimensions.*

*Straight-line applications only. Contact us for curved applications.*

*Other center distance values are possible. Contact us.*

*Contact us for loads in excess of 2,000 kg.*

## d. PULLEYS



Hutchinson Belt Drive Systems works in partnership with the leading pulley manufacturers.

**Please contact us for more information.**

We make it ***possible***



## e. TENSIONERS / IDLERS

Hutchinson offers a complete range of tensioners and idlers:

- **Hydraulic tensioners**
- **Linear tensioners**
- **Steel and PA ribbed or smooth tensioners.**

Our products are designed for offroad applications or industrial engines (motor-driven agricultural machinery, military vehicles, building machinery, mining and quarry machinery, etc.).

**Please contact us for more information.**

## f. V BELTS



Hutchinson offers a complete catalogue of wrapped and cogged V belts.

**Please contact us for more information.**

## g. TIMING BELTS



Hutchinson offers a complete catalogue of timing belts with different profiles.

**Please contact us for more information.**

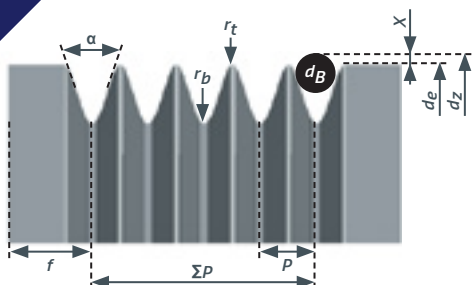
We make it **possible**

## a. POLY V® BELTS

### a.1 PULLEYS

Pulleys must meet the ISO 9982 standard (ribbed pulleys and belts for industrial applications), which contains the following information:

- Designation
- Geometry
- Roughness
- Permissible circular run-out.



PULLEY PROFILE	PH	PJ	PK	PL	PM
$\alpha$ (°)	$40 \pm 0.5$	$40 \pm 0.5$	$40 \pm 0.5$	$40 \pm 0.5$	$40 \pm 0.5$
P (mm)	$1.6 \pm 0.03$	$2.34 \pm 0.03$	$3.56 \pm 0.05$	$4.70 \pm 0.05$	$9.40 \pm 0.08$
Tolerance on $\Sigma P$	$\pm 0.3$	$\pm 0.3$	$\pm 0.3$	$\pm 0.3$	$\pm 0.3$
$r_t$ min. (mm)	0.15	0.20	0.25	0.40	0.75
$r_b$ max. (mm)	0.30	0.40	0.50	0.40	0.75
f min. (mm)	1.3	1.8	2.5	3.3	6.4
$d_b$ min. (mm)	$1 \pm 0.01$	$1.5 \pm 0.01$	$2.5 \pm 0.01$	$3.5 \pm 0.01$	$7.0 \pm 0.01$
$2x = d_z - d_e$ (mm)	0.11	0.23	0.99	2.36	4.53

The surface roughness of the pulley rib must be  $Ra \leq 3.2 \mu\text{m}$ .

Pulleys can be solid, spoked or lightweight (with holes or gaps).

### a.2 SMOOTH IDLERS

The width of an idler must be equal to the width of the belt, multiplied by a coefficient equal to twice the pitch of the belt (P) for a number of ribs of less than 10, and four times otherwise.

- N° ribs < 10:  
idler  $\geq$  belt width + ( 2 x P )
- N° ribs  $\geq$  10:  
idler  $\geq$  belt width + ( 4 x P )

These coefficients do not take account of any geometric defects in the transmission: warped pulleys, pinching of the shafts, etc. Therefore, they should be increased by a value equal to the offset of the pulley.

The surface roughness Ra must be less than or equal to  $3.2 \mu\text{m}$

Tensioner idlers are usually positioned on the "loose" strand of the belt and as close as possible to the small pulley. Please contact us for machines with two directions of rotation.

### a.3 CIRCULAR RUN-OUT OF THE PULLEY

The radial circular run-out, or out-of-roundness of the pulley, must be within the following limits:

Effective diameter $d_{\text{eff}}$	Limit
$d_{\text{eff}} \leq 74 \text{ mm}$	0.13 mm
$74 < d_{\text{eff}} \leq 250 \text{ mm}$	0.25 mm
$d_{\text{eff}} > 250 \text{ mm}$	$0.25 + 0.0004 * (d_{\text{eff}} - 250)$

The axial circular run-out, or warping of the pulley, must not exceed 0.002mm per millimetre of effective diameter.

Circular run-out is measured using a comparator. The values shown are the maximum amplitudes of the variation read on the dial of the comparator.

### a.4 PULLEY BALANCING

It is advisable to balance pulleys to avoid early wear of the bearings and serious vibration problems. Pulleys are usually balanced by the manufacturer.

- **We recommend that all the pulleys should always be statically balanced**
- **Dynamic balancing is recommended when the linear speed reaches 20 mps.**



### a.5 PULLEY MATERIALS

Different types of materials can be used, such as cast iron, steel aluminium or plastics.

In addition to the economic considerations, the choice of the material depends on the field of application and the operating conditions of the transmission.

Please contact us for more information.

### a.6 PULLEY TIGHTENING SYSTEMS

Standard pulleys are fitted with keyed, detachable hubs.

There are many different ways of attaching pulleys or idlers to the shafts.

Most manufacturers propose their own system.

Please contact us for more information.

### a.7 SHAFT ALIGNMENT

Today, easy-to-use systems allow for almost perfect adjustment of the alignment and parallelism (e.g., laser systems).

The maximum permissible tolerance is usually 2°. If the transmission has one or more smooth pulleys, this tolerance is 1°.

### a.8 INSTALLING THE PULLEYS

The pulleys must be installed as close as possible to the bearings to minimise the overhang and limit the load on the bearings.

### a.9 ALIGNING THE PULLEYS

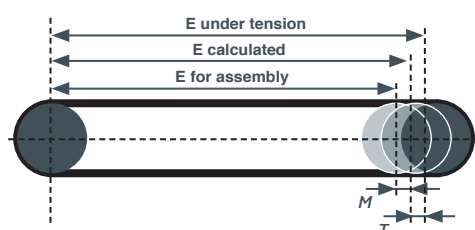
The pulleys must be aligned with a tolerance of 3mm per meter of center distance, with a maximum of 15mm. This also applies to the idlers, unless their width allows for a greater misalignment.

We make it **possible**

## b. INSTALLING POLY V® BELTS

### b.1 TENSIONING MARGINS

The margins are shown in the table below.



L (mm)	PH		PJ		PK		PL		PM	
	M	T	M	T	M	T	M	T	M	T
< 750	-9	+8	-10	+10	-11	+13				
750 to 1,200	-9	+12	-10	+15	-12	+16	-15	+20		
1,200 to 2,000	-12	+16	-15	+20	-16	+22	-20	+25		
2,000 to 3,500	-17	+25	-20	+30	-23	+32	-30	+35	-40	+50
3,500 to 6,000							-40	+50	-50	+70
> 6,000									-100	+130

Excluding the machine geometric dispersions

### b.2 TENSIONING THE BELT

#### THE VIBRATING STRING METHOD:

The tension of the belt can only be measured when the transmission system is at a standstill.

- 1 Switch on **Easytec**
- 2 Hold the sensor 2 to 3mm above the belt. Aim at the middle of the length of the strand of belt.
- 3 Tap the back of the belt with your index finger or a screwdriver, so that it starts to vibrate naturally.
- 4 A beep and the message "Measure" indicate you that your measurement was successful.
- 5 Retrieve the value in Hz.
- 6 Use the following formula to calculate the value of the tension.

$$T_{\text{strand}} \text{ (N)} = 3.8 \times M_l \times n^{\circ} \text{ of ribs} \times l_b^2 \times F^2$$

**F:** the frequency (Hz) is usually measured on the longest strand.

**l<sub>b</sub>:** length of the measured strand (m)

**M<sub>l</sub>:** linear density of the belt (kg/m/rib)

- 7 Compare the measured frequency with the recommended values for the design of the transmission.
- 8 If necessary, adjust the tension and repeat the measurement.  
**Note: take two or three measurements, while completely rotating the transmission between each measurement, if possible.**
- 9 Perform a complete run-in of the loaded transmission for the time recommended by Hutchinson (at least 20 min)
- 10 Check the tension of the belt again and adjust to the values recommended by Hutchinson, if necessary.



◀ **Easytec**

It is essential to adjust belts to the right tension. If the belt is not taut enough or is too taut, then the transmission will not work properly, and the belt may even be destroyed. Hutchinson recommends the vibrating string method to check the tension of the belt. This precise method requires the use of a tensiometer.

Hutchinson proposes its own universal laser tensiometer.

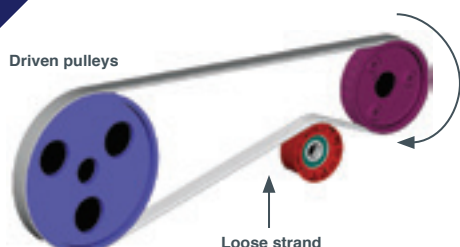
**Easytec** is an electronic measuring instrument comprising a sensor and a microprocessor. It can be used to measure frequency and, therefore, to check the tension of your belt (measured in Hertz).

**Easytec** can be used to measure all types of belts at frequencies between 10 and 800 Hz.

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## c. SPECIAL INSTALLATIONS

### c.1 COUNTER FLEXION IDLERS



Counter flexion idlers must be installed on the loose strand of the belt as close to the driven pulley as possible. They offer a number of advantages, and in particular:

- **Tensioning of belts on installations with a fixed center distance**
- **Increasing the pulley/belt contact arcs**
- **Absorbing the vibrations of the strands on transmissions with a wide center distance.**

**Note:** the recommended minimum diameters can be found on page 19.

### c.2 SMOOTH PULLEYS



Smooth pulleys can be driven by the ribs of a **Poly V®** belt. However, since the contact surface of a smooth pulley is smaller than that of a ribbed pulley, some precautions must be taken in the design of the drive system.

As a general rule, the use of smooth pulleys is limited to the drives with a power transmission ratio of at least 4, and only on the pulley with the largest diameter (value given for a center distance less than or equal to twice the sum total of the outer diameters of the pulleys).

A flat and uniform contact surface is recommended. The wear of the idlers or the moulded pulleys must not exceed 1 degree. The maximum tolerated difference between two half-pulleys made of buttoned sheet metal is 0.2mm of the diameter.

For convex pulleys, see the ISO 22:1991 standard.

### c.3.3 INSTALLATION BETWEEN BEARINGS

The force on the bearing is defined by:  $F_p (N) = T_{shaft} \times 0.8$

If the width of the belt is greater than the diameter of the pulley, we recommend an installation between two bearings.

**Pulley mounted on the end of the shaft**



**Pulley mounted between two bearings**



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### d. INSTALLING FLEXONIC®

FleXonic® belts must be installed according to the criteria applying to the parallelism of the shafts and the alignment of the pulleys (respectively 2° and 3mm per metre of permitted center distance).

The tensioning of FleXonic® belts has been simplified and does not require the pulley to be removed.



The belt is fitted on the large pulley without any tools



The belt is fitted on the large pulley with a universal installation tool

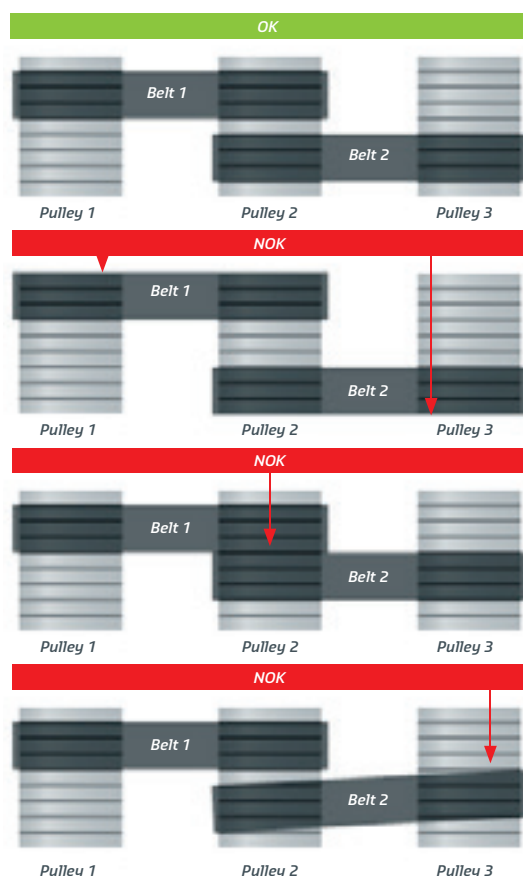
In most case, the FleXonic® belt can be mounted on a fixed center distance.

For certain special cases, Hutchinson proposes a universal installation tool. Specific tools can be used under the following conditions:

- A transmission ratio of 1:1
- A transmission ratio close to 1, with high elongation
- Transmissions that are not readily accessible

Please contact us for more information about our specific assembly tools.

**Easytec can be used to measure the tension in order to check the settings contained in Hutchinson's calculation report.**



### e. INSTALLING CONVEYXONIC®

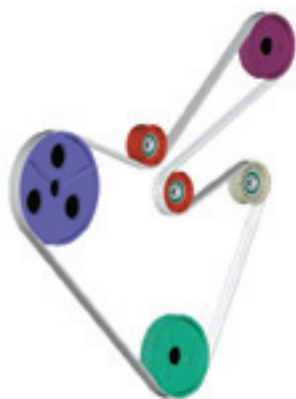
The elastic ConveyXonic® belt can be installed quickly and easily. Suitable tools can be used to tension the belt with a transmission ratio of 1:1 in order to avoid over-elongation of the belt when it is installed.

It is essential to use a suitable tool for pallet conveyors that use PK belts. Please consult us for more information.

As a general rule:

- There **must not be any contact between two belts**, the box or any other part of the conveyor
- Each belt must be assembled on the same rib of the two pulleys to avoid any misalignment
- Leave one rib free between two belts (visual)
- The first and last ribs of the pulley must not be used.

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## f. CASES OF SPECIAL KINETICS

### f.1 SERPENTINE TRANSMISSIONS

The flexion and counter-flexion capacity of Poly V® belts allows for serpentine-type installations offering the following advantages.

- **Only one belt** is needed to drive several accessories:
- Accessories **may be driven by the back** of the belt.
- **Very compact transmissions.**

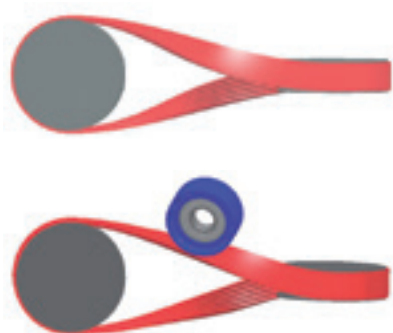
The recommended minimum diameters can be found on page 19.

### f.2 QUARTER TURN TRANSMISSIONS

The Poly V® belt transmits power between **two pulleys in different planes**. This involves relatively high flexion stress on the belt and limits its use to low-power applications.

The idler must be inclined for **quarter turn transmissions with idlers**, which allow for high speed ratios with relatively short center distances. The value of the incline depends on the center distance and the diameter of the pulleys.

The characteristics of Poly V® allow it to be adapted to **complex installations**. Please contact us for any special applications.





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### a. STORAGE

The storage recommendations for elastomer-based products are detailed in the **ISO 2230** standard.

Ribbed belts must be stored at temperatures between 10° and 35°C.

From the date of manufacture, the belts must not be stored for any longer than:

- **2 years in their original packaging for H, J and K belts**
- **5 years for L and M belts**

\*\* The 5-figure number on the belt shows the date of manufacture of the belt > the first two figures show the year of manufacture, and the next three show the calendar day in the year. (e.g. 14 022 corresponds to the 22nd day of 2014, i.e., 22 January).

**Once the belt has been installed and tensioned, the maximum period of static storage is 1 year.**

### b. PREVENTIVE MAINTENANCE

When they are correctly dimensioned for your machines, the Hutchinson ribbed belts are designed to limit **maintenance operations**. But just like for any other equipment, proper maintenance will increase the service life of a transmission. This chapter describes the operations required to guarantee the optimal performance of the Hutchinson belts, and to cut your costs (reduced maintenance costs, no production stoppages, etc.).

Before working on the belts, always obey the usual safety rules. Always use suitable equipment, switch off the machines and call on qualified operators.

Check that the transmission is in good working order by inspecting it visually on a regular basis. Any abnormal signs must be spotted quickly, in order to avoid possible failures. Keep a close lookout for the following signs:

- **abnormal noise**
- **vibrations**
- **excessive powder**
- **oil leaks**
- **extreme ambient temperatures.**

Refer to page 35 for the catalogue of **signs of wear**.

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### c. REPLACING A RIBBED BELT

When your belt shows signs of excessive wear and has reached its end of life (page 35), follow the procedure below to remove and replace the belt.

- 1 Before removing, check the belt tension when cold using Easytec (long strand).
- 2 Remove the belt by hand or using a special tool approved by Hutchinson. Do not store the belt near to a source of heat.
- 3 Visually inspect the belt. There must be no signs of cuts, tears, broken cord or rubber, or cracks on the ribs or on the back of the belt. If any of these faults are visible, replace with a new belt. Also check that the pulleys are aligned and clean.
- 4 Install the belt in the ribs of the pulleys, without tensioning.

- **Poly V® belts: center distance variation:**

Gradually tighten the belt by varying the center distance until the calculated center distance is reached. Check the frequency on the longer strand using an Easytec. Adjust the center distance until the calculated installation frequency or the frequency measured before removal is reached, if using the same belt. Rotate the belt three times by hand and measure the frequency. If necessary, adjust the center distance until the recommended frequency is reached.

If installed with an idler tensioner, the idler should be positioned on the loose strand of the belt.

- **FleXonic® belts with fixed center distance:**

Never re-install a used FleXonic®. Always install a new belt. Check that the center distance matches the calculated value. The belt may appear to be too short to be fitted on the ribs of the two pulleys, but a tool certified by Hutchinson can be used. Install the belt and rotate a few times by hand.

- 5 Check that the belt is properly installed on the pulleys (alignment of the pulleys, proper positioning of the belt in the ribs, belt centred, if there is a smooth pulley). Run-in for at least 20 minutes. Visually check the belt.
- 6 Never use solvents or resin on the parts of the transmission. The belt should be protected against all forms of projections: gravel, liquids, other.

Refer to section 7 p27. See the installation recommendations for more details.

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To check the tension, Hutchinson recommends the vibrating string method, which requires the use of an Easytec type tensiometer (see section 7 p29)



### d. CHECKING THE TENSION

It is essential to **adjust belts to the right tension**. If the belt is not taut enough or is too taut, then the transmission will not work properly, and the belt may even be destroyed.

- **If the belt is not taut enough**, it may slip excessively, resulting in quick deterioration of the belt, which can no longer transmit all the required power. Vibrations may occur and the belt may even jump out of place.
- **If the belt is too taut**, it may deteriorate quickly. The forces applied to the bearings are higher, and may result in quick damage.

### e. CATALOGUE OF SIGNS OF WEAR

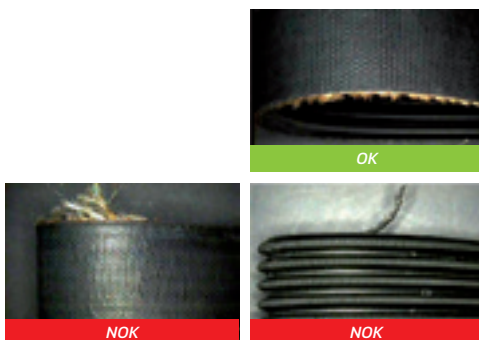
#### FRAYED STRAND

##### POSSIBLE CAUSES

- Check the flanks of the belt for signs of friction, which indicate that the belt is incorrectly installed or that the pulleys are misaligned
- If there are no signs of friction and the cord is not detached from the belt, then the belt is OK.

##### SOLUTIONS

- Check that the pulleys comply with the ISO9982 standard
- Follow Hutchinson's recommendations on misalignment and pinching
- Check the tension
- Replace the belt.



#### CORD VISIBLE AT THE BASE OF THE RIBS

##### POSSIBLE CAUSES

- Excessive slippage of the belt due to an incorrect tension
- Misalignment of the pulleys
- Pinched shafts.

##### SOLUTIONS

- Check that the pulleys comply with the ISO9982 standard
- Follow Hutchinson's recommendations on misalignment and pinching
- Check the tension
- Replace the belt.

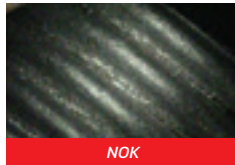


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### PEELING / DEPOSIT OF RUBBER AT THE BASE OF THE RIBS



NOK



NOK

#### POSSIBLE CAUSES

- Incorrect belt tension
- Misalignment of the pulleys
- Pinched shafts
- Pollution.

#### SOLUTIONS

- Check that the pulleys comply with the ISO9982 standard
- Follow Hutchinson's recommendations on misalignment and pinching. Check the tension
- Replace the belt.

### CRACKS IN THE RIBS



NOK



NOK

#### POSSIBLE CAUSES

- The belt was damaged during installation
- Excessively high temperature
- Excessive slippage
- Pollution
- Possible jamming of an accessory
- Misalignment of the pulleys
- Pinched shafts.

#### SOLUTIONS

- Check that the pulleys, idlers and accessories rotate freely
- Respect the operating temperatures:  
80/100°C continuous in BR,  
120°C continuous in EPDM.
- Protect the belt against projections (gravel, liquids, other)
- Only use tools approved by Hutchinson
- Check that the pulleys comply with the ISO9982 standard
- Follow Hutchinson's recommendations on misalignment and pinching
- Check the tension
- Replace the belt.

### RUBBING ON THE BACK



NOK



NOK

#### POSSIBLE CAUSES

- Rubbing of a metal part on the back of the belt (housing, idler, etc.).

#### SOLUTIONS

- For 3-shaft installations, respect a distance of at least 20mm between mechanical parts and a free strand of the belt, and 5mm for the rolled strands
- Replace the belt.

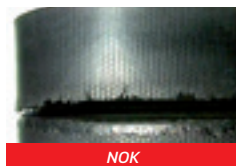
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NOK



NOK



NOK



NOK



NOK

### CRACKS ON THE BACK

#### POSSIBLE CAUSES

- Probable overheating and bakelisation of the rubber.

#### SOLUTIONS

- Check that the pulleys, idlers and accessories rotate freely.
- Respect the operating temperatures:  
80/100°C continuous in BR,  
20°C continuous in EPDM.
- Replace the belt.

### DETACHED RIB

#### POSSIBLE CAUSES

- Probable overlap of the first of the belt on the edge of the pulley
- Non-conformity of the pulleys (angle, roughness, pitch, etc.) and of the installation (misalignment or pinching)
- Overheating of the transmission due to possible seizure of one of the accessories
- Belt not taut enough.

#### SOLUTIONS

- Check that the pulleys comply with the ISO 9982 standard
- Follow Hutchinson's recommendations on misalignment and pinching
- Check the tension
- Replace the belt.

### POLLUTION BY FLUID

#### POSSIBLE CAUSES

- Fluid leak on the belt.

#### SOLUTIONS

- Protect the belt against projections (gravel, liquids, other). Clean the pulleys and replace the belt.

### ASYMMETRICAL WEAR OF THE RIBS / SERIOUS ABRASION OF THE RIBS

#### POSSIBLE CAUSES

- Non-conformity of the pulleys (angle, roughness, pitch, etc.) and of the installation (misalignment or pinching).
- Abnormal lateral stress.
- Excessive slippage.
- Non-compliant tension.

#### SOLUTIONS

- Check that the pulleys comply with the ISO9982 standard.
- Follow Hutchinson's recommendations on misalignment and pinching.
- Check the tension
- Replace the belt

## EXCESSIVE NOISE FROM THE TRANSMISSION

### POSSIBLE CAUSES

- Non-conformity of the pulleys and the installation
- Excessive slippage
- Non-compliant tension.

### SOLUTIONS

- Check that the pulleys comply with the ISO9982 standard
- Follow Hutchinson's recommendations on misalignment and pinching
- Check the tension.

## THE BELT JUMPS OUT OF PLACE

### POSSIBLE CAUSES

- Non-compliant tension
- Incorrect installation center distance
- Wrong belt part number
- Misalignment or excessive pinching of the belts
- Incorrect dimensions.

### SOLUTIONS

- Check that the pulleys comply with the ISO9982 standard
- Follow Hutchinson's recommendations on misalignment and pinching
- Check the transmission calculation
- Check the tension
- Replace the belt.

## EXCESSIVE VIBRATIONS

### POSSIBLE CAUSES

- Problem with the tension
- Incorrect installation
- Belt at end of life.

### SOLUTIONS

- Follow Hutchinson's recommendations on misalignment and pinching
- Check the tension
- Replace the belt.

Incomplete list. Please contact us for further expert advice.

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## a. CALCULATION SOFTWARE

We propose several software applications to help you to define your Hutchinson belt precisely and quickly.

Our Poly V® Design calculation software is available on our web site <http://www.hutchinsontransmission.com/resource-center/online-calculation-softwares/poly-v-design>. You can use this software to dimension your Poly V® belt online. This software can only be used for electric motors and Poly V® belts.

For internal combustion engines and other belt types (e.g., HPP™), the calculations must be made by a Hutchinson engineer who is qualified and experienced in belt drive systems.

## b. APP: WIZARD CONVEYXONIC®

Hutchinson's Wizard Conveyxonic® application can be used to define your ConveyXonic® belt for your straight or curved conveyor in just a few clicks!

This simple, fast and efficient software will guide you as you dimension your ConveyXonic® belts. It is already widely used by manufacturers of conveyor systems and components.

The application is available from Apple store or Google Play store, and on our own web site.

<http://www.hutchinsontransmission.com/resource-center/online-calculation-softwares/wizard-conveyxonic>

## c. INTERNET

### WWW.HUTCHINSONTRANSMISSION.COM

A site dedicated to the power transmission industry.

In the "Market" section, you will find the right transmission solution to all of your problems.

The "Products" section contains personalised transmission solutions: Poly V®, FleXonic®, ConveyXonic®, HPP™, synchronous belts and V belts.

We rely on our experience and expertise to propose the technical solutions that will optimise your transmission at the best possible price.



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## d. DOCUMENTATION

Hutchinson Belt Drive Systems offers the technical resources that will help you to optimise your belt drive system.

On our web site

<http://www.hutchinsontransmission.com/resource-center>

you will find:

- **Documentation:** a presentation of Hutchinson, market-specific flyers, product flyers and lists of references.
- **Case studies:** to share our experience and our success stories with you.
- **Technical videos**
- **FAQ**
- **Wallpaper.**

## e. TECHNICAL INFORMATION FORM

Please complete this form, and we will examine your request as quickly as possible. This request does not engage you in any way.





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## TECHNICAL INFORMATION FORM FOR ELECTRIC MOTORS

### CUSTOMER INFORMATION

Date: ..... Country: .....  
 Hutchinson contact: ..... Distributor: .....  
 Market: ..... Application: .....  
 Company: ..... Customer contact: .....  
 Phone.: ..... E-mail: .....

### CURRENT DRIVE

- ☐ Chain  
☐ Flat belt  
☐ Ribbed belt  
☐ Synchronous belt  
☐ V belt

### CENTER DISTANCE

Min. / max. (mm): .....

### REQUESTED LIFESPAN

..... (h)

### TENSIONER SYSTEM

- ☐ Center distance variation (mm): .....  
☐ FleXonic® belt  
☐ Tensioner: ☐ Fixed ☐ Dynamic  
                   ☐ Inside ☐ Outside  
                   ☐ Ribbed ☐ Flat

Motor (X ; Y) / Receptor in (X ; 0)

Retracted position: ( ..... / ..... )

Advanced position: ( ..... / ..... )

Diameter (mm): .....

### MOTOR

Type: .....  
*(asynchronous, brushless, turbine, etc.)*

Starter: .....  
*(clutch, star triangle, etc.)*

Nominal speed (rpm): .....  
*(Indication plate)*

Nominal power: .....  
*(Indication plate)*

Electrical efficiency (%): .....

Pulley diameter (mm): .....  
*(outer diameter)*

Pulley profile: ☐ PH ☐ PJ ☐ PK ☐ PL  
                   ☐ PM ☐ Flat ☐ TBD

Max. bearing load (N): .....

### DRIVEN MACHINE

Type: .....  
*(fan, compressor)*

Nominal speed (rpm): .....

Power/torque: .....  
*(Value mechanical shaft)*

Electrical power (kW): .....

Electrical efficiency (%): .....

Pulley diameter (mm): .....  
*(outer diameter)*

Pulley profile: ☐ PH ☐ PJ ☐ PK ☐ PL  
                   ☐ PM ☐ Flat ☐ TBD

Max. bearing load (N): .....

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#### SPECIAL POINTS

- If possible, please enclose the torque characteristics of the driven machine
  - Multiple-pulley transmissions: please enclose a drive layout
  - Dual sheave system: Fill out two forms
  - Multi-speed drive: attach duty cycle (speed and torque curves).
- .....
- .....
- .....
- .....
- .....
- .....
- .....
- .....

#### SERVICE FACTOR

Rotation: ☐ Clockwise ☐ Counter clockwise ☐ Alternative

N° of starts / day: .....

Operating time / day: ☐ < 10h ☐ 10h to 16h ☐ > 16h

Load: ☐ Regular ☐ Overloads

Starts with load: ☐ Yes ☐ No

#### ENVIRONMENT / EXPOSURE

Temperature (°C) ..... / ..... / .....  
(ambient average / min. / max.)

Abrasive dust: ☐ Yes ☐ No

Water: ☐ Yes ☐ No

Oil: ☐ Yes ☐ No

Hydrocarbon: ☐ Yes ☐ No

ATEX: ☐ Yes ☐ No

#### PULLEY DESIGN

	MOTOR	DRIVEN MACHINE
Shaft diameter (mm)		
Min. pulley diameter (mm):		
Max. pulley diameter (mm):		
Max. width (mm)		

## HUTCHINSON BELT DRIVE SYSTEMS

Email: [belt.drives@hutchinson.fr](mailto:belt.drives@hutchinson.fr)

Tel.: +33 2 47 48 39 99 - Fax: +33 2 47 48 38 34

[www.hutchinsontransmission.com](http://www.hutchinsontransmission.com)

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## **f. HUTCHINSON EXPERTISE CENTERS**

### **HUTCHINSON BELT DRIVE SYSTEMS**

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37304 Joué-les-Tours Cedex  
FRANCE  
belt.drives@hutchinson.fr  
Tel.: +33 2 47 48 39 99 – Fax: + 33 2 47 48 38 34

### **HUTCHINSON BRASIL AUTOMATIVE LTDA**

Estrada do Barreiro  
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000037640  
Extrema  
BRAZIL  
belt.drives@hutchinson.com.br  
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belt.drives@hutchinson.de  
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Kozhikode, Kerala 673017  
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Tel.: + 91 98450 94771

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UK  
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