

WHITE PAPER:
Seven tips for selecting the optimum conveyor rollers

February 2020

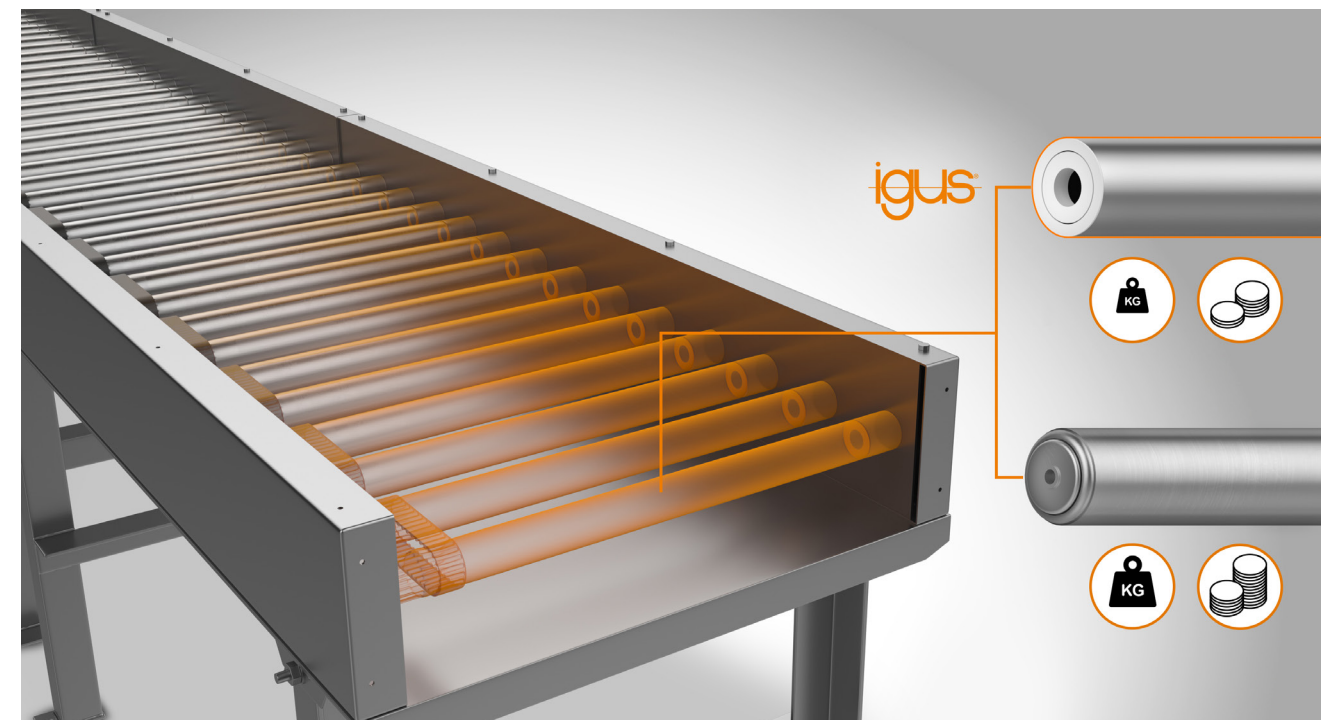
igus[®]

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Tip 1: Determine the load profile ...

In selecting guide rollers, it helps to pay attention to detail and, depending on the application, to take a look at solutions that go beyond the standard. This applies to such items as materials (for instance, components do not always have to be metal) and 3D printing options. The following article provides tips for selecting the right guide roller for each application.

At the beginning of each selection process, the conveyor system design engineer should determine the requirements for the drive rollers and guide rollers. They will often notice that they can use more cost-effective guide rollers than the standard rollers, which are designed for high speeds and/or loads. This reduces user costs without compromising roller performance properties or service life.



Source: igus® GmbH

Product example:

If the required load capacity is not too high, plastic guide rollers (made of PVC or carbon) or aluminium rollers from the igus® guide roller range can be used. They are cost-effective, and their modular construction allows adaptation to the individual application profile. In addition to cost, they have other advantages over standard rollers with steel jackets, such as the fact that they are corrosion-free and lightweight.



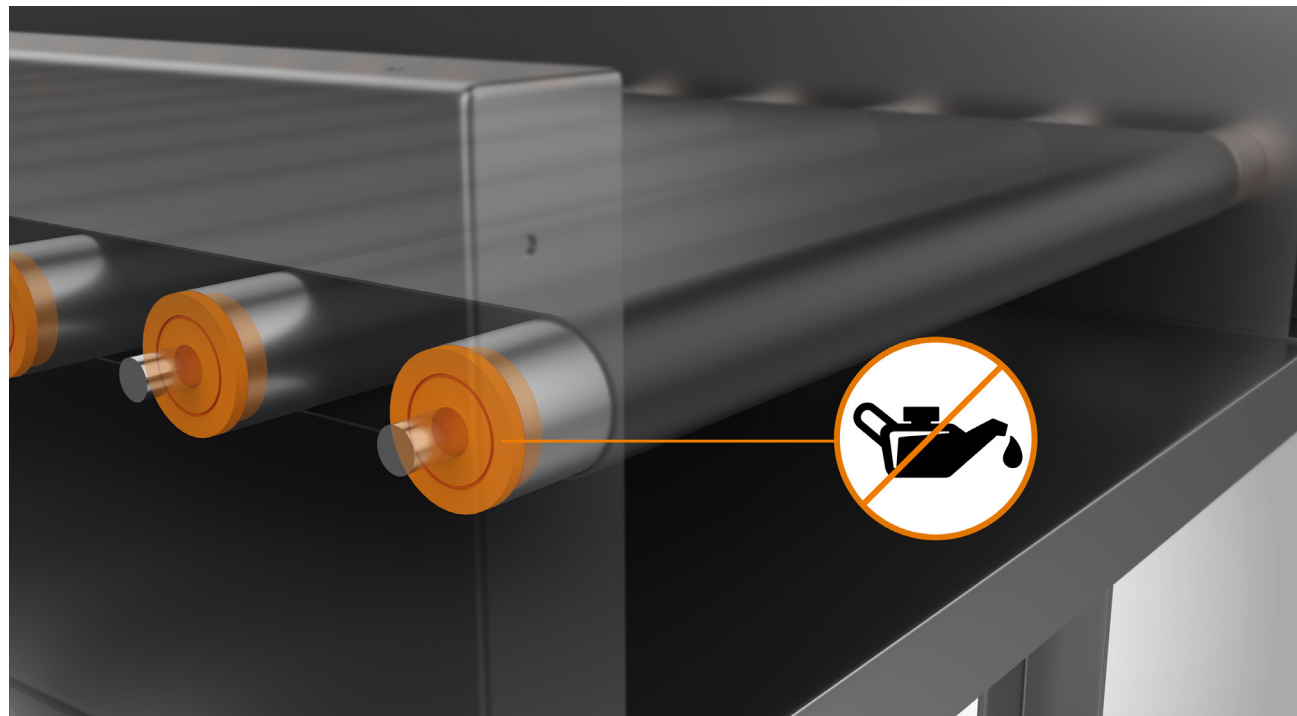
xiros® guide rollers

Source: igus® GmbH



Tip 2: Determine whether you can remove the need for lubrication ...

Deep groove ball bearings for conventional guide rollers depend on continuous lubrication. In some cases, this can become a problem. These cases include hygiene-sensitive areas in food production, where lubrication must not contact the product and harsh environments such as conveyor belts on agricultural machinery, where dust can mix with lubricant.



Source: igus® GmbH

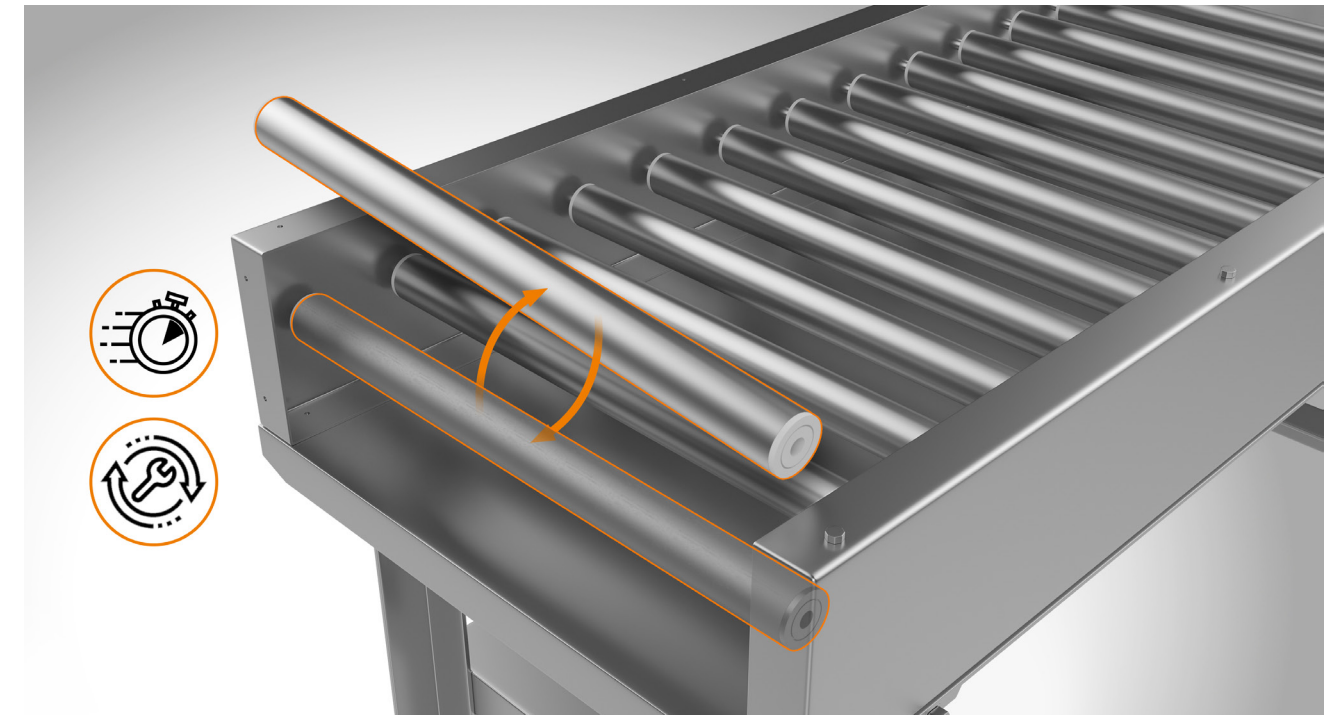
Product example:

There are guide rollers with lubricant-free bearings that use igus® xiros® deep groove ball bearings. A material combination of tribologically optimised polymers and stainless steel balls ensures outstanding performance without lubrication. Other advantages are the low breakaway torque and high resistance to chemicals and corrosion. These ball bearings are suitable for the low loads and speeds frequently encountered in material handling.



Tip 3: Ensure maintenance-friendliness ...

During servicing, quick guide roller maintenance should be possible so that downtime is minimised.



Source: igus® GmbH

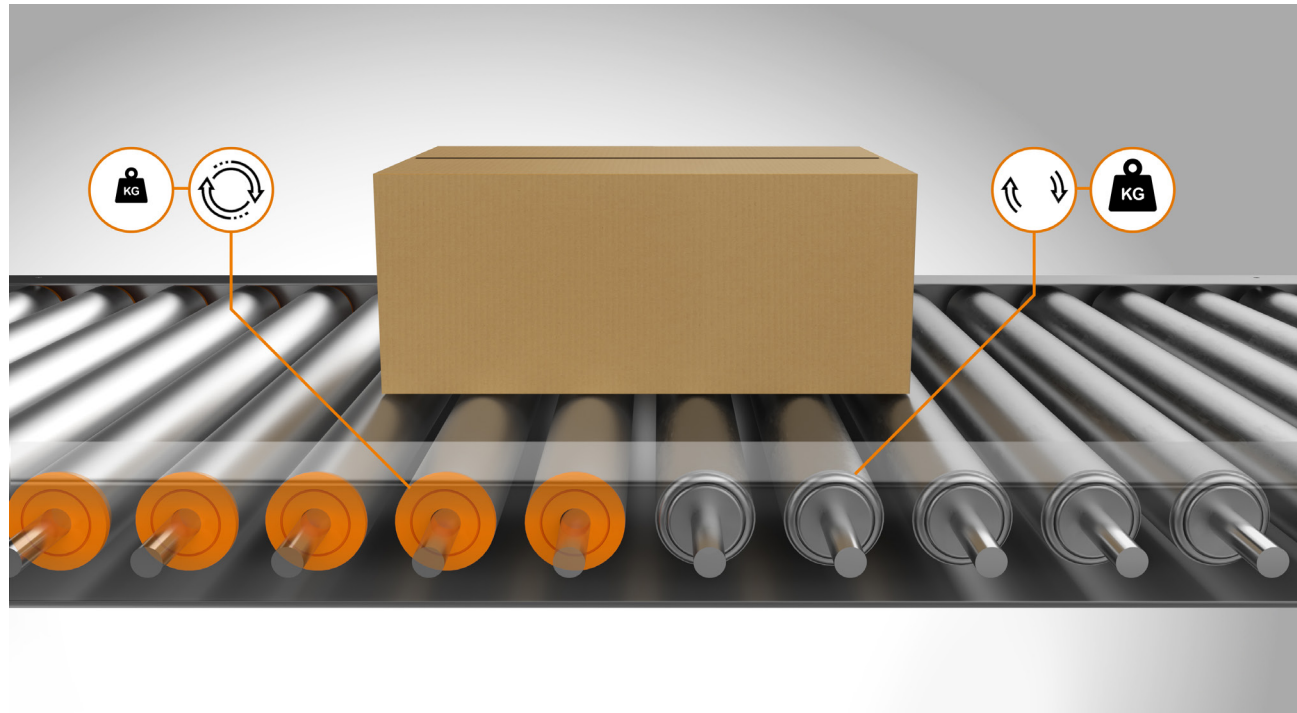
Product example:

igus® guide rollers are designed for easy installation. An essential design feature is modularity, so that individual components can be replaced quickly.



Keep an eye on energy efficiency ...

Energy efficiency is an increasingly important factor in selecting driven rollers. It is greatly affected by interior friction (ball bearing, seal) and roller weight.



Source: igus® GmbH

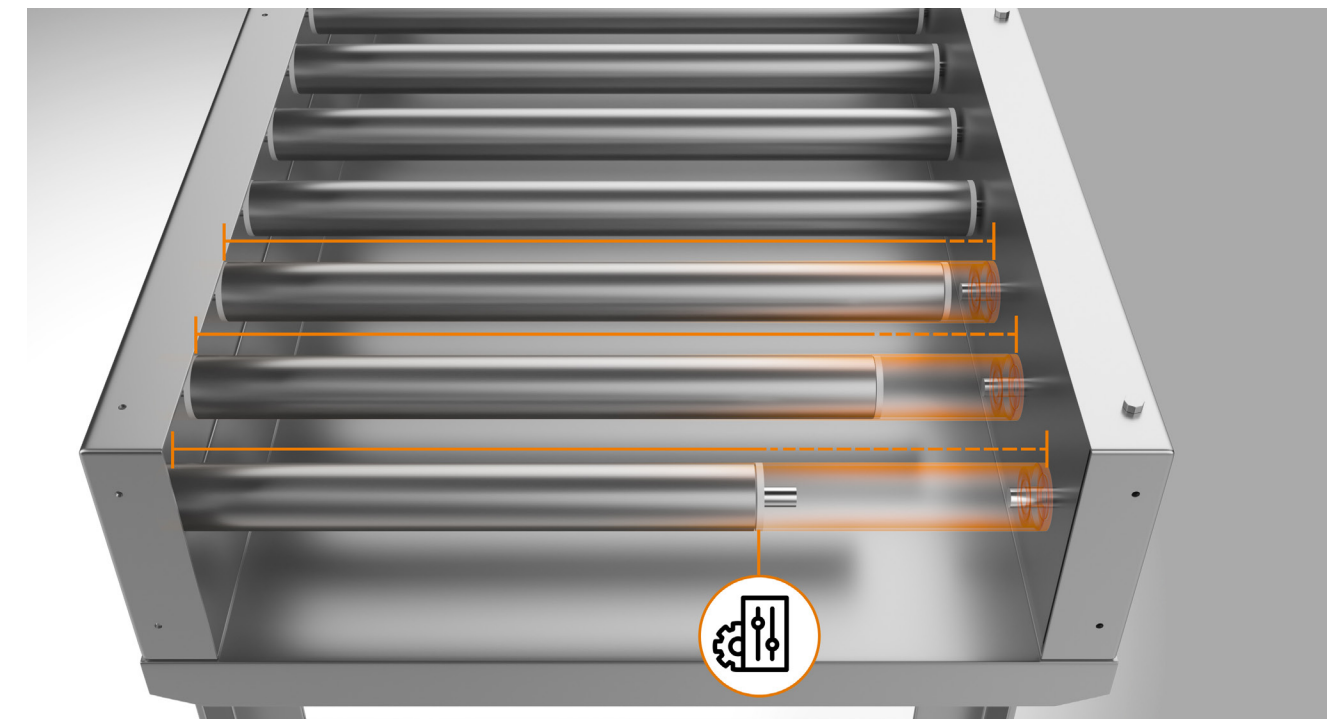
Product example:

Guide rollers with aluminium or plastic jackets are much lighter than those with steel jackets. This means that when they are used as drive rollers, they require less energy and allow a quick start-up with little energy consumption. This makes them especially well-suited to dynamic applications with limited transported-goods weight.



Optimum integration into the design ...

The design engineer should always consider how the guide roller can be best integrated into the surrounding structure. Would special non-standard sizes be advantageous, for instance?



Product example:

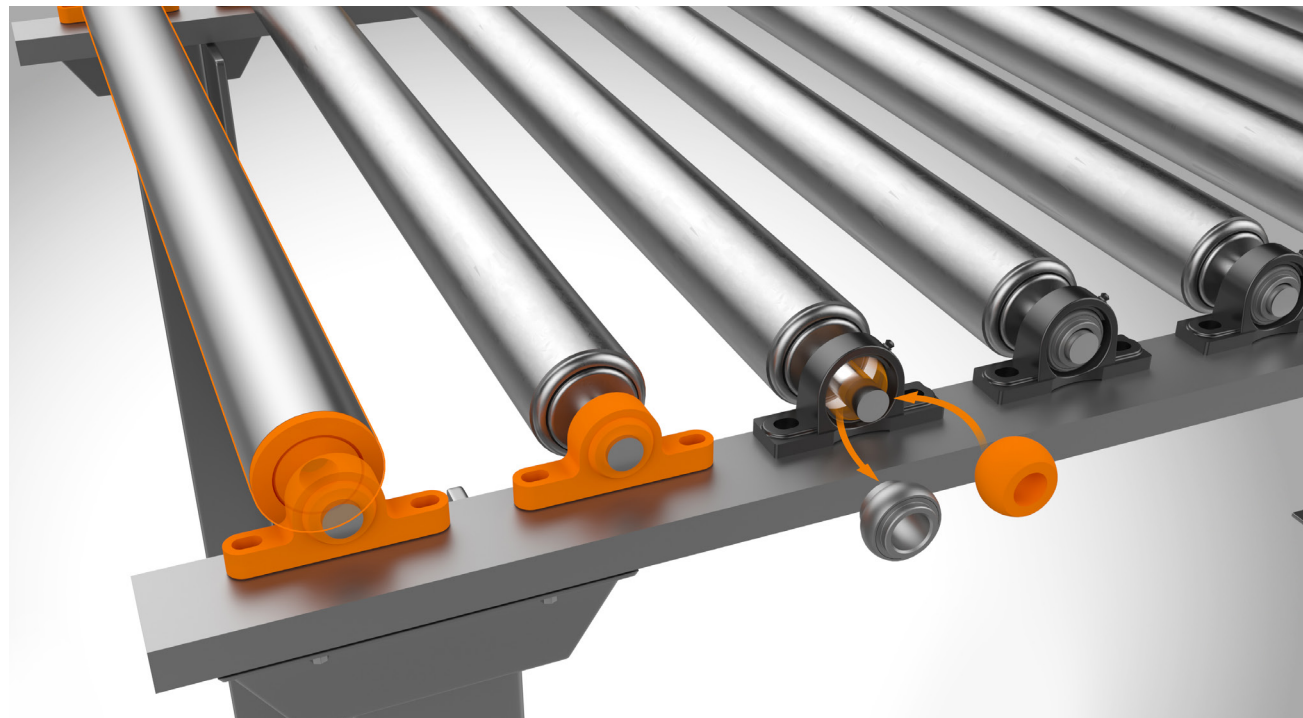
This question can be posed openly today because the igus® product range includes guide rollers that are 3D printed and customised to customer requirements. The combination of xiros® bearings and 3D printed housings and attachments allows guide rollers to be perfectly adapted to the overall design, rollers to be manufactured with special surface features, and for additional functions to be integrated. 3D printing also allows customer-specific pillow block bearings and fixed flange bearings to be manufactured in special sizes. xiros® guide rollers are also produced in customer-specific lengths.

Source: igus® GmbH



Optimise existing conveyor systems ...

The tips presented here do not only apply to new conveyor system design. Existing systems can be optimised in a targeted manner by means such as replacing guide rollers with rollers that are optimised for the application or replacing existing rolling bearings in rollers with special bearing inserts.



Source: igus® GmbH

Product example:

Maintenance-free igubal® bearing inserts can be installed in existing metal pillow block bearings and fixed flange bearings. They fit in existing bearing housings and have the potential to greatly increase bearing point service life because of their resistance to dirt, dust and corrosion. Practical tests in comparison have returned results of up to eight times the service life of ball bearings, especially in dirty environments.



Top: igus® tribo-tape in desired shapes

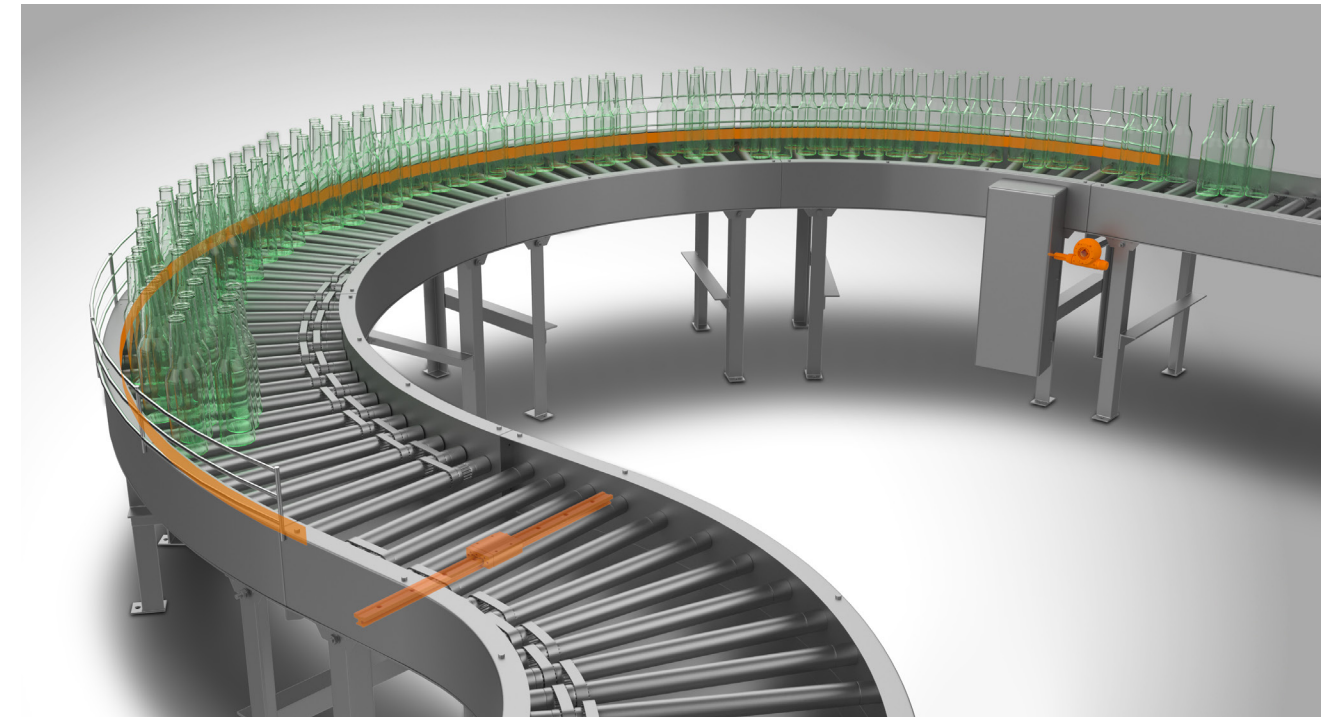
Bottom: igubal® bearing inserts

Source: igus® GmbH



Look for holistic solutions ...

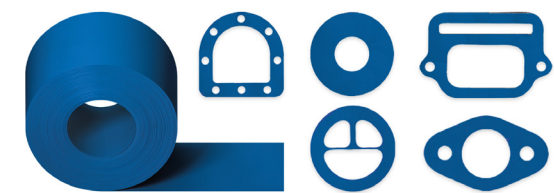
It is generally a good idea not only to focus on rollers, but to also consider the design in optimising conveyor systems (whether existing or still to be designed). For example, the guide rollers should run as smoothly as possible, and to connect two conveyor belts, there is a knife edge roller with an especially small diameter that works particularly well when the transported-goods are small.



Source: igus® GmbH

Product examples:

In addition to guide rollers and knife edge rollers, the product range that igus® has developed for material handling applications now includes tribo-tape, a high-performance polymer film that can be self-adhesive (optional) and has incorporated lubricant to improve the movement of transported-goods such as glass bottles around curves and through congested areas.



igus® tribo-tape in desired shapes

Source: igus® GmbH

Case study:

xiros® ball bearings in coated guide rollers

However, xiros® ball bearings not only passed the laboratory test successfully but have long been proving their worth in field experience as well. An example of the variety of tried-and-tested applications is their use in coated guide rollers of diverse machines used to supply materials. Metal ball bearings were previously used for pressure rollers serving as guide rollers. With the intermediate drive, the guide roller drives the product, generating web tension in the material. In order to keep the rolling friction low, the metal ball bearings had to be lubricated with special oil, the result of which was higher costs.

This is why the metal bearings were replaced with xiros® B180 radial deep groove ball bearings. The polymer ball bearings are 50% more cost-effective and can be supplied from stock. Due to their low weight, better friction behaviour and the freedom from maintenance, the replacement reduced the costs considerably on the whole and plant availability was increased.



xiros® ball bearings in guide rollers
Source: igus® GmbH

Custom guide roller – configured in just two steps

igus® has developed the guide roller expert system for the quick selection of a suitable guide roller. In this online tool, the user only has to specify the outer and inner diameter as well as the length of the roller, the load, the load case and the ambient temperature. By entering the acting force and the degree of wrap around, the online expert calculates the resulting force on the roller and recommends the appropriate tube materials. In the second step, the user can select their guide roller based on the deflection, weight and price data, download the configuration CAD data and order the roller directly online.

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Contact ...

Dean Aylott

Phone: 01604 677240

e-mail: daylott@igus.co.uk

www.igus.co.uk/dry-tech