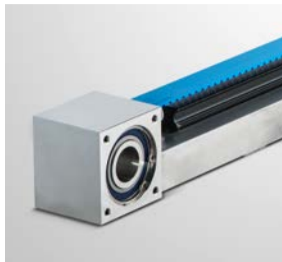




### “Make Power Smart” app

True efficiency! Digital on-site tool by Continental for belt analysis and condition inspection

More on page 2



### FDA-compliant timing belt drives

Superior quality! Highly durable BRECO® timing belts for the food and pharmaceuticals industry

More on page 4



### Mulco belt-pilot relaunch

Optimised! The popular online tool for design engineers with a new look and many improvements.

More on page 5

# Reducing electricity costs by 80%

## Innovative polyurethane roller belt BRECOroll for material transport systems

Everyone is talking about energy costs but the options for saving are limited. BRECOroll, an innovation by BRECO Antriebstechnik in the town of Porta Westfalica, gives the industry a way to significantly reduce energy consumption in plants that have long transport belt drives and to build smaller, lower-cost drive motors.

Timing belts used to transport materials are usually very long. The load run of the belt is almost always supported by a support rail, which guides the belt on its sides and absorbs the weight of the workpieces on the belt and of the belt itself. This generates friction between the belt and the support rail.

The greater percentage of the drive power is used to overcome this self-inhibiting behaviour of the system. During this process, the drive is subject to major forces, generates heat and runs at a low degree of efficiency.



For this reason, timing belts for material transport come standard with a backing on the tooth side.

This reduces the coefficient of friction between the timing belt and the support rail from  $\mu=\pm 1,0$  to  $\mu=0.5$  to  $0.6$ . By cutting the friction in half, timing belts achieve high running performance with a low rate of wear.

However, the remaining energy consumption caused by the friction between the timing belt and the support rail is still significant.

Due to the low drive power of the motors, between 0.38 and 2 kW, energy consumption has so far been largely ignored in a practical context. But this is a mistake, as our brief example calculation will show.

### Example calculation of friction loss

If a conveyor belt transports 20 workpieces weighing 10 kg each, i.e. a total load of 200 kg at  $v=1$  m/s, the power or friction loss is  $P_v$ :

$$P_v = \mu \cdot m \cdot g \cdot v$$

$$= 0,5 \cdot 200 \text{ kg} \cdot 10 \text{ m/s}^2 \cdot 1 \text{ m/s}$$

$$= 1 \text{ kW}$$

Conventional worm gear motors have a total efficiency of approximately 0.75. The efficiency of the belt drive (without support rail) can be disregarded. This means that, for the friction loss between the belt and the support rail alone, the motor in our example has to provide  $1.0 \text{ kW}/0.75 = 1.33 \text{ kW}$ .

► Continued on page 2

## One size longer



Enough of a reason to visit the Isle of Wight from the south coast of England: a trip in a hovercraft.

## CONTI® SYNCHROCHAIN CARBON timing belts in hovercraft

In two hovercraft ferries between Portsmouth on the south coast of England and the Isle of Wight, the British manufacturer Griffon Hoverwork uses CONTI® SYNCHROCHAIN CARBON timing belts from Mulco member Continental. They are the longest endless Polyurethane timing belts that have ever been made.

Griffon Hoverwork has equipped the drives of their hovercrafts with timing belts for many years now. For good reasons: The timing belt drives only cause minimal obstruction to the airflow through the propellers, they don't need lubricants and they

can bridge very large centre distances. What makes these timing belts so special is their dimensions: created in endless design, they are actually longer than five metres. Continental produces the CONTI SYNCHROCHAIN CARBON timing belts at its Dannenberg site. The moulds for the timing belts were specially made for Griffon Hoverwork.

► Continued on page 3

► Continued from page 1

## Reducing electricity costs by 80%

In single-shift operation, the yearly machine operating time taking into account averages for holidays, annual plant shutdowns, sick days, servicing, etc. is approximately 1600 hours. This means the annual power consumption resulting from friction in single-shift operation amounts to a total of 2133 kWh per belt drive.

This corresponds approximately to the annual power consumption of a 2-person household. When several belt drives operate in 2/3 shifts, the losses rise to a degree that should not be disregarded in light of operating costs and the CO2 footprint. So how do you solve this problem?

### From sliding to rolling friction

The idea of transferring weight forces to the support rail through rollers rather than through a sliding tooth tip is obvious, but by no means a trivial solution.

Concepts involving rollers in the support rail proved to be too costly and had negative effects on the function of the timing belt. The solution: Integrating the rollers in the belt tooth.

### Tooth mesh in the pulley does not change

One basic prerequisite for the position of the rollers is that they must protrude over the tooth tip so that the rollers and not the tooth tips make contact with the support rail. To prevent the rollers from lifting the timing belt when entering the pulley and thereby generating strong constraining forces, the T20 was selected.

The T timing belt is what is referred to as a "gap carrier". The tooth tips of the belt do not touch the tooth root of the pulley.

On the T20 this gap is 0.8 mm. This means the roller can protrude from the tooth tip by less than a tenth to fulfil its function of transferring the forces on the support rail. The roller practically "floats" freely in the tooth gap of the pulley. The roller diameter is dimensioned so that it does not protrude beyond the tooth flank.

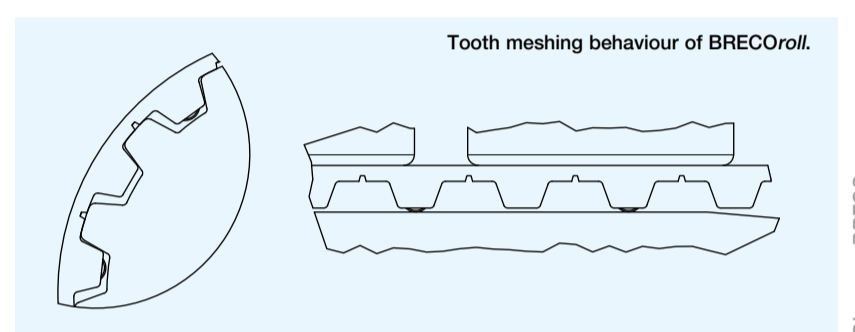
This allows the BRECOroll T20 to run perfectly in any standard pulley. By the way: The tension members are not interrupted by the roller.



### Reducing the coefficient of friction

The BRECOroll offers a coefficient of friction of  $\pm 0.1$ , meaning that, compared with a PAZ-backed timing belt, it only generates 20 % of the initial loss (0.2 kW). In our example calculation, the BRECOroll would reduce the annual loss of 2133 kWh per belt in single-shift operation by an impressive 1706 kWh. And: It becomes possible to use a drive motor that is 0.93 kW (0.8 kW/0.75) smaller.

The BRECOroll can be used for speeds of up to 1 m/s and with area



loads of up to 3 kg per roller (3kg/40cm<sup>2</sup>). These limits are entirely sufficient for most material transport tasks in automated production processes. As the BRECOroll is based on a standard T20 timing belt, this is a product

that has been tried-and-tested hundreds of thousands of times and will help operating companies reduce the operating cost and CO<sub>2</sub> footprint of their plants thanks to reduced friction losses.

# Efficient and Simple: Continental "Make Power Smart" App Saves Time and Costs – and Increases Comfort

**Simple and comfortable maintenance at the touch of a finger: Continental has developed a mobile app that represents a new way of working with belts.**

"Make Power Smart" has been running very successfully on the North American market since summer 2021, and customer feedback has been consistently positive. Now the app is also launching in Europe – for Android and iOS. "The app is another important step into the digital age to help customers do their work more easily and efficiently," emphasizes Mariano Alvaro, who is leading the development of "Make Power Smart".

"Make Power Smart" is a versatile on-site 'first aid' tool. With just a few clicks, the user gets a digital and interactive analysis of the belt, as well as important data on its condition. The benefits: ease of use, less downtime, longer belt life and lower costs.

In doing so, the "Make Power Smart" app digitizes the information and most common tools used to analyze and set up a belt drive.

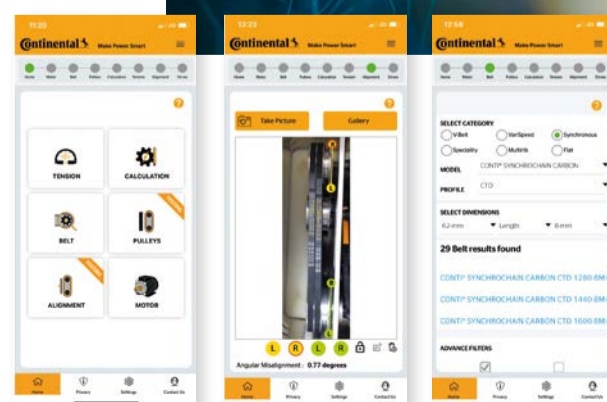
### Independent action comfortably possible

This enables users to improve the belt drives themselves on site. Those responsible for machines and systems with belt drives, sales professionals or application consultants can thus find the most important tools bundled in an app on their mobile device. The app provides advice and empowers the respective person to act accordingly. "Make Power Smart" consists of various modules with special functions: Gathering information on the spot, identifying and selecting the best belt according to the requirements, measuring drive geometry such as center distance, pulley diameter and wrap angle, checking drive alignment, calculating drive systems, and checking and setting the correct tension, which

is analyzed by the smartphone's built-in microphone.

### Efficient solution minimizes errors

"Our app offers important maintenance functions that customers can access at the touch of a finger. 'Make Power Smart' is designed not only to save costs while extending the life of belt systems, but also to improve their operation," Alvaro explains. "This app represents a revolution because it allows our customers to troubleshoot their drive belts on their own without having to call the technician directly or interrupt the production process."



The "Make Power Smart" app digitizes the information and most common tools used to analyze and set up a belt drive.

The "Make Power Smart" app is available for download free of charge in the app stores for iOS and Android.

► Continued from page 1

## One size longer

### Low centre of gravity thanks to long centre distance

With a length of 22 metres and a width of 10 metres, a hovercraft in the 12000TD series is almost the size of a tennis court and carries up to 88 passengers. It has two propellers and two fans. It also has two diesel engines, each with 793 kW, which serve as drives for the two propellers and two fans!

Each engine drives a fan and a propeller via a main shaft and a belt drive. The main shaft is connected to the propeller, which is about 2 metres in diameter, by a CONTI SYNCHROCHAIN CARBON timing belt, 5,502 mm long, and the connection to the fan is provided by a timing belt of the same type, 4,956 mm long and 60 mm wide. To reduce the rotational speed and thus the noise level, the propellers have been given the

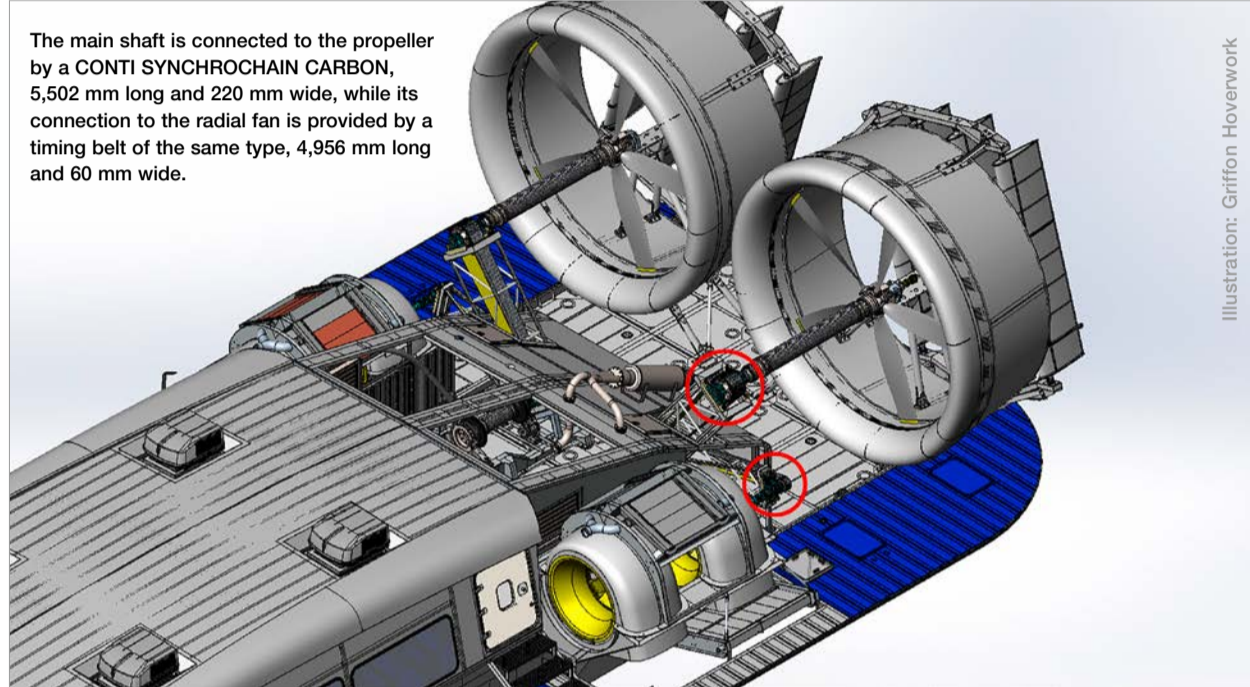
greatest possible diameters. To achieve the lowest possible centre of gravity for a hovercraft, the diesel engines are positioned as low as possible. This ensures very long centre distances and timing belts that are 5.5 metres in length.

The CONTI SYNCHROCHAIN CARBON is a Polyurethane timing belt with a carbon tension member from Continental.



Ideal solution for hovercrafts:  
The CONTI SYNCHROCHAIN CARBON is highly resistant to abrasion and wear, while ensuring high performance and excellent reliability in tough environments.

Photo: Continental



The main shaft is connected to the propeller by a CONTI SYNCHROCHAIN CARBON, 5,502 mm long and 220 mm wide, while its connection to the radial fan is provided by a timing belt of the same type, 4,956 mm long and 60 mm wide.

Illustration: Griffon Hoverwork

### The CONTI SYNCHROCHAIN CARBON

Furthermore, thanks to the fabric on the toothed side, it is highly resistant to abrasion and wear, while delivering extremely reliable performance. The heart of the belt is the carbon tension member, which stretches even less than a standard aramid tension member. As a result, it has better spacing accuracy at high tensile loads and improved tooth mesh.

Another important benefit is that the carbon tension member minimises any losses from pretensioning

forces during the run-in phase. As a result, the CONTI SYNCHROCHAIN CARBON is almost totally maintenance-free, which helps to reduce the cost of maintenance and servicing. Thanks to its excellent efficiency and smooth performance, low wear and tear while running and no need for lubrication, the belt has numerous benefits over chain drives and serves as a good replacement.

This report is published with kind permission from ContiTech Antriebssysteme GmbH, Transmission Developments Co. (GB) Ltd and Griffon Hoverwork Ltd.

## Interactive E-learning Tool

Illustration: Continental



### Dear Customer,

Let me just introduce myself: My name is Felix, and I'll be guiding you through the e-learning tool from Continental Power Transmission Group Industrial. It'll be a good opportunity to find out about our products or to increase the knowledge you already have. There's something in it for everyone – though only for our customers. We've really come up with something outstanding, and so we do hope you'll like it.

The e-learning tool consists of several modules. It starts with two interactive courses: one on the basics of belts, and another specifically on timing belts. The content of these courses is entertaining, and you'll gain an in-depth understanding of belt technology. I'll explain to you how it works. The courses will conclude with a test, and you'll be given a certificate. The test will be quite challenging, so you might want to pay close attention.

In addition to the courses, you can look forward to some short videos explaining our VSM Mini and our Laser Alignment Tool as well as several presentations which you are also welcome to use with your customers.

Perhaps you've got new colleagues or trainees? If so, you're welcome to pass on this information and the web address within your organisation. However, do please remember that this tool is intended exclusively for our customers.

Click here to get going:  
[www.continental-learningplatform.com](http://www.continental-learningplatform.com)



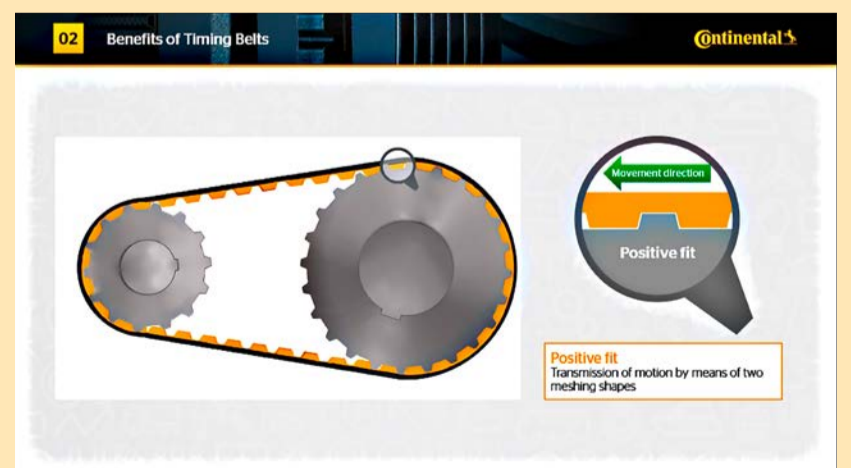
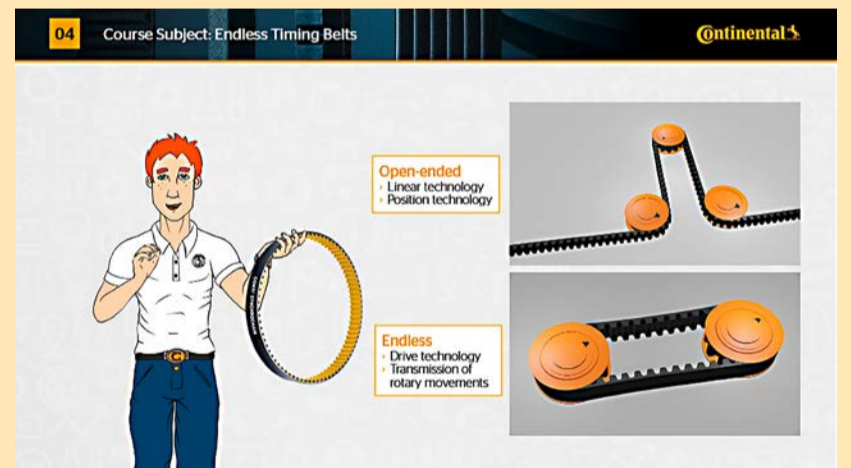
Just fill in the form, send it off, and you'll receive an access code, so that you're good to go.

We hope you'll have lots of fun and make some interesting discoveries. My colleagues would love to read your comments, as we want to keep improving.

See you soon,

*Felix*

Felix is the program guide on the Continental e-learning platform.



The Continental web-based training course on timing belts provides clear insights into belt technology.

Illustrations: Continental

## All you need for FDA-compliant timing belt drives

Photo: Wilhelm Herm, Müller

These days, it's virtually impossible to imagine automated production systems in the food and pharma industries without timing belts. They perform key roles in processing and packing. The wide range of possible coatings and the scope offered in designing profiles, not to mention lubricant-free running, make them such a popular option for sensitive areas. Nevertheless, they have to be specifically adapted to the needs of these industries. For instance, particularly stringent standards apply to direct and indirect contact with foodstuffs, such as when making and packing confectionery, filling containers with liquids and powders, or storing, transporting and packing cheese. Packing medical products such as tablets is just as demanding. We'll show you what you need to look out for.

Mechanically reworked polyurethane timing belt equipped with special profiles and made from an FDA-compliant material with stainless steel tension members for use in the food industry.

### FDA-compliant materials are a must

The scope for using timing belt drives in the food and pharma industries is defined by a series of mandatory legal requirements issued by the US FDA (Food and Drug Administration) and the European Union.

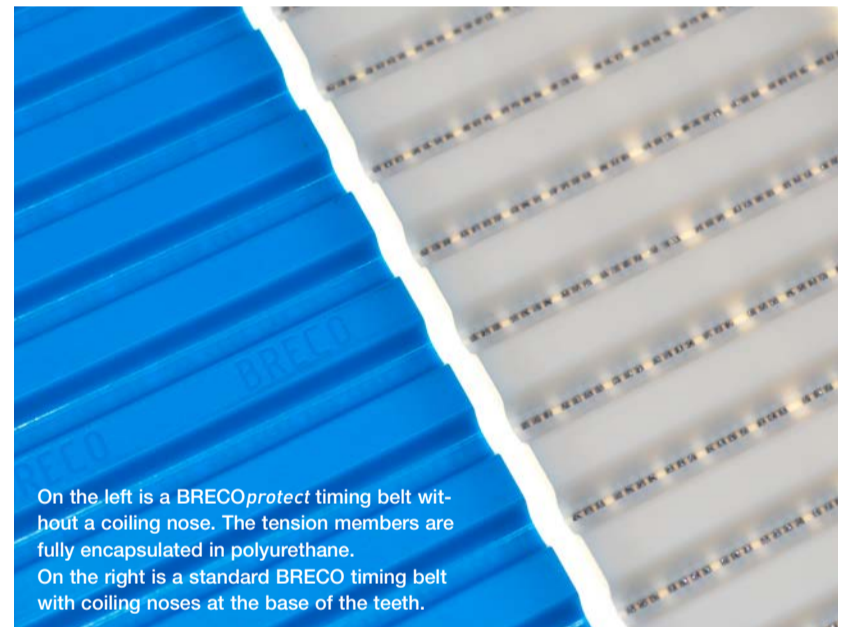
In order to be allowed in these sensitive areas, the polyurethane used in the timing belt as well as the coating material and, if relevant, the tension member material all need to be compliant or approved. The table below provides an overview of the various polyurethanes available. In the food industry,

tooth and the back of the belt, a narrow raised section known as the coiling nose is included on the mandrel. This is used to tension the tension members before they are encapsulated in the polyurethane. The tension members are then left exposed at this spot on the finished timing belt.

Timing belts with coiling noses are equipped with high-tensile galvanized steel tension members as standard. Fitted with FDA-compliant polyurethane, the belts are granted limited FDA compliance. Unlimited FDA compliance is only available to timing belts with coiling noses if their tension members are made of stainless steel.

TPUAU1, the polyurethane used as standard on BRECOprotect timing belts, is food-safe and extremely resistant to cleaning processes in the food and pharma industries. The material also resists oils and lubricants. The blue colouration on the polyurethane is ideally suited to visual inspection systems. Any dirt sticking to the surface is also easy to detect.

Across the board, declarations of conformity are also being required more and more frequently for timing belts that come into direct contact with food. This means that it is no longer sufficient simply to state that the materials used comply with the regulations in the



On the left is a BRECOprotect timing belt without a coiling nose. The tension members are fully encapsulated in polyurethane. On the right is a standard BRECO timing belt with coiling noses at the base of the teeth.

Photo: BRECO

		Polyurethanes					Timing belt
		For wet foodstuffs		For dry foodstuffs			BRECOprotect
		TPUFD1	TPUFD2	TPUAU1	TPUAU2	TPUAU3	
		92 Shore A	85 Shore A	92 Shore	95 Shore		
		0 to 80 °C	5 to 50 °C				
Europe: European Commission Regulations	(EC) No. 1935/2004	x	x	x	x	x	x
	(EC) No. 10/2011	x	x	x	x	x	x
USA: FDA (Food and Drug Administration)	FDA CFR Sections 175.105 and 177.2600	x	x	Cleaning agent suitable			
	FDA CFR Section 177.1680	x	x	x	x	x	x
Stainless steel tension members							Steel tension members

timing belts need to be particularly resistant to cleaning fluids and water. Timing belts made from conventional polyurethane often have a very limited service life under these conditions, particularly due to hydrolysis.

### BRECO timing belt materials for the food and pharma industries

Any tension member material can be used for the food industry as long as it is fully encapsulated in polyurethane. This is not usually the case, however: to be able to place the tension members in a specific position between the base of the

### BRECOprotect polyurethane timing belts

As a general principle, it would be better if timing belts did not have this coiling nose. But there is a solution: BRECOprotect. This timing belt does away with the coiling nose so that the tension member is fully encapsulated by the polyurethane at the base of the tooth.

This prevents corrosion and hidden or hard-to-remove contamination and makes cleaning easier. It also obviates the need for stainless steel, meaning that high-tensile steel tension members can now also be used – a real win-win situation.

table. Instead, all the materials that go into the product need to be tested to verify their suitability for direct contact with food.

These "migration tests" were successfully completed for the BRECOprotect product range and confirmed in a corresponding certificate. BRECOprotect timing belts are food-safe.

Compliance with the GMP Regulation (EC) 2023/2006 (Good Manufacturing Practice) is also necessary to receive this certificate. Only this guarantees the cleanliness or purity of the product following the manufacturing process.

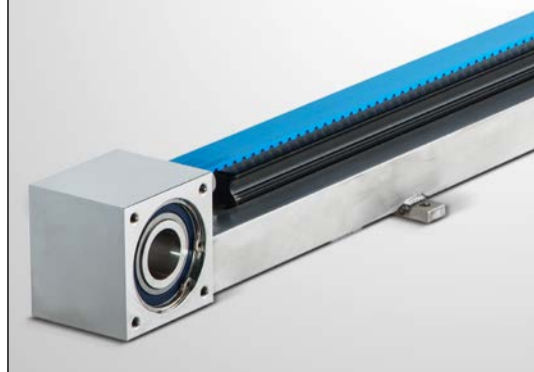
### As a basic principle, the following recommendations apply to the use of polyurethane timing belts in packing plants that work with foodstuffs:

- BRECO timing belts with coiling noses require a steel tension member. The same goes for timing belts whose tension members are exposed as a result of subsequent reworking such as milling or piercing.
- Food-safe materials must also be used for profiles, screw connections and, in particular, coatings.
- The following food-safe materials are available for coatings: Linaplast FG FDA, PVC fishbone FDA, HV film FDA, PVC film white FDA, PVC nubs white FDA and Supergrip FDA.
- The ink used to mark the back of timing belts is not FDA-compliant and will be left exposed on

uncoated belts. On request, therefore, timing belts can also be supplied unmarked.

Open linear drive fitted with a BRECOprotect timing belt for use in the confectionery industry.

Photo: Mulco



Declarations of conformity for BRECO timing belts that come into contact with food are available at [www.breco.de](http://www.breco.de). These declarations of conformity confirm compliance with Regulations (EU) 1935/2004, (EU) 2024/2006 and (EU) 10/2011. The associated material safety data sheets also confirm that the polyurethanes used comply with FDA regulations.

## Mulco belt-pilot relaunch

In early 2022 our Mulco belt-pilot got a new design. Our online tool for design engineers consists of an extensive product catalogue for BRECO®, BRECOFLEX® and CONTI® SYNCHROFLEX timing belts combined with a calculation software for power drives and linear drives. All products are available as CAD downloads.

**New domain:**  
[www.belt-pilot.com](http://www.belt-pilot.com)

Design, calculate and download all relevant data. The service on the new domain [www.belt-pilot.com](http://www.belt-pilot.com) continues to be accessible and free of charge in German, English and French.

We have added a large number of improvements and new functions. For instance, the calculation log can now be saved not just as HTML but also in a PDF format. The CAD mode contains new, versatile functions

such as a rotating 3D view, snapshots, a zoom function and transparency.

### Expanded product catalogue

Linear drive and lifting drive calculations can now also be created for the timing belts BRECOprotect, BRECOmove and BRECOFLEXmove, including the latest profile AT15.

The current version also includes almost 100 % of the complete synchronising pulley range for CAD download – from 20 to 114 teeth. Mulco belt-pilot will run on any device including desktop PCs, tablets and smartphones.

The only feature you cannot access as a smartphone user is calculation, as the screen would simply be too inconvenient for this application.



We would also like to let our experienced users know that a Java plug-in is no longer required for the calculation feature, so any associated problems are now a thing of the past. Existing log-ins for earlier versions of the Mulco belt-pilot remain valid. Simply register on [www.belt-pilot.com](http://www.belt-pilot.com) and start immediately.

## Timing belts with antistatic properties

Antistatic BRECO timing belts made of conductive transparent TPU. The timing belts in the foreground are equipped with an additional conductive backing on the belt tooth side and back of the belt.

**Electrostatic charging is the physical process by which an excess or shortage of electrons that cannot be compensated forms on non-electrically conductive surfaces. This potential difference usually does not pose a problem. However, if this charge is compensated by flashover and therefore strong pulsed discharge currents, damage may occur on sensitive components. In explosive environments these discharges may even pose a risk of ignition.**

To protect electronic components in industrial environments from flashover, it is therefore required to continuously remove charge carriers (electrons) from the affected surfaces. Electrostatic charging of belt drives is primarily the result of sliding friction on guide and support rails, friction in the tooth mesh and electric fields. As the thermoplastic polyurethane (TPU) makes timing belts excellent insulators, dissipation of charge differentials can pose problems.

To give timing belts antistatic properties, i.e. allow them to discharge electricity, a conductive material is mixed with the TPU. This creates a slightly

conductive compound such as BRECO-TPU-AS1 with a resistance of  $< 10^8 \Omega$ . Significantly lower resistance values are achieved by the TPU compounds BRECO-TPU-AS2 and TPU-AS7. The latter is a recent development and offers particularly consistent resistance distribution in the longitudinal and transverse timing belt direction as well as very low resistance values  $< 10^4 \Omega$ .

Another option for making timing belts conductive is coating the tooth and/or belt back with a conductive backing. The antistatic PA backing created by BRECO offers a resistance value of  $10^5 \Omega$  and is primarily used in

belt drives serving as accumulating conveyors for electronic components. It also reduces the coefficient of friction to approximately 0.3.

CONTI SYNCHROFLEX polyurethane timing belts are also available with antistatic properties. A special conductive polyurethane compound is available up to a belt length of 700 mm. Alternatively, an electrically conductive backing can be applied post-manufacture.

Antistatic CONTI SYNCHROFLEX timing belts made of conductive black PU compound.



Photos: Mulco

To give our readers and customers greater insight into this somewhat complex topic, we plan to publish a longer article about it in one of the next issues of mulco innovativ. We want to explore the questions posed by practical applications such as: Which product should you use under which circumstances? Which standards, regulations and measurements have to be applied? How long are the electrically conductive properties of timing belts maintained? Is a low resistance value generally advantageous? And many more.



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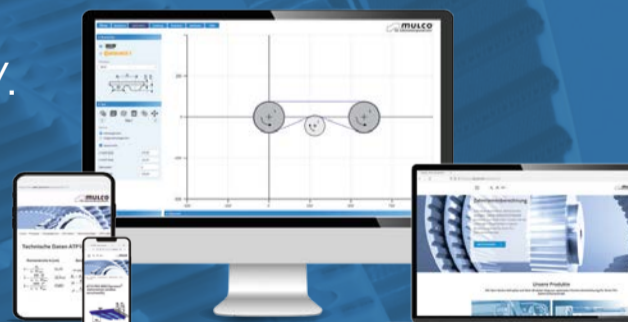
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## The new Mulco belt-pilot.

NEW DESIGN  
MEETS VERSATILITY.



See for yourself  
on belt-pilot.com  
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PC, laptop, smartphone or tablet, from now on you can use any device to access the optimised version of the Mulco belt-pilot. The new CAD tool box with its broad range of functions, the expanded product catalogue containing even more CAD models for download and the user-friendly calculation programs let you develop customised design solutions online. Thanks to improved user-friendliness, it is now even easier to find the right solution for your BRECO®, BREFOFLEX® or CONTI® SYNCHROFLEX polyurethane timing belt drive.



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