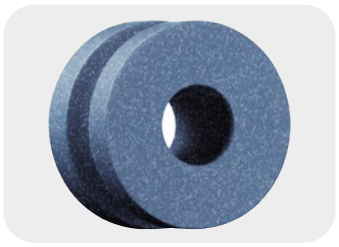
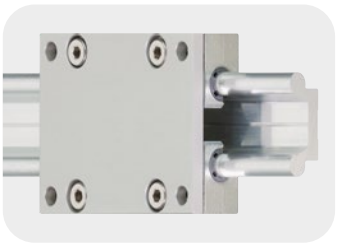
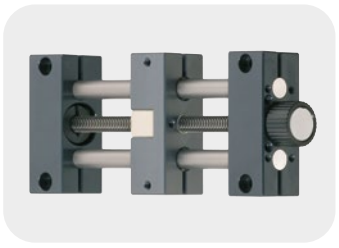
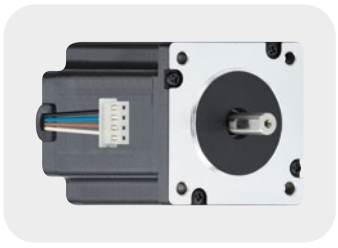
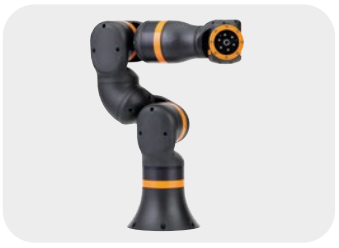
iglidur®
bearing technology





motion plastics® catalogues

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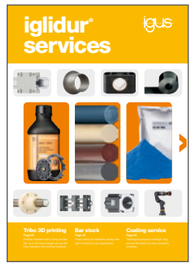

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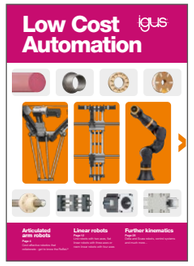

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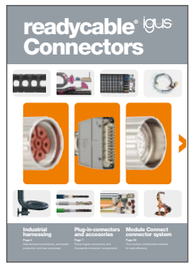

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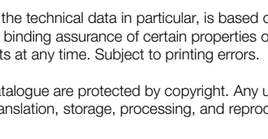
iglidur® bearing technology

Company

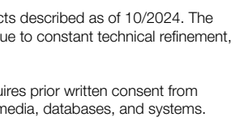
iglidur® plain bearings

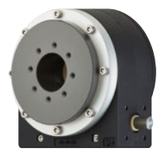
iglidur® rollers



drygear® gear and gearbox technology

iglidur® slewing ring bearings





Tech up

Cost down

Proof

Sustainability

Digital

Facts

The story behind igus®

"Give me your most difficult part and I will give you a solution", said Günter Blase. He had to take a risk in order to win over Pierburg, his very first customer. There were two children at home who needed to be cared for. Money was in short supply. He had just set up igus® with his wife (tax consultant) and the first injection moulding machine still had to be bought. The order from Pierburg was urgently needed.

And Günter Blase received that enquiry from Pierburg. Their complicated problem part was a valve cone for a carburettor. In 1964, no-one would have come up with the idea of using plastic to make this small metal component and, what's more, to do so with an injection-moulding machine. The manufacturing process was simply too complicated. For Günter Blase, this was no reason to lose heart. He went into his double garage and experimented until the first perfect plastic valve plug emerged from the injection-moulding machine.

The double garage in Cologne-Mülheim soon became too small. Just like the new location in Bergisch Gladbach. Today, the headquarters of igus® are still in Cologne but accommodates over 800 injection-moulding machines in an area of over 200,000m^2. In addition, igus® has over 30 locations worldwide. The business areas have expanded, from plastic energy chains and plain bearings to other components for moving applications and complex automation solutions. The core philosophy is still the same as in 1964, improve anything that moves.

"Give us your most difficult moving part and we give you a solution."

motion plastics® ... improve what moves

igus® facts at a glance

4,600 employees worldwide

€1.136 billion turnover

31 locations + distributors in over 80 countries

188,000 customers

243,000 parts from stock

800 injection-moulding machines

Our test laboratory

Materials are manufactured by igus® in accordance with the motto “Tech up, Cost down”. Our products are designed with great passion to extend the service life of machines and applications, eliminate maintenance and reduce costs. For our engineers, the quality and reliability of parts, i.e. their resilience and service life, are vital factors in development. Every igus® product is tested thoroughly before it is made available for sale. To this end, we have been operating our own test laboratory since 1985. It's not only the largest test laboratory for tribopolymers in the industry in terms of area, but it also conducts the highest number of product tests and test procedures.

What is tested and how?
Our facilities for testing applications and materials cover a total of 4,000m². Every business sector has its own test laboratory. However, we test some products together in one area. For example, 1,500m² is dedicated to testing chainflex® cables in our own energy chains. For especially long travels, 2,000m² of outdoor space is available. iglidur® plain bearings, drylin® linear bearings, and our Low Cost Automation components are tested in an area of over 300m². The latter partly under real conditions in quality assurance. To be able to develop new cleanroom-compatible products faster, we operate our own cleanroom laboratory with an ISO Class 1 cleanroom system in cooperation with the Fraunhofer IPA. An outdoor testing area, a laboratory for noise tests and the climatic chamber with -40°C completes our test area. To achieve maximum realistic conditions, we also test customer applications and conduct standard industry tests.

We would love to test your application
You don't want to test and would like to subject your application to a material test before using it? Or do you have an unusual application for which you need a suitable component? No problem. We will test your application in our test laboratory and use our know-how to find the best igus® solution for you. Regardless of whether it is a plain bearing, energy chain, cable, linear technology, bar stock or Low Cost Automation.

How many tests are conducted in the test laboratory?
Annually, a large number of tests and material examinations are conducted in the numerous test facilities.

Laboratory facts

- Total area of igus® test laboratory: 4,000m²
- More than 15,000 tests, about 4,000 of them for e-chains® and chainflex® and around 11,000 of them for dry-tech® (rotating, pivoting, linear, tumbling, heated, underwater, and so on.)
- 450 test rigs for plain bearings
- 10 billion e-chain® cycles
- 3,500 tested cables
- 400 customer-specific tests

igus.eu/testlab

What happens to the test data?
The use of testing data does not stop after development. We have been developing innovative online tools since 2001 and sensor-based smart plastics since 2016, which are based on the database of our test laboratory results. With these online tools, the economic efficiency and reliability of our products can be determined quickly and very easily online 24/7. This means a high degree of transparency for our customers, enabling engineers to find the most cost-effective, functioning solution to their problem. More than 40 tools are available to you free of charge.

Sustainability

Sustainable product developments

Plastic is a much-discussed material. We know that high-performance plastics can contribute to protecting resources and the environment, and we have made this the focus of our activities.

We look at plastics in three phases: during their production, in use and at the end of the product's life. We will give you our answers to sustainability questions for both our products and everyday life at igus®. Not everything has been answered yet, and for some things, especially with regard to sustainable production, we are still working on answers and solutions.

igus® has been focusing more and more on sustainability in manufacturing and products since 2018. As a result, we are now also able to state the carbon footprint of a large number of our iglidur® plain bearings. In addition, there are new products that are largely or completely made from recycled material from our own production. And these are also tested in the laboratory and have a predictable service life.

Certified according to ISO 14001
In order to make our environmental policy transparent and comprehensible, we have been certified according to ISO standard 14001 since 2019, a recognised basis for environmental management systems. This helps us towards having a CO_2 neutral factory.

99% recycled
99% of our rejects in injection-moulding production (sprues, defective parts) are recycled and reused in the manufacturing process.

CO_2 emissions
In 2021, we achieved 31.2% less CO_2 emissions than in 2020.This figure relates to Scope 1 and Scope 2 emissions. The switch to green electricity in mid-2021 and to climate-neutral gas in October 2021 played a key role here.

Power consumption
We purchase 100% green electricity and reduce the consumption of our machinery and equipment. We acquire injection moulding machines that are 40% more energy efficient. The power consumption was reduced by 11% in 2021, while increasing production.

clean igus® programme
Mechanical measures such as magnetic foils and guide plates prevent parts from falling out of the machines in the production process and becoming waste. The waste ratio (production waste + processed material) could be reduced by 21% in 2021 due to these and other measures.

The circular economy goes digital

Chainge
engineering plastics recycling

igus®

100t
of material returned as part of the chainge® recycling program since 2019

31.2%
CO_2
CO_2 savings 2021 compared to 2020*

reguse **150**
renewed IT equipment sold internally and proceeds donated in 2022

196
new energy-efficient injection moulding machines, 275 old machines exchanged for new ones between 2021 - 2022

76,280
trees planted since 2020

igus® services

Harnessed for you: readycable® and readychain®

Ready-to-install readychain® - Energy supply systems
Energy chains from igus® are already being reliably used in hundreds of thousands of applications all over the world. From small devices up to steelworks, from very simple linear applications up to the most complicated task - igus® offers thousands of options for all types of applications. With more than 1,350 chainflex® cables from stock, igus® offers the largest range of cables specifically for the energy chain. Thanks to the industry's largest test laboratory, igus® is the only supplier in the market able to offer a 4-year guarantee on its chainflex® cables.
All common plug-in connections and more than 5,000 drive cables suitable for 34 manufacturer standards are available.

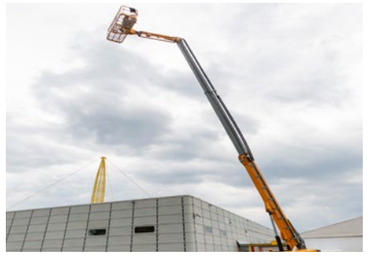
igus.eu/ready-to-install

Ready-to-connect readycable®
readycable® harnessed cables are ready-to-connect cables for use in energy chains. As a manufacturer and harnesser, igus® offers everything from one source, reducing throughput times and the number of suppliers.The portfolio includes an extensive range of catalogue products, including cables harnessed suitable for 34 manufacturers' standards and various industrial standards as well as customised components produced singly or in volume.Numerous cable types and qualities, with different approvals and certifications of conformity are available.All components are subjected to extensive quality checks and function tests.

igus.eu/readycable









igus® project

Custom-solutions

Tech up, Cost down: we take the difficulty out of even the most complex energy supply systems
Conversion or new installation - special solutions do not need to be expensive. With more than twenty years of experience in project work and more than 1,000 projects each year, we have a rich modular system that makes it very easy for us to assemble customer-specific solutions. Our focus during these efforts is always to avoid over-engineering. We consistently develop technically precise solutions at the best price. If our customers want, we add installation and maintenance service and an individual guarantee.

Conversion project or new development – we provide you with on-site support
Whether you are working with an initial design or modernising an existing system, igus® specialists will give you on-site or remote assistance. Our goal: Tech up, Cost down. It’s our job. You receive a free design proposal.

Project planning and quotation phase
If you find our design attractive, we will work out further details with you. We will discuss all necessary solution components: accessory parts and services. We will use this basis to quote a fixed price.

Project phase
Our project team prepares detailed drawings with all components and interfaces. Once they are approved, work begins in our 32,000m² production plant. The energy supply system is assembled precisely for shipment, with all its components and attachments, ready to connect and including documentation.

Delivery and assembly
The pre-assembled energy supply is now delivered to the installation site. Here it can be installed by your fitters, optionally with an igus® supervisor. Alternatively, installation and commissioning can also be carried out by the igus® installation service. You can find more information about our after-sales services here:
igus.eu/engineering

igus® services

Made for you: 3D printing and CNC service

3D printing with abrasion-resistant plastics
Abrasion and wear-resistant tribo-plastics for additive manufacturing via selective laser sintering (SLS), with filament (FDM/FFF) or resin (DLP) allow you to use the printed component or to test the function of the part reliably and completely from the prototype or production batch onward.

- Abrasion-resistant
- Lubrication and maintenance-free
- No tooling costs
- Design freedom
- 3D printing of parts on site
- Can be processed by commercially available 3D printers
- Predictable service life
- 3D printing service in 1 to 3 days

igus.eu/3D

Individual machined parts
Configure your wishes and receive direct price feedback. A large number of different iglidur® high-performance polymers are available to you. The ideal iglidur® material can be found for almost every application, from high temperatures to sea water, from food to automotive. Various online tools and our experts are on hand to help for the selection of materials.

Assign priority to your order:
If things have to go faster: select our express option and your components will be ready to ship in 3 days.

igus.eu/cnc

igus® Test & Integrate

From the idea to production

Industrial robots have their price. The payback times for robot systems are three to four years. But for small and medium-sized companies that want to manufacture more product types with small batch sizes, the requirements are very different. Entry into the world of automation is often considered to be complex and time-consuming. With Low Cost Automation we want to prove the opposite to you. Our goal is to make cost-effective and user-friendly automation solutions accessible to everyone. Developed and produced by igus® for the whole world. All of this is made possible by motion plastics®.

Do you want to be on the safe side when it comes to implementing your application?
You are welcome to visit our customer test areas. We will show you the world of Low Cost Automation in more than 400 square metres. As a proof of concept, we will perform a free handling test. Just send us your workpiece/object. In return, you will receive a video of the test, or we will show you your application's feasibility live.

The Low Cost Automation integrator network
Do you need additional specialist knowledge and manpower for integration? Our integrator network gives you access to experts familiar with our products. Each integrator brings experience in customer project implementation and has access to igus® project experience. This is how we work with you to find the best possible solution.

Typical integration services are:

- Integrating a control system into existing machines
- Setting up and commissioning a robot
- Integrating vision and image processing systems
- Assessing security measures and safety precautions
- Individual project work

A clean AI revolution saves on lubrication, maintenance and costs

GO ZERO Lubrication ... with motion plastics®

With "GO ZERO", we present our solutions for a lubrication-free and sustainable world. We are driving the clean revolution forwards with innovative products and materials in addition to pioneering technologies such as AI and VR. Apart from lubrication and maintenance, this saves time and money and reduces the impact on the environment.

Why bother with freedom from lubrication?

Even today, most applications can run without lubrication and easily save money and time.
The lowest-cost lubrication method is the one you don't need.

ZERO costs for lubricants
The costs of lubricants and their subsequent disposal have continued to rise in recent years. Expenses for incorrect or lack of lubrication are not even taken into account. Lubrication: money saved.

ZERO maintenance costs
Maintenance costs money, but also time. Shortage of skilled labour can also be countered with effectiveness. Recurring lubrication of bearing points is no longer necessary. Maintenance: time saved.

ZERO lubricants in the environment
To a large extent, forgotten liquid waste consists of so-called FOGs (fats, oil and grease). Half of the lubricants sold worldwide end up as pollution. And one litre of oil can contaminate one million litres of water. Causing unnecessary pollution.

What can you see? A bird? Two tractors? Something else? We see potential savings of €3 million!

Our goal is to make moving applications lubrication-free. That's why we try to discover possibilities for using our motion plastics® everywhere. One of the pioneers is the agricultural machinery manufacturer Lemken, who saves €88 every year by using iglidur® plastic bearings. An independent study by RWTH Aachen proves this.

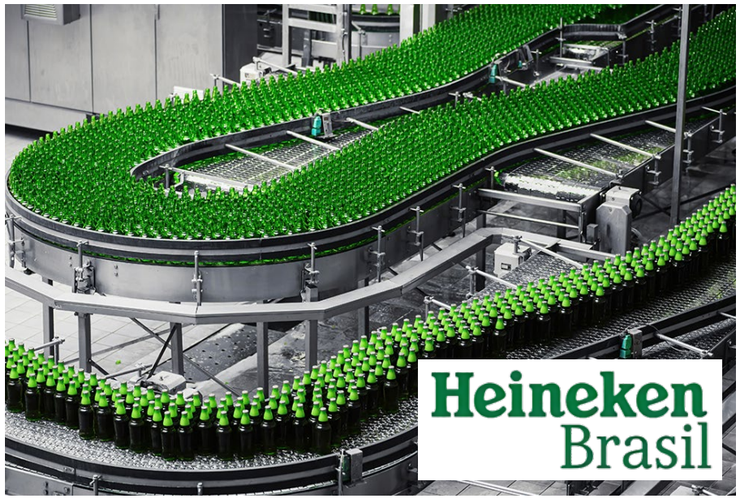
Study on lubrication-free systems with the RWTH Aachen

GO ZERO Lubrication - this is what our customers save

Savings per system or per machine

Costs of €2,815.49
1,560 hours of maintenance
180.08kg of CO_2 equivalent

Heineken Brasil uses self-lubricating igus bearing technology in conveyor belts, increasing reliability and minimising downtimes.



Savings per system or per machine

Costs of €87.36
13 hours of maintenance
1.4kg CO_2 equivalent

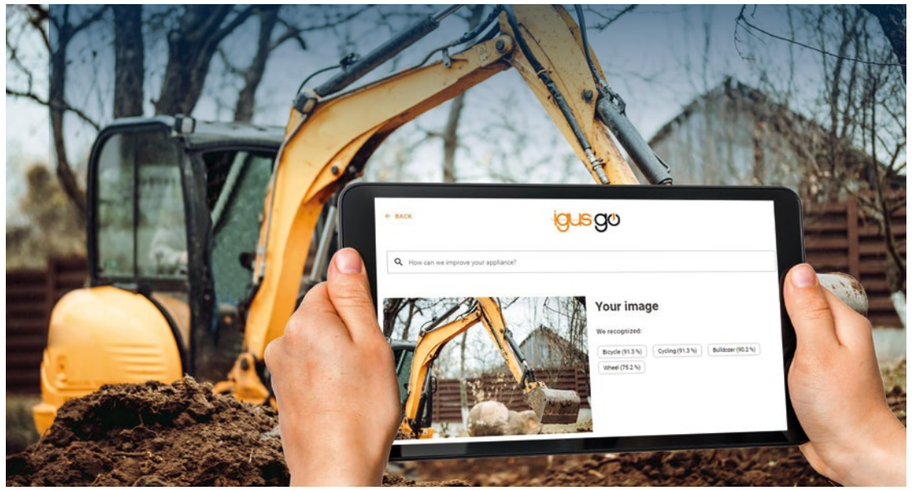
Rockinger uses a self-lubricating wear insert in the KS80 ball coupling, which makes lubrication superfluous and minimises maintenance.

Savings per system or per machine

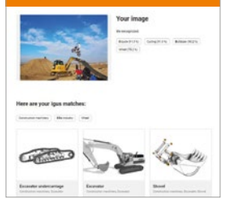
Costs of €88
14.7 hours of maintenance
6.3kg CO_2 equivalent

Lemken specialises in the manufacture of agricultural equipment for soil cultivation, sowing and crop protection and saves 22 lubrication points per cultivator.

Design lubrication-free applications in seconds

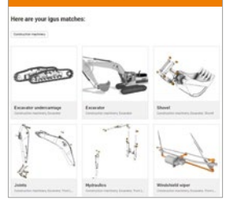


1. Take a photo of the real application

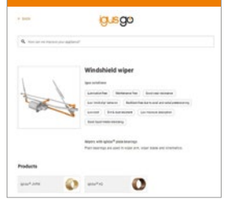


2. Choose from recognised suggestions

3. Browse through motion plastics® applications



4. See a detailed motion plastics® solution



5. Buy parts directly in the shop

Would you like to discover the optimisation potential for thousands of machines in just a few seconds?

Experience a revolutionary way of searching for products with igusGO® - our cloud platform with artificial intelligence.

Just take a picture of the existing application and its surroundings, and the igusGO® intelligence will show you which igus® products can help in your application so that it requires no lubrication. The app also shows where there is more potential to improve your machine's technology and even reduce costs at the same time. You will find out more about applications that have already been optimised on comparable machines and components and be taken directly to the shop, where you can find more information and submit orders or queries directly.

We are constantly developing our igusGO® app further: from minor optimisations in the background to additional information and to completely new functions that opens up new possibilities. With the latest update of igusGO®, we have added more languages and implemented an AI chat.

Learn more about it and download the app now:

igus.eu/igusgo

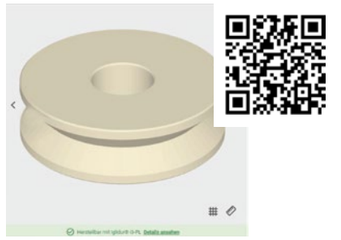
More digital services

iguverse®
XR collaboration platform for customers

Our digital services and solutions

iguverse®
Virtual engineering

kopla®
Software platform



speediPrint
3D printing service

speediCut
CNC service

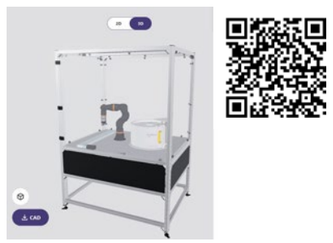
Tolerance check

igus:bike®

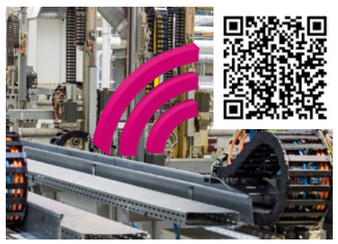
Online configurator tools

iDentify AI spare parts service

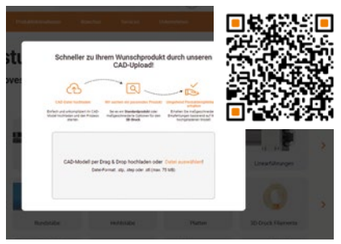
Augmented Reality



RBTX®
Marketplace for Low Cost-Robotics



smart IIOT
Condition monitoring



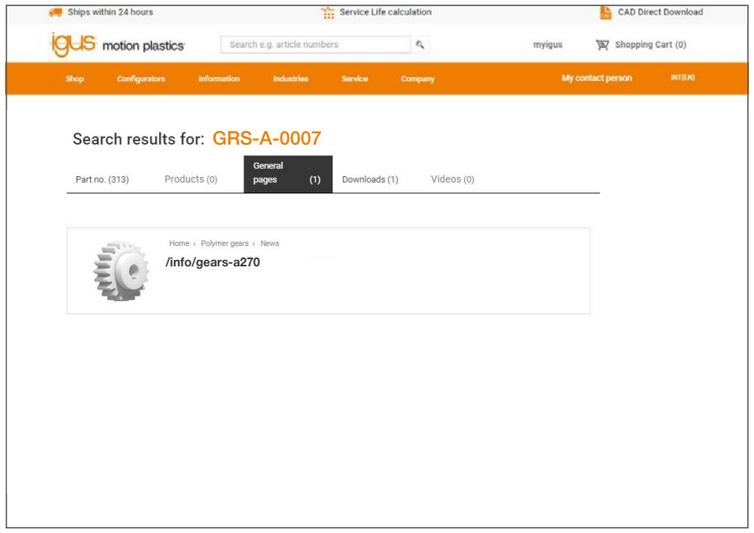
Next-best catalogue part
Alternative recommended parts catalogue via CAD upload

Print2Digital ... made easy

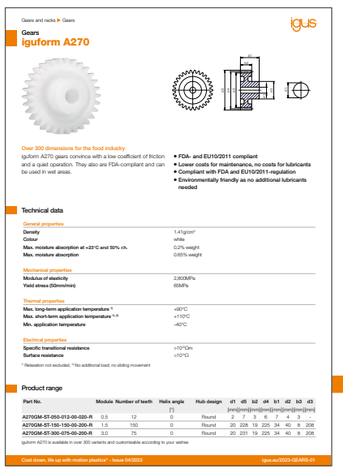
The QR code will take you directly to the relevant category and/or to the product's shop page.

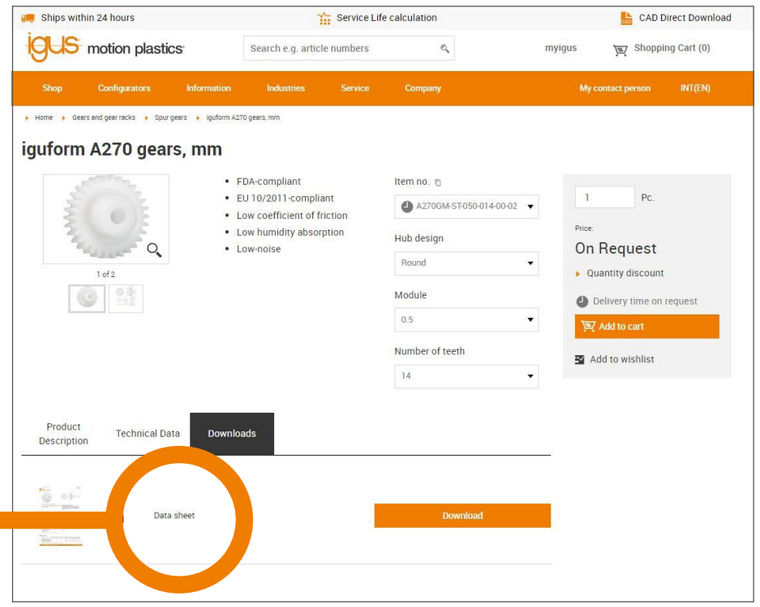
GRS-A-0007

No mobile device?
No problem!
You can also use the text code to go directly to the product page via the search function on our website.



In addition to the detailed technical information in the shop, you can also access it in compact form as a PDF "factsheet".





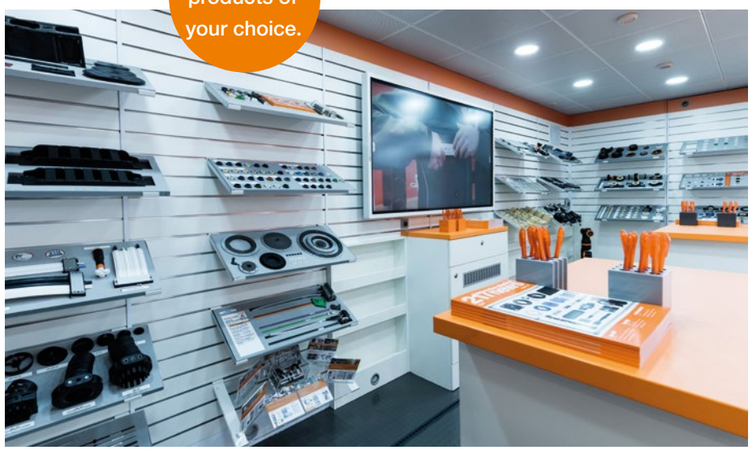
All igus® catalogues online at:

igus.eu/online-kiosk

Customised ... free of charge ... according to your requirements

Roadshow truck ... trade show on wheels with products of your choice

With products of your choice.



- Your employees can find out for themselves
- No cost for travel or accommodation
- Time-independent, fits your daily routine
- Individual application advice and general new products presentation - anything is possible
- Groups can be customised

igus.eu/roadshow

Experience motion plastics® live

On-site exhibition

For 22 years, we have been visiting you with our mobile pop-up trade show stand. We will show you our latest products, and together we can find the best solution for your application.

With products of your choice.

Low Cost Automation roadshow

We adjust our presentation to the customer visit, much like our mobile in-house exhibition. The Low Cost Automation roadshow focuses on direct implementation of an application at the customer's site with a quick return on investment.

Virtual/real trade show

igus® motion plastics® show

- Browse our trade show stand & get more information without leaving the website.
- Clear listing of new products in the menu.
- Book a guided news presentation with an igus® expert LIVE at the trade show at any time.
- Use our watch list function. Add news products to your watch list and receive more information via e-mail.

igus.eu/imps

dry-tech® | Lubrication-free made easy ...

iglidur® plain bearings

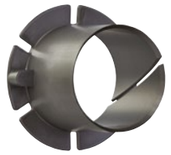
Sleeve bearings

Flanged bearings

Thrust washers

Guide rings

Split bearings



Split bearings, anti-rotation feature

Double flange bearings

Two hole flange bearings

Preloaded sleeve bearings

Preloaded flanged bearings

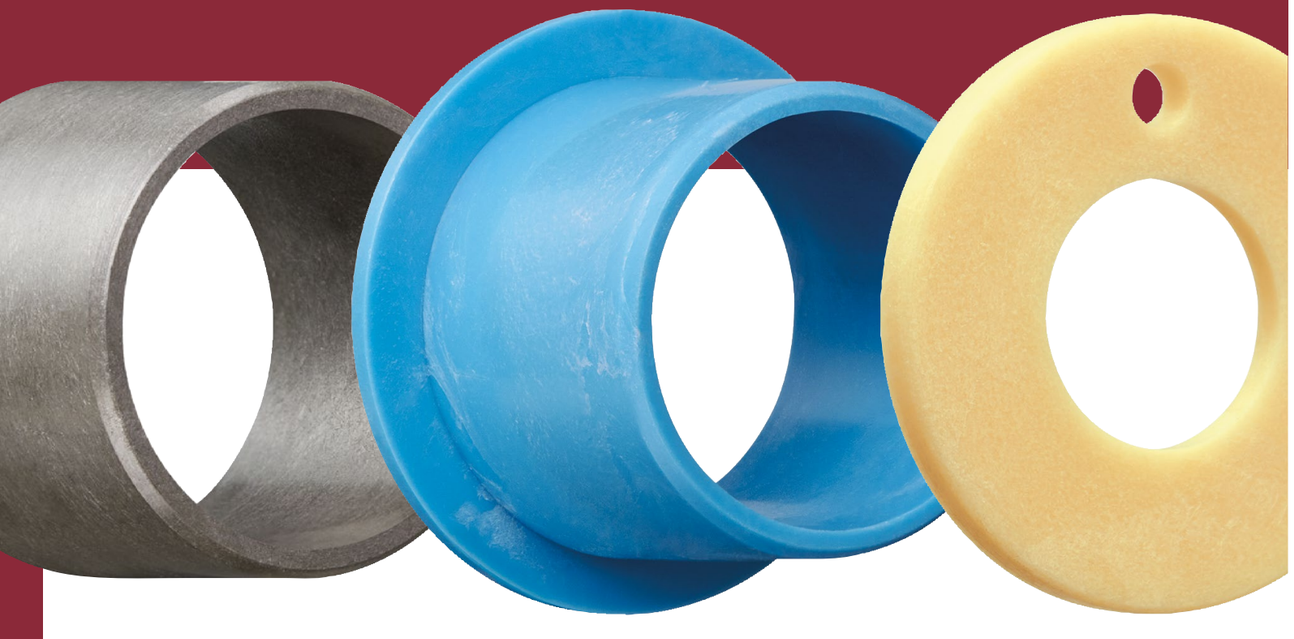
Disc springs

FastLine

igus.eu/iglidur

iglidur® bearing technology

Plain bearings



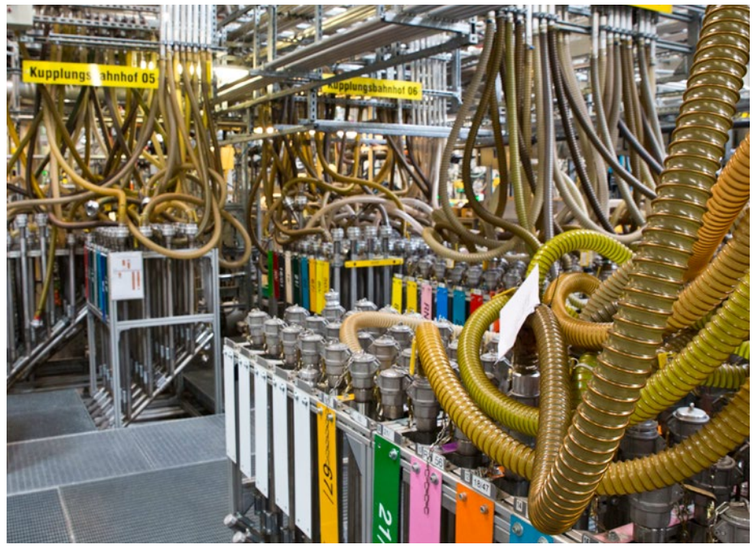
Always the right plain bearing for any application

Plain bearings made of iglidur® and igutex® materials are predestined for use in applications in which lubricants of any kind are to be dispensed with. Empirical tests and sophisticated algorithms can be used to calculate the service life in the customer application and thus determine the ideal material in advance. Our plain bearings are available from stock in a wide range of standard shapes in over 10,000 dimensions. Alternatively, customised products according to customer specifications are also available.

- Increasing the durability, performance and quality of bearing points
- Cost savings through reduction of unit, maintenance and complaint costs
- Tested in 10,000 tests per year and successfully used by over 250,000 customers worldwide
- Reduces environmental contamination through avoidance of lubricants and optimised abrasion behaviour
- Predictable service life ensures predictable maintenance intervals

Introduction

Everything from one source



In-house compounding and bar stock production

Benefits
- Especially cost-effective
- No lubrication
- Resistant to dirt, dust and lint
- Corrosion and chemical-resistant
- Can be used in liquid media
- Vibration-dampening
- Suitable for rotating, oscillating and linear movements

Typical application areas
- Bicycle construction
- Plant construction
- Packaging
- Offshore

With over 230,000 parts and more than 15,000 plain bearing products, igus® offers a huge portfolio of standard sizes. In addition to standard dimensions from stock, customised products are also possible. Prototyping, mould construction and volume production take place at igus®. The smallest numbers can be realised as well as large-volume blanket orders.

Quality and reliability
Our focus is on quality and accuracy as well as speed. Continuous quality controls are carried out in the pre-series and volume production processes.

Depending on requirements, 100% checks are also carried out here using fully automatic optoelectronic testing and sorting systems. igus® is certified according to ISO 9001, ISO/TS 16949 and ISO 14001-2015, among others.

Material development and compounding
In order to consistently ensure the high quality of iglidur® materials, we have been relying on our in-house expertise in material development and compounding for decades. In total, igus® processes 2,000 tons of plastic per year (as of 2023).

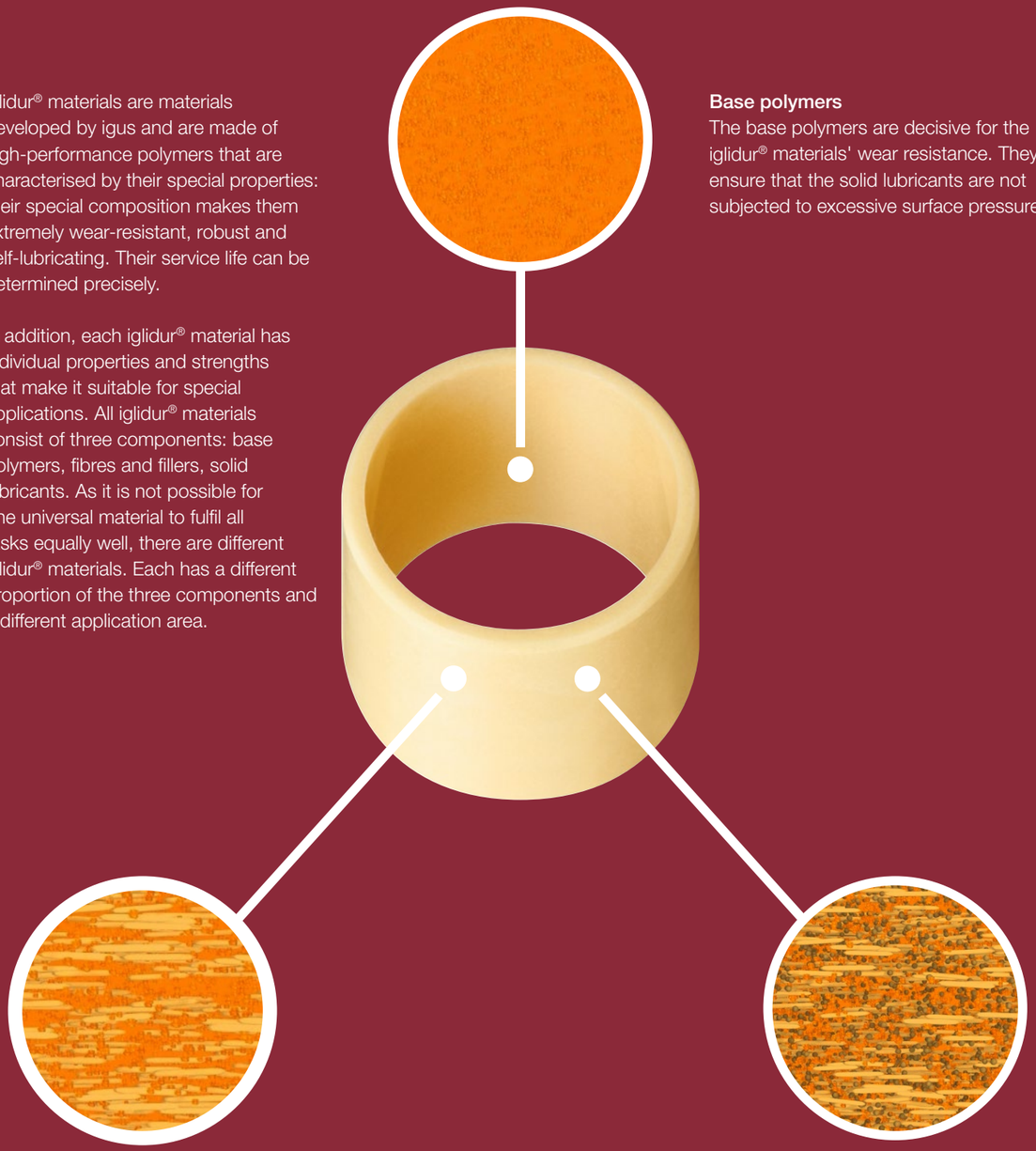
Our test laboratory for plain bearings
With their tribological properties, our polymer plain bearings fulfil the highest requirements for a long service life without additional lubrication. To achieve this quality, we carry out over 135 trillion test movements per year in our plain bearing test laboratory spread over 250m². We test and develop materials and plain bearings under real conditions with the goal of providing you with the best solution made of polymer for your application.

Laboratory and development: test laboratory for iglidur® plain bearings

What is iglidur®?

iglidur® materials are materials developed by igus and are made of high-performance polymers that are characterised by their special properties: their special composition makes them extremely wear-resistant, robust and self-lubricating. Their service life can be determined precisely.

In addition, each iglidur® material has individual properties and strengths that make it suitable for special applications. All iglidur® materials consist of three components: base polymers, fibres and fillers, solid lubricants. As it is not possible for one universal material to fulfil all tasks equally well, there are different iglidur® materials. Each has a different proportion of the three components and a different application area.



Base polymers
The base polymers are decisive for the iglidur® materials' wear resistance. They ensure that the solid lubricants are not subjected to excessive surface pressure.

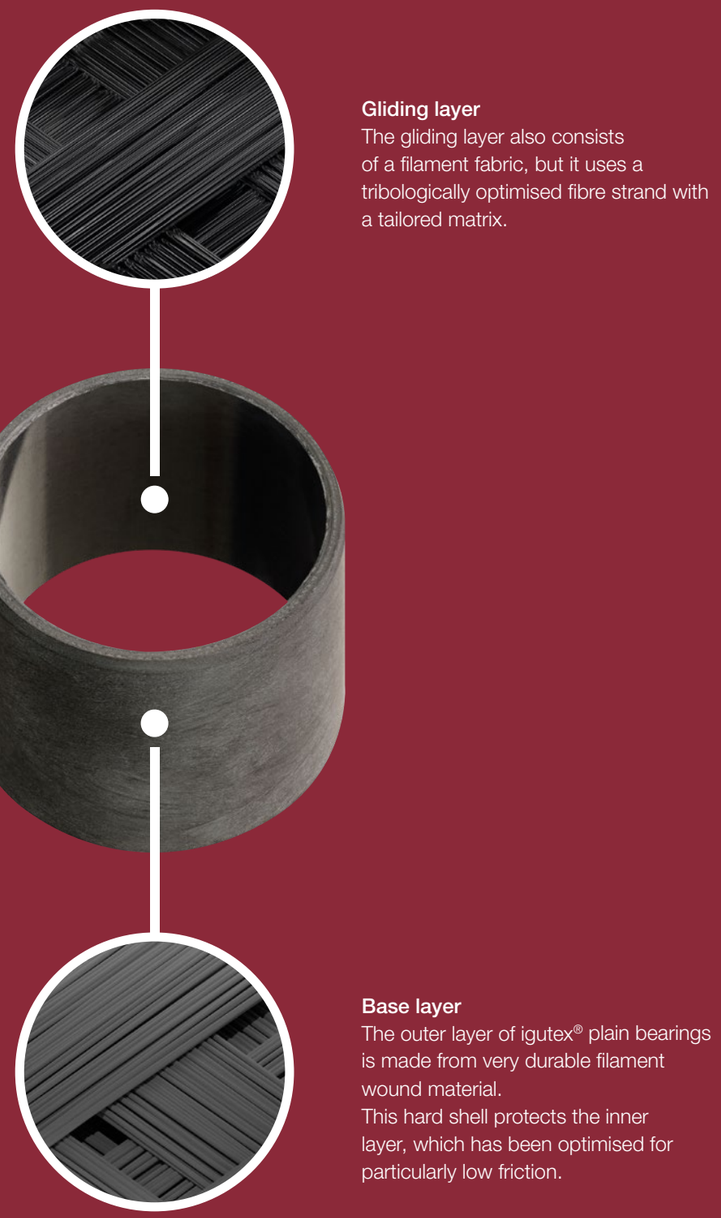
Fibres and fillers
These components strengthen the materials so that they withstand high forces or edge loads and can be used continuously.

Solid lubricants
They lubricate components made of iglidur® materials independently, preventing friction. They are distributed throughout the material in the form of microscopic particles.

What is igutex®?

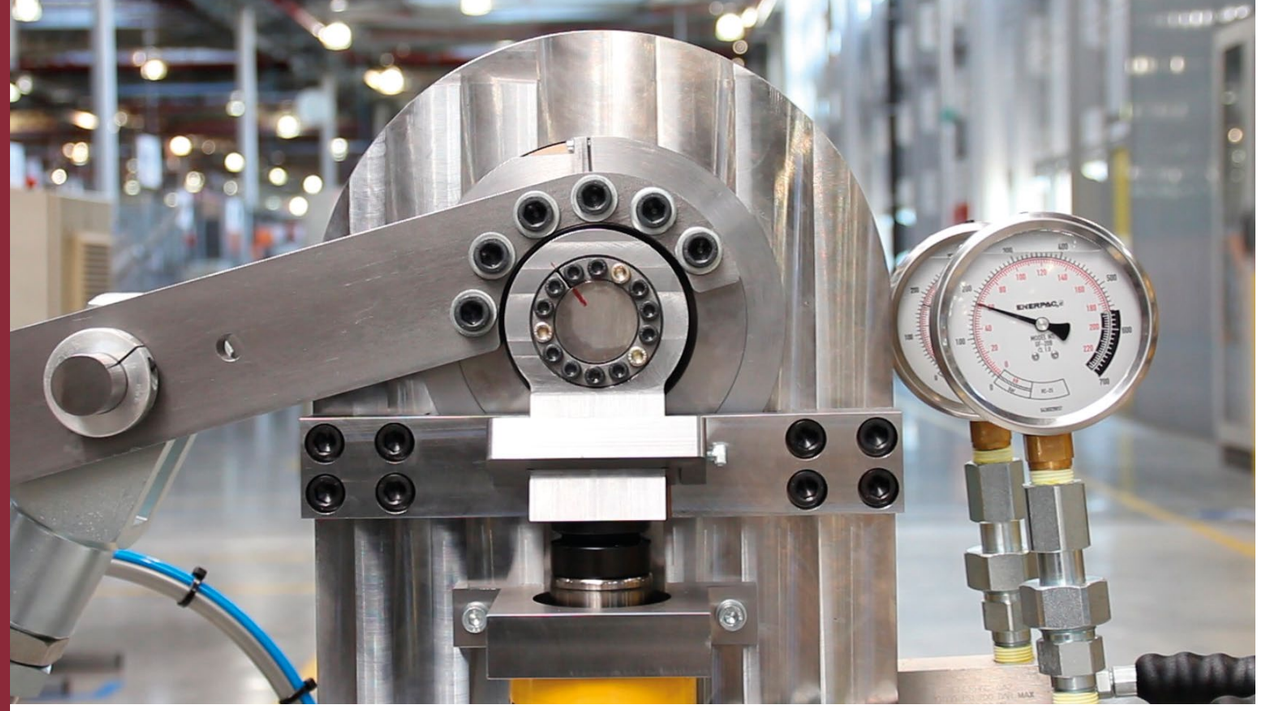
igutex® plain bearings consist of fibre composite materials, which is the name of a fabric made of high-strength fibre filaments connected by means of a matrix - usually synthetic resin. The processing or weaving methods depend on the area of application and the shape to be produced.

High-tensile fibres in combination with special resins produce robust plain bearings featuring high compressive strength and rigidity. This technology can be used to create both bearings made from wound tubes and plates.



Gliding layer
The gliding layer also consists of a filament fabric, but it uses a tribologically optimised fibre strand with a tailored matrix.

Base layer
The outer layer of igutex® plain bearings is made from very durable filament wound material.
This hard shell protects the inner layer, which has been optimised for particularly low friction.



Unique worldwide

Service life calculation based on empirical data

In tribology - the science of wear and friction - wear tests are often carried out by means of the pin-on-disk method. Here, a disk rotates on the sliding material that is tested under a pin that slides on it.

This pin consists of the mating partner that is to be tested (e. g. steel with a steel shaft). After the test, the amount of abrasion is analysed. The disadvantage of this standardised procedure is, in our view, the closeness to practice. In real conditions, various load and motion profiles influence a geometry that differs strongly from the disk. To represent the characteristics of a bearing point as realistically as possible, igus® has developed several standardised test setups.

For decades, plain bearings from various materials have been pressed into a housing and tested in combination with different shafts in more than 10,000 tests per year. The tests were carried out under different temperatures and with different loads and motion profiles. The result of the wear test is given by measuring the loss of wall thickness. In real plain bearing applications, this is decisive for the clearance development and therefore the running performance of the bearing point.

The wear data obtained in the tests is fed into a comprehensive database, which in turn forms the basis for special design software. This software, specially developed by igus®, uses algorithms based on many years of experience from a large number of applications to determine the expected service life for customer applications. The high density of information on many different application scenarios allows sufficiently precise interpolation for almost any combination of application parameters in new applications. This makes it possible to calculate in advance what bearing material will last how long in which application, from among a large number of applications.

In combination with the transparent costs for the plain bearings, the "most cost-effective bearing that works" and the most economical and sustainable solution can be determined at any time. The operation of this software is also tailored equally to experienced and less experienced users and thus offers customers the possibility of quickly and easily calculating applications in advance, but also the working basis for igus® application consultants to be able to lead complex consulting projects to success more quickly.
Simply test the iglidur® expert system yourself:

iglidur® expert
By entering just a few details of your application in the iglidur® plain bearing expert, you will get an overview of suitable parts from 56 iglidur® materials.

igus.eu/iglidur-expert

Application example

iglidur® plain bearings in use

... in trailer coupling
The company Rockinger Agriculture GmbH received the green manus for the use of a wear insert made of iglidur® high-performance plastic.

... in cargo e-bikes
The patented tilting technology of the cargo e-bike from GLEAM allows you to ride it like a normal bike.

... in pedal axes
One product Demarko develops is an oscillating axle for an articulated lorry trailer. Bearing point lubrication poses a particular challenge.

... in infusion pumps
With a specially manufactured iglidur® J clip bearing, B. Braun AG guarantees a simple and high-quality solution despite the limited installation space.

... in solar systems
The requirements of Ecotherm were a plain bearing service life of 20 years, maintenance-free operation and low costs.

... in special excavators
Transporting earth from pits up to 65 metres deep. This is made possible by a pulley module from the French company Ets Payant.

Over 250,000 customers

Be inspired and discover more exciting application examples

Over 250,000 customers worldwide rely on plain bearings made of iglidur® and igutex® materials. From brake pedals in cars to bearings in solar panel tracking systems. From the peristaltic pump in dialysis machines to the conveyor chain in machine tools. With iglidur® and igutex® plain bearings you improve performance and reduce costs.

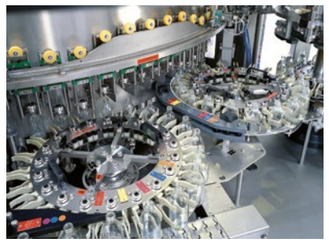
igus.eu/iglidur

The right material for every application

All-rounder
Materials for general purpose

Endurance runner
Materials for long service life

High temperatures
Materials for high temperatures

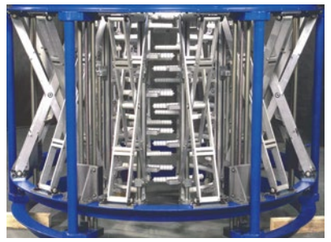


High media resistance
Materials with good media resistance

Contact with food
Materials for contact with food

Harsh environments
Materials for harsh environments

High loads
Materials for heavy-duty applications



Specialists
Materials for special application areas

Speed and pressure

The peripheral speed is always significant in plain bearings. The absolute speed is not crucial, but the relative speed between the shaft and the bearing. The surface speed is expressed in meters per second [m/s] and calculated from the speed n [rpm] with the following formula.
With varying speeds for example with pivoting movements, the value needed is the average surface speed v.

Rotational movement:

$$v = \frac{n \cdot d1 \cdot \pi}{60 \cdot 1.000} \left[\frac{m}{s}\right]$$

Pivoting movement:

$$v = d1 \cdot \pi \cdot \frac{2 \cdot ß}{360} \cdot \frac{f}{1.000} \left[\frac{m}{s}\right]$$

In these equations:
$d1$ = Shaft diameter [mm]
f = Frequency per second
$ß$ = Angle of motion per cycle [°]
n = rpm

Permissible surface speeds
iglidur® plain bearings were primarily developed for low to average surface speeds in continuous operation. Each pressure increase leads unavoidably to a reduction of the permissible surface speeds and vice versa.

The speed limit is determined by the thermal properties of the bearing. This is also the reason why different surface speeds can occur for the different movement types. For linear movements, more heat can be dissipated via the shaft, since the bearing uses a longer surface area on the shaft.

Surface speed and wear
Considerations regarding the permissible surface speeds should also include the wear resistance of the plain bearing. High surface speeds automatically bring correspondingly high wear rates with them. With higher surface speed, not only the wear rate rises but also the absolute wear.

Surface speed and coefficient of friction
In practice the coefficient of friction of plain bearings is a result of the surface speed. High surface speeds have a higher coefficient of friction than low surface speeds. The table on page 31 shows this relationship by using the example of a steel shaft (Cf53) with a load of 0.7MPa.

Load
The load of a plain bearing is expressed by the surface pressure (p) in MPa (corresponding to N/mm²). For this purpose, the radial load is determined on the projected surface of the bearing.

Radial bearing:

$$p = \frac{F}{d1 \cdot b1}$$

Thrust bearing:

$$p = \frac{F}{(d2^2 - d1^2) \cdot \frac{\pi}{4}}$$

In these equations:
F = load in [N]
$d1$ = bearing inner diameter in [mm]
$b1$ = bearing length in [mm]
$d2$ = outer diameter of the bearing in [mm]

Max. recommended surface pressure
A comparative value of the iglidur® material is the maximum recommended static surface pressure [MPa] at +20°C. The values of the individual iglidur® plain bearings differ greatly on this point. The value [p] indicates the pressure limit of a plain bearing. The plain bearing can carry this pressure permanently without damage. The given value applies to static operation; only very slow speeds up to 0.01m/s are tolerated under this pressure. Higher pressures than those indicated are possible if the duration of the load is short.

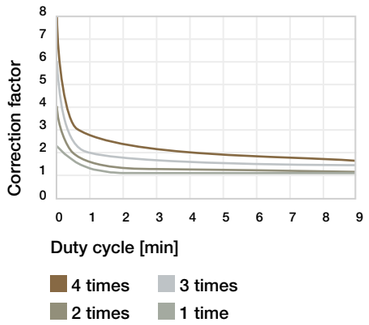
Pressure and speed
With decreasing radial load on the plain bearing, the permissible surface speed increases. The product of the pressure [p] and speed [v], the so-called pv value, can be understood as a measurement for the frictional heat of the bearing.

pv value and coefficient of friction

For plain bearings, the product is given a new value depending on the pressure [p] and the surface speed [v]. The pv value can be considered a measure of the frictional heat and can be used as an analytical tool to answer questions concerning the proper application of a plain bearing. For this purpose the actual pv value is compared with a permitted pv value calculable for the height. The permitted pv value depends on the shaft material, the ambient temperature and the duty cycle.

Correction factor

The permissible pv value can be increased in practical operation if the bearing temperature never reaches the maximum limit because of the short operating time. Tests have shown that this is true for operating times below 10 minutes. It is known that a longer dwell time makes a greater contribution to re-cooling. An important qualifier here is the ratio of the duty cycle and dwell times. The different curves of the diagram represent different ratios (3 x means that the dwell time is three times longer than the operating time).



Correction factor for p · v

Lubrication

Although iglidur® plain bearings are designed for dry operation, they are quite compatible with standard oils and greases. A single lubrication during the installation improves the start-up behaviour and the coefficient of friction, thus reducing the frictional heat. Due to this effect, the permissible loads for plain bearings can be increased by lubrication. The table shows the correction factors for pv value using lubrication.

Lubrication	Correction factor
Dry operation	1.0
During installation	1.3
Continuous, grease	2.0
Continuous, water	4.0
Continuous, oil	5.0

Correction of the tolerated pv value by means of lubrication

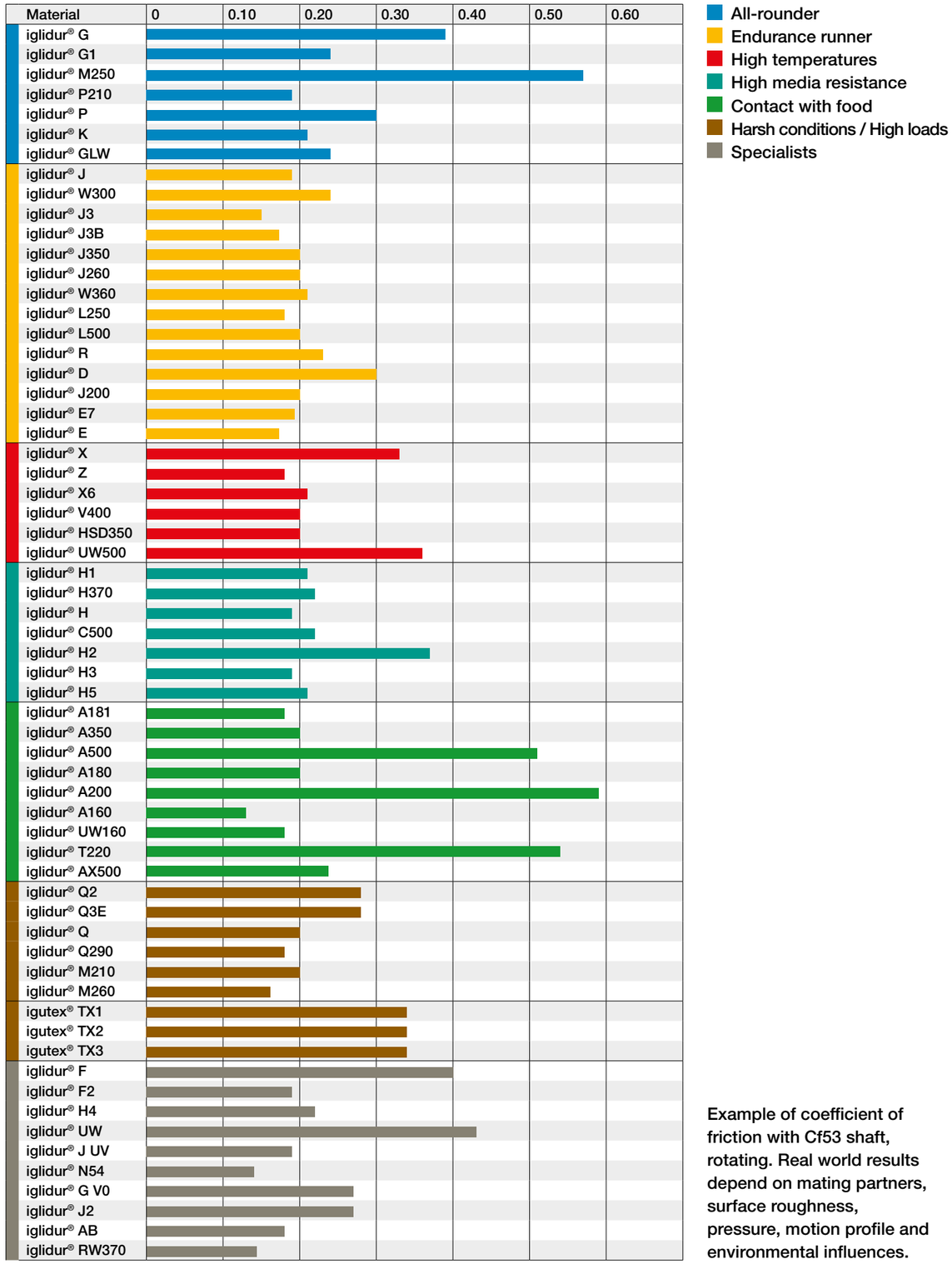
Coefficient of friction

iglidur® plain bearings are self-lubricating with the addition of solid lubricants. The solid lubricants lower the coefficient of friction of the plain bearings and thus increase the wear resistance. The coefficient of friction μ is proportional to the normal force and describes which force is needed to move a body in relation to another. Depending on whether an application is starting from a stationary position or the movement is in progress and needs to be maintained, a distinction is made between a static coefficient of friction and a dynamic coefficient of friction.

Coefficient of friction and surfaces

Shown here is the relationship between coefficient of friction and surface finish of shaft materials. It is clearly shown that the amount of friction is composed of different factors.
If the shaft is too rough, abrasion levels play an important role. Small areas of unevenness that can interlock with each other must be worn off the surface.

When the surfaces are too smooth, however, higher adhesion results, i.e. the surfaces stick to each other. Higher forces are necessary to overcome the adhesion, which results from an increased coefficient of friction.
Stick-slip can be the result of a large difference between static and dynamic friction and of a higher adhesive tendency of mating surfaces. Stick-slip also occurs due to intermittent running behaviour and can result in loud squeaking. Over and over again, it is observed that these noises do not occur or can be eliminated with rough shafts. Thus for applications that have a great potential for stick-slip - slow movements, large resonance of the housing - attention must be paid to the optimal surface finish of the shafts.



Example of coefficient of friction with Cf53 shaft, rotating. Real world results depend on mating partners, surface roughness, pressure, motion profile and environmental influences.

Wear resistance

The wear of components depends on many different factors, therefore it is difficult to make general statements about the wear behaviour. In many experiments and tests, the measurement of the wear is a primary factor. In testing, it has become clear what variances are possible between different material pairings. For given loads and surface speeds, the wear resistance can easily vary by a factor of 10 between material pairings that run well together.

Wear under load
Different loads greatly influence the bearing wear. Among the iglidur® plain bearings, certain materials are optimised for low loads, while others are suitable for use with high or extremely high loads.

Wear and temperature
Within wide temperature ranges, the wear resistance of the iglidur® plain bearings shows little change. In the maximum temperature range, however, the temperature increases and the wear of the plain bearing increases. One particular exception is represented by iglidur® X. The wear resistance of iglidur® X greatly increases as temperature increases and reaches the optimum wear resistance at a temperature of +160°C. Then resistance decreases again, gradually.

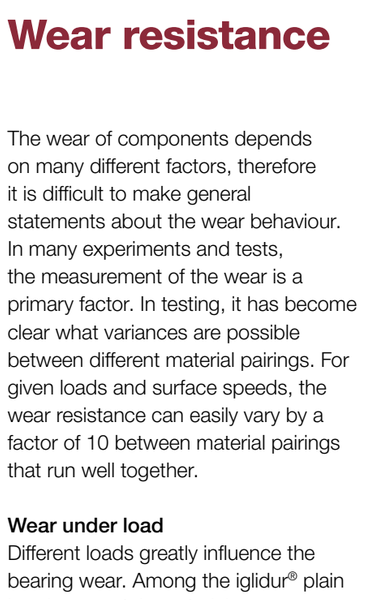
Wear during abrasive dirt accumulation
Special wear problems frequently occur if abrasive dirt particles get into the bearing. iglidur® plain bearings can clearly improve the operating time of machines and systems in these situations. The high wear resistance of the materials and the dry operation result in the highest service life. As no oil or grease is on the bearing, dirt particles cannot adhere or penetrate as easily into the bearing. Most debris simply falls away from the bearing thus limiting potential damage. If however, a hard particle penetrates into the bearing area, then an iglidur® plain bearing can absorb this particle. The foreign body becomes embedded in the wall of the plain bearing. Up to a certain point, operation can be maintained at optimal levels even when there is extreme dirt accumulation.

However, it is not just hard particles that can damage bearings and shafts. Soft dirt particles such as for example, textile or paper fibres, are frequently the cause for increased wear. In this instance, the dry operation capability and the dust resistance of the iglidur® plain bearings go into action. In the past, this helped save costs in many applications.

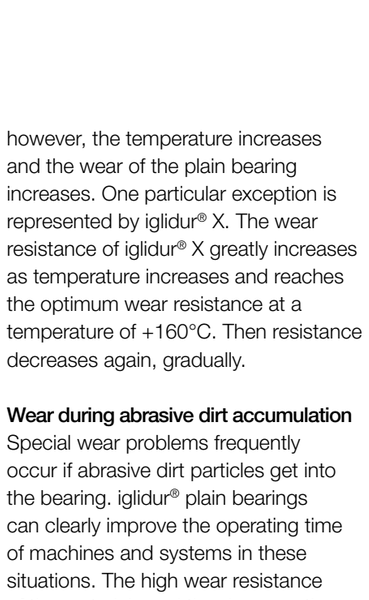
Wear and surfaces
Shaft surfaces are important for the wear of bearing systems. Similar to the considerations for the coefficient of friction, a shaft can be too rough in regard to the bearing wear, but it can also be too smooth. A shaft that is too rough acts like a file and during movement separates small particles from the bearing surface. For shafts that are too smooth, however, higher wear can also occur.

An extreme increase in friction results due to adhesion. The forces that act on the mating surface can be so large that material blow-outs occur. It is significant to note that wear by erosion is non-linear, random and cannot be accurately predicted.

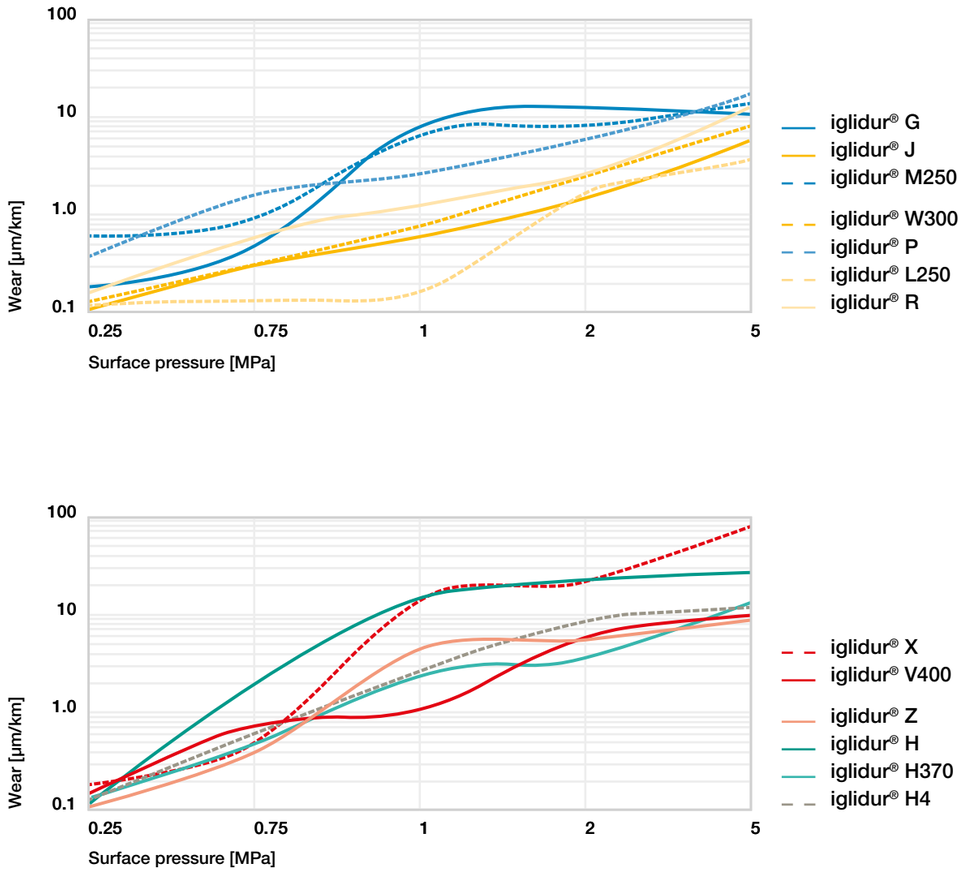
The load of the plain bearing has an effect on the wear of the bearing. The following diagrams show the wear behaviour of the iglidur® bearing materials. It is easily recognised that for each pressure, there is an optimal plain bearing available. The wear is shown as a wear rate in [µm/km].

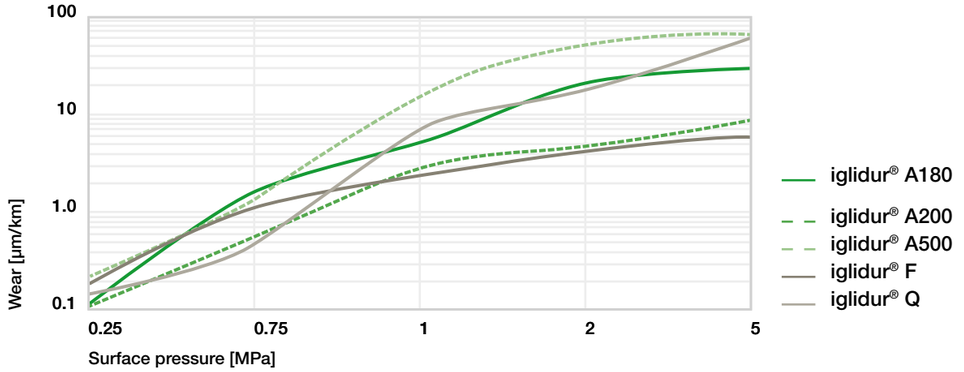


Wear experiments with aluminium shafts

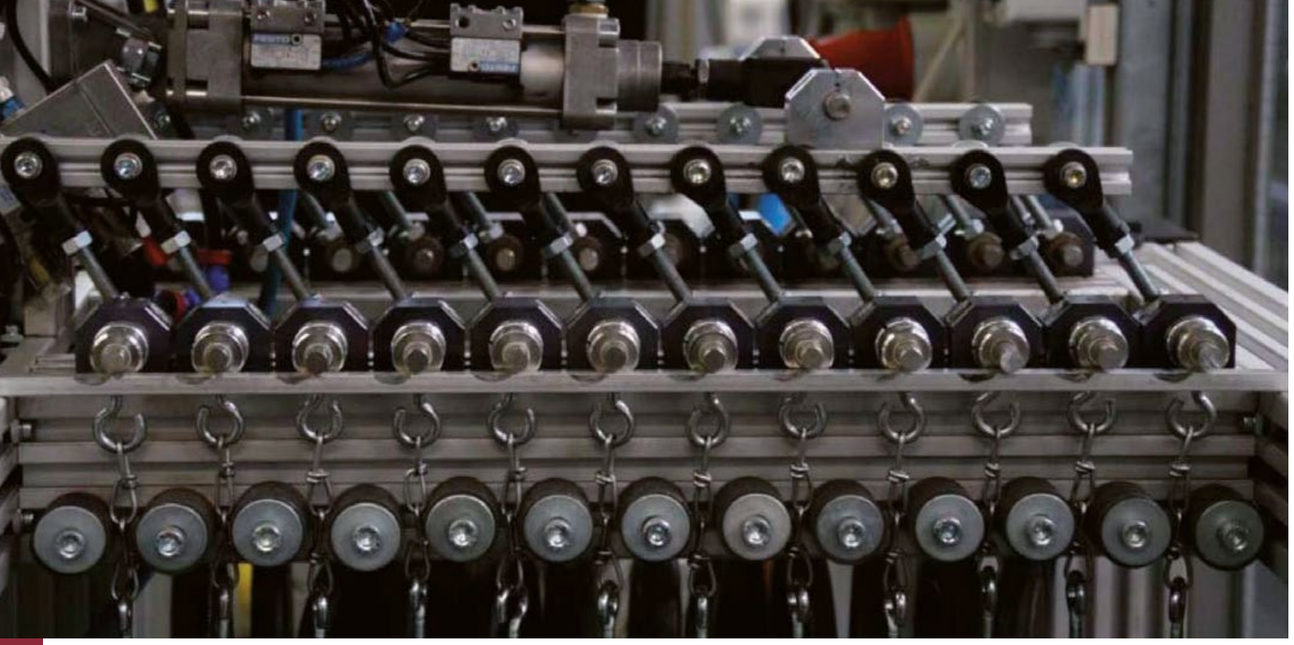


High wear resistance: plain bearing in permanent contact with sand





Wear of iglidur® plain bearings at low loads



Pivoting wear test rig for medium loads

Technical data

Wear and shaft materials

The shaft is, apart from the plain bearing itself, the most important parameter in a bearing system. It is in direct contact with the bearing, and like the bearing, it is affected by relative motion. The shaft will wear in any case. Modern bearing systems however are designed in a way that the wear of the shafts is so small that it cannot be detected with traditional methods of measurement technology. Shafts can be distinguished and classified according to their hardness and according to the surface finish.

The hardness of the shaft also plays an important role. When the shafts are less hard, the shaft is worn smooth during the break-in phase. Abrasive points are worn off and the surface is rebuilt. For some materials, this effect has positive influences, and the wear resistance of the polymer bearing increases.

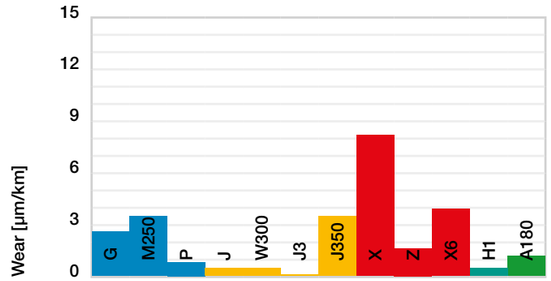
In the following graphs, the most common shaft materials are listed and the iglidur® materials that are best suited are compared. For easier comparison, the scaling of the wear axis is the same in all graphs.

The low wear results of the systems with hard-chromed shafts are especially impressive. This very hard, but also smooth shaft gives excellent results on the wear behaviour with many bearing combinations. The wear of many iglidur® plain bearings is lower on this shaft than on any other shaft material tested. However, it should be pointed out that because of the low surface roughness, the danger of stick-slip on hard-chromed shafts is especially high.

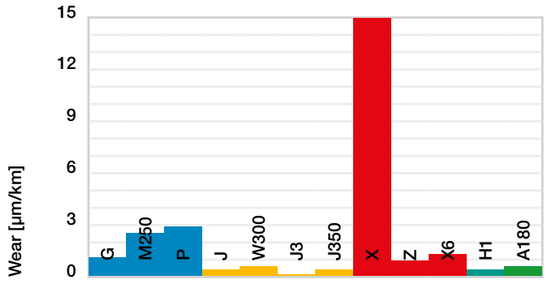
With high-grade steel, a similarly good result is obtained. Cf53 standard shafts give very good results, too. With other shaft materials, the wear results vary considerably.

For example, in tests with 304 stainless steel shafts at low loads, extremely positive results can be found with the right bearing material. It must be said on the other side, that no other shaft material shows a bigger variation of wear results with different bearing materials. Therefore, the choice of the most suitable bearing material is particularly important with the shaft materials 304 stainless steel and HR carbon steel.

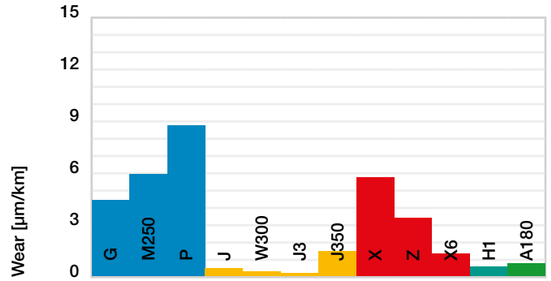
The test results give only a sample of the existing data. All of the results shown were made with same loads and speeds.



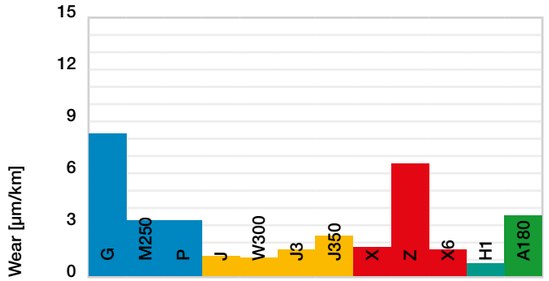
Wear with Cf53 shaft,
p = 1MPa, v = 0.30m/s, Ra = 0.20µm



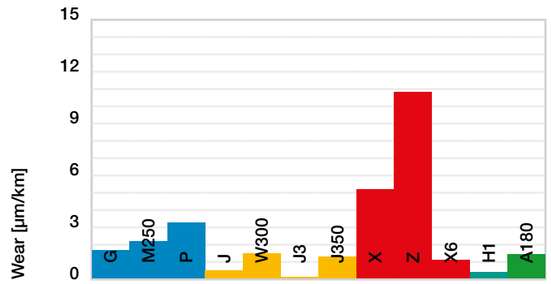
Wear with hard-anodised aluminium shaft,
p = 1MPa, v = 0.30m/s, Ra = 0.20µm



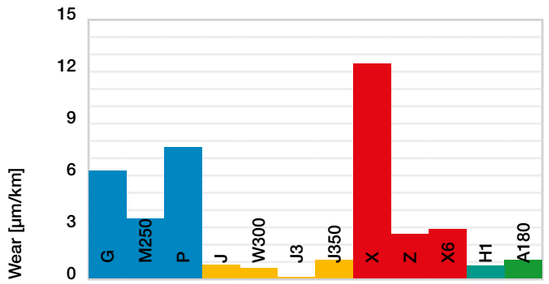
Wear with 304 stainless steel shaft,
p = 1MPa, v = 0.30m/s, Ra = 0.20µm



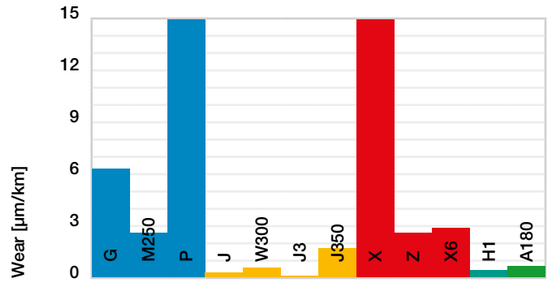
Wear with free cutting steel shaft,
p = 1MPa, v = 0.30m/s, Ra = 0.20µm



Wear with HR carbon steel shaft,
p = 1MPa, v = 0.30m/s, Ra = 0.20µm



Wear with high grade steel shaft,
p = 1MPa, v = 0.30m/s, Ra = 0.20µm



Wear with Cf53 hard-chromed shaft, p = 1MPa,
v = 0.30m/s, Ra = 0.20µm

Temperatures

The temperature resistance of high-performance polymer plain bearings is usually underestimated. Data is often found in the literature about the continuous operating temperature. The continuous operating temperature is the highest temperature, which the plastic can withstand for a period of time without a reduction in the tensile strength of the material above or below a prespecified value. This standardised test however yields only a less relevant characteristic value, as bearings are almost always subjected to a load. The application temperatures of the materials are more revealing.

Application temperatures

The minimum application temperature is the temperature below which the material is so rigid and hard that it becomes too brittle for standard applications. The maximum continuous application temperature is the temperature the material can endure for a longer period of time without the properties changing considerably.

The maximum, short-term application temperature is the temperature above which the material becomes so soft, that it can only withstand small external loads. "Short term" is defined as a period of a few minutes.

If the plain bearings are moved axially or axial forces occur, there is more opportunity for the bearing to lose press-fit. In these cases, axial securing of the bearing is necessary in addition to the press-fit. The table shows the temperature at which additional securing of the iglidur® plain bearing is required, even under low axial loads. The greater the forces, the more reasons to engage such a fastening.

Temperature and load

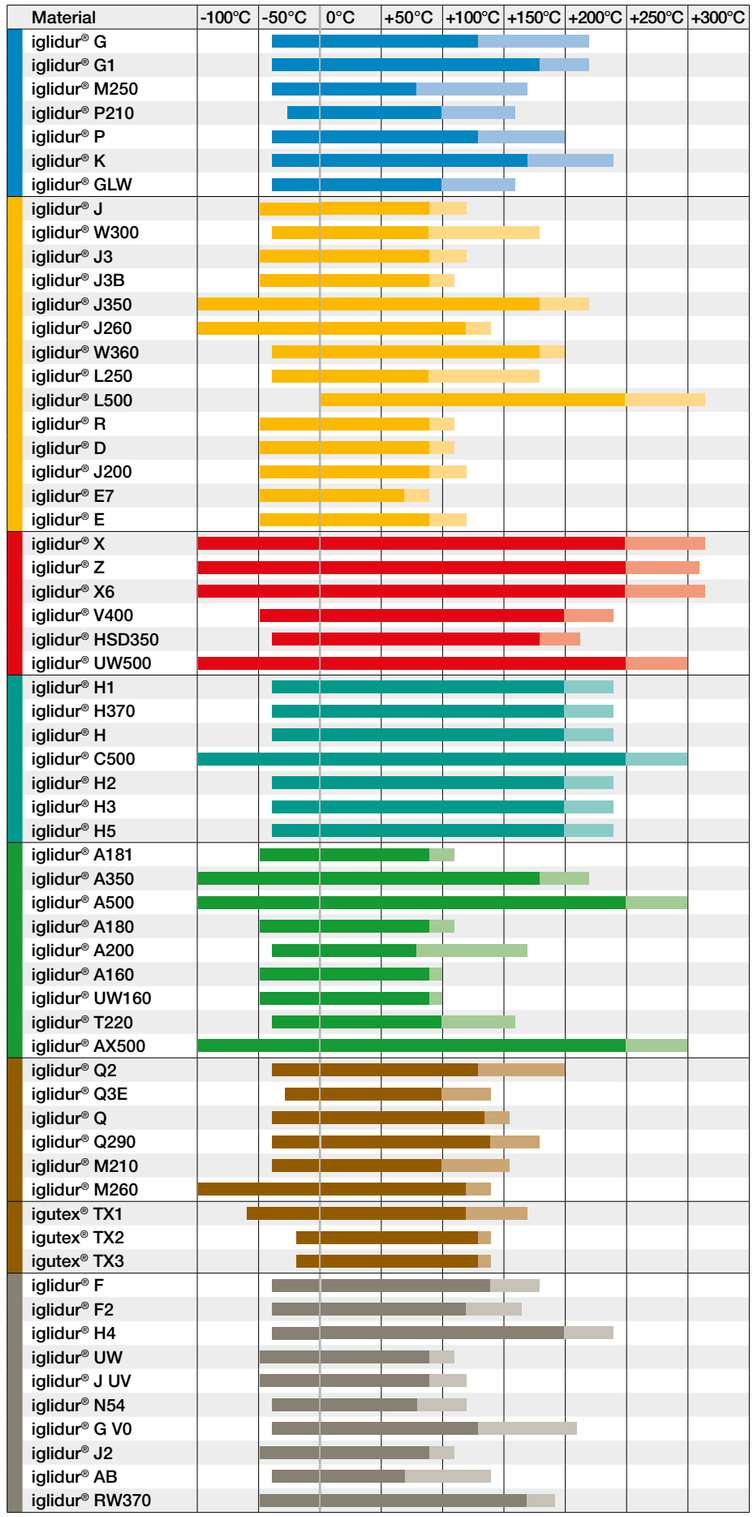
With increasing temperature, the maximum recommended surface pressure [p] decreases continuously. With plain bearings it is important to note that, due to the friction, the bearing temperature may be higher than the ambient temperature.

Coefficient of thermal expansion

The thermal expansion of polymers is approximately 10 to 20 times higher than metals. In contrast to metal, this expansion is non-linear in plastics. The coefficient of thermal expansion of the iglidur® plain bearing is a significant reason for the bearing clearance. At the given application clearance, seizing of the bearing to the shaft does not occur at high temperatures.

Material	Temperature [°C]
iglidur® G	+80
iglidur® G1	+120
iglidur® M250	+60
iglidur® P210	+50
iglidur® P	+90
iglidur® K	+70
iglidur® GLW	+80
iglidur® J	+60
iglidur® W300	+60
iglidur® J3	+60
iglidur® J3B	+60
iglidur® J350	+140
iglidur® J260	+80
iglidur® W360	+90
iglidur® L250	+55
iglidur® L500	+135
iglidur® R	+50
iglidur® D	+50
iglidur® J200	+60
iglidur® E7	+30
iglidur® E	+60
iglidur® X	+135
iglidur® Z	+145
iglidur® X6	+165
iglidur® V400	+100
iglidur® HSD350	+130
iglidur® UW500	+150
iglidur® H1	+80
iglidur® H370	+100
iglidur® H	+120
iglidur® C500	+130
iglidur® H2	+110
iglidur® H3	+80
iglidur® H5	+80
iglidur® A181	+60
iglidur® A350	+140
iglidur® A500	+130
iglidur® A180	+60
iglidur® A200	+50
iglidur® A160	+60
iglidur® UW160	+70
iglidur® T220	+50
iglidur® AX500	+130
iglidur® Q2	+70
iglidur® Q3E	+75
iglidur® Q	+50
iglidur® Q290	+80
iglidur® M210	+50
iglidur® M260	+80
igutex® TX1	+100
igutex® TX2	+100
igutex® TX3	+100
iglidur® F	+105
iglidur® F2	+70
iglidur® H4	+110
iglidur® UW	+80
iglidur® J UV	+60
iglidur® N54	+60
iglidur® G V0	+100
iglidur® J2	+60
iglidur® AB	+50
iglidur® RW370	+120

Temperature at which additional securing of the iglidur® plain bearing is required



Comparison of the continuous and short-term upper application temperature limits

Technical data

Chemical resistance

iglidur® plain bearings can come into contact with many chemicals during their use. This contact can lead to changes of the structural properties. The behaviour of plastics towards a certain chemical is dependent on the temperature, the length of exposure, and the type and amount of the mechanical stress.

If iglidur® plain bearings are resistant to a chemical, they can be used in these media. Sometimes, the surrounding media can even take on the role of a lubricant. Therefore plain bearings may also be used lubricated. However, in dirty environments, a traditional lubricant can decrease the wear resistance when compared to dry operation. The following overview demonstrates this.

Applications in the food industry
The iglidur® product range with specially developed bearing materials is prepared for the special requirements in machines and equipment for the food industry. The materials of the iglidur® A series and of iglidur® T220 are made according to the requirements of the American Food and Drugs Administration (FDA) for the repeated contact with food.

Material	Hydrocarbons	Greases, oils without additives	Diluted acids	Diluted alkalines
iglidur® G	+	+	0 up to –	+
iglidur® G1	+	+	0 up to –	+
iglidur® M250	+	+	0 up to –	+
iglidur® P210	–	–	0	–
iglidur® P	–	+	0	–
iglidur® K	+	+	0 up to –	+
iglidur® GLW	+	+	0 up to –	+
iglidur® J	+	+	0 up to –	+
iglidur® W300	+	+	0 up to –	+
iglidur® J3	+	+	0 up to –	+
iglidur® J3B	+	+	0 up to –	+
iglidur® J350	+ up to 0	+	+	+
iglidur® J260	+	0 up to –	–	+ up to 0
iglidur® W360	+	+	0 up to –	+
iglidur® L250	+	+	0 up to –	+
iglidur® L500	+	+	+	+
iglidur® R	+	+	0 up to –	+
iglidur® D	+	+	0 up to –	+
iglidur® J200	+	+	0 up to –	+
iglidur® E7	+	+	0 up to –	+
iglidur® E	+	+	0 up to –	+
iglidur® X	+	+	+	+
iglidur® Z	+	+	+	+
iglidur® X6	+	+	+	+
iglidur® V400	+	+	+	+
iglidur® HSD350	+	+	+	+
iglidur® UW500	+	+	+	+
iglidur® H1	+	+	+ up to 0	+
iglidur® H370	+	+	+ up to 0	+
iglidur® H	+	+	+ up to 0	+
iglidur® C500	+	+	+	+
iglidur® H2	+	+	+ up to 0	+
iglidur® H3	+	+	+ up to 0	+
iglidur® H5	+	+	+ up to 0	+
iglidur® A181	+	+	0 up to –	+
iglidur® A350	+ up to 0	+	+	+
iglidur® A500	+	+	+	+
iglidur® A180	+	+	0 up to –	+
iglidur® A200	+	+	0 up to –	+
iglidur® A160	+	+	+	+
iglidur® UW160	+	+	+	+
iglidur® T220	–	+	0	–
iglidur® AX500	+	+	+	+
iglidur® Q2	+	+	0 up to –	+
iglidur® Q3E	+	+	0 up to –	+
iglidur® Q	+	+	0 up to –	+
iglidur® Q290	+	+	0 up to –	+
iglidur® M210	–	–	0	–
iglidur® M260	+	0 up to –	–	+ up to 0
igutex® TX1	+	+	+	+
igutex® TX2	+	+	+	+
igutex® TX3	+	+	+	+
iglidur® F	+	+	0 up to –	+
iglidur® F2	–	+	0	–
iglidur® H4	+	+	+ up to 0	+
iglidur® UW	+	+	0 up to –	+
iglidur® J UV	+	+	0 up to –	+
iglidur® N54	+	+	0 up to –	+
iglidur® G V0	+	+	0 up to –	+
iglidur® J2	+	+	0 up to –	+
iglidur® AB	+	+	0 up to –	+
iglidur® RW370	–	+	+	+

Chemical resistance of iglidur® materials
+ resistant
0 conditionally resistant
- not resistant
All data given at room temperature [+20°C]

Injection-moulded clamping star wheels in Krones bottlers save setup times

Universal grippers for bottle transport increase the productivity of filling systems

Grippers for curve-controlled bottle transport usually have to be changed daily for new bottle sizes or shapes. In order to save these setup times, Krones is now working with grippers that cover various bottle sizes. This saves time and increases efficiency. The clamps and rollers are special parts, while the plain bearings in the gripping mechanism are made of iglidur® X material. All components have been specially developed for dry clean, continuous operation and glass handling.

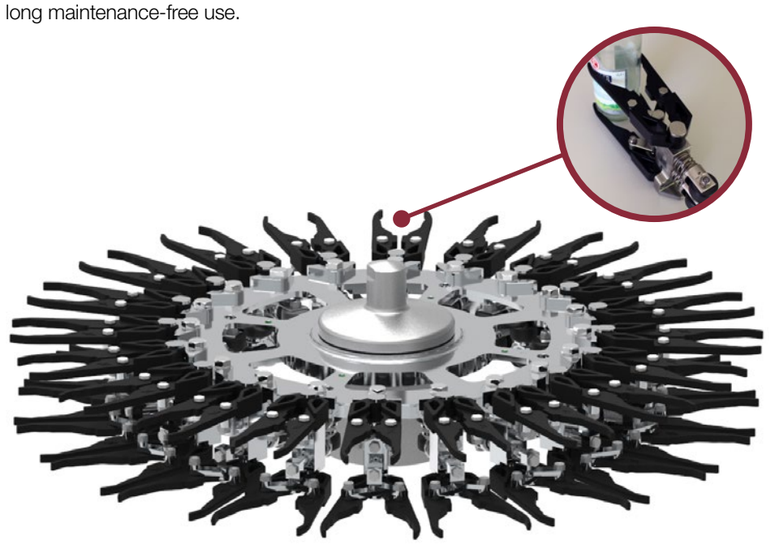
While bottle transport involving fillers in Krones systems has so far been implemented with pocket stars, a new solution is now coming into play. Why? When different bottle shapes or sizes are used, the tools of the bottle stars have so far had to be converted. Such an exchange, which is usually carried out once a day in bottling plants, takes around two hours: there is immense potential for optimisation here.
The goal was therefore obvious: a universal gripping mechanism had to be created that could safely transport bottles of various sizes and shapes to their destination.
For the implementation, Krones AG was now faced with the task of finding suitable material for the grippers for filling systems and the right rollers and plain bearings for the mechanism.

The answer for implementing the new gripping mechanism: a new clamp developed by Krones that is also based on the completely new material iglidur® X. The grippers are made of RN367 material, which was developed for the special challenges of bottle handling. Hygienic design requirements and chemical cleaning were also taken into account during development. This keeps the level of bacterial contamination in the grippers as low as possible. Support rollers at the rear of the clamps and plain bearings are made of iglidur® X, which is also suitable for chemical cleaning, has low coefficient of friction and allows long maintenance-free use.

Last but not least, drylin® R liners made of iglidur® E7 material are used for the linear movement of the clamps, which are attached to the carousel via springs. However, the new grippers have even more advantages. Thanks to the universal solution and the durability of the solution, spare and conversion parts are saved, and a whole 2.5 tons of material are eliminated.

And in the end, the market response also speaks for itself: customer enquiries for Krones increased dramatically .

igus.eu/krones



The MultiGuide Base clamps can grip bottles with different shapes and sizes.

Specifications, approvals and standards

Material	Wear resistance at +23°C	Wear resistance at +90°C	Wear resistance at +150°C
iglidur® G			
iglidur® G1			
iglidur® M250			
iglidur® P210			
iglidur® P			
iglidur® K			
iglidur® GLW			
iglidur® J			
iglidur® W300			
iglidur® J3			
iglidur® J3B			
iglidur® J350			
iglidur® J260			
iglidur® W360			
iglidur® L250			
iglidur® L500			
iglidur® R			
iglidur® D			
iglidur® J200			
iglidur® E7			
iglidur® E			
iglidur® X			
iglidur® Z			
iglidur® X6			
iglidur® V400			
iglidur® HSD350			
iglidur® UW500			
iglidur® H1			
iglidur® H370			
iglidur® H			
iglidur® C500			
iglidur® H2			
iglidur® H3			
iglidur® H5			
iglidur® A181			
iglidur® A350			
iglidur® A500			
iglidur® A180			
iglidur® A200			
iglidur® A160			
iglidur® UW160			
iglidur® T220			
iglidur® AX500			
iglidur® Q2			
iglidur® Q3E			
iglidur® Q			
iglidur® Q290			
iglidur® M210			
iglidur® M260			
igutex® TX1			
igutex® TX2			
igutex® TX3			
iglidur® F			
iglidur® F2			
iglidur® H4			
iglidur® UW			
iglidur® J UV			
iglidur® N54			
iglidur® G V0			
iglidur® J2			
iglidur® AB			
iglidur® RW370			

Material	Radiation resistance	Electrically conductive	Compliant with food requirements	Fire class in accordance with UL-94	Mould test DIN EN ISO 846	Fogging DIN 75201-B
iglidur® G	$3 \cdot 10^2$ Gy			HB	●	●
iglidur® G1	$3 \cdot 10^2$ Gy			HB	●	
iglidur® M250	$1 \cdot 10^4$ Gy			V-2		●
iglidur® P210	$3 \cdot 10^2$ Gy			HB		●
iglidur® P	$5 \cdot 10^2$ Gy			HB		
iglidur® K	$5 \cdot 10^2$ Gy			HB		
iglidur® GLW	$3 \cdot 10^2$ Gy			HB		●
iglidur® J	$3 \cdot 10^2$ Gy			HB	●	
iglidur® W300	$3 \cdot 10^2$ Gy			HB		
iglidur® J3	$1 \cdot 10^4$ Gy			HB		
iglidur® J3B	$3 \cdot 10^2$ Gy			HB		
iglidur® J350	$2 \cdot 10^2$ Gy			V-0	●	
iglidur® J260	$3 \cdot 10^2$ Gy			V-2		
iglidur® W360	$2 \cdot 10^2$ Gy			HB		
iglidur® L250	$3 \cdot 10^4$ Gy			HB		
iglidur® L500	$3 \cdot 10^2$ Gy			V-0		
iglidur® R	$3 \cdot 10^2$ Gy			HB		
iglidur® D	$3 \cdot 10^2$ Gy			HB		
iglidur® J200	$3 \cdot 10^2$ Gy			HB		
iglidur® E7	$3 \cdot 10^2$ Gy			HB		
iglidur® E	$3 \cdot 10^2$ Gy			HB		
iglidur® X	$1 \cdot 10^5$ Gy	●		V-0	●	
iglidur® Z	$1 \cdot 10^5$ Gy			V-0	●	
iglidur® X6	$2 \cdot 10^5$ Gy	●		V-0		
iglidur® V400	$2 \cdot 10^4$ Gy			V-0		
iglidur® HSD350				V-0		
iglidur® UW500	$1 \cdot 10^5$ Gy	●		V-0		
iglidur® H1	$2 \cdot 10^2$ Gy			V-0	●	
iglidur® H370	$2 \cdot 10^2$ Gy	●		V-0		
iglidur® H	$2 \cdot 10^2$ Gy			V-0		
iglidur® C500	$3 \cdot 10^2$ Gy			V-0		
iglidur® H2	$2 \cdot 10^2$ Gy			V-0		
iglidur® H3	$2 \cdot 10^2$ Gy			V-0		
iglidur® H5	$2 \cdot 10^2$ Gy			V-0		
iglidur® A181	$2 \cdot 10^2$ Gy		●	HB		
iglidur® A350	$2 \cdot 10^2$ Gy		●	V-0		
iglidur® A500	$2 \cdot 10^5$ Gy		●	V-1		
iglidur® A180	$3 \cdot 10^2$ Gy		●	HB		
iglidur® A200	$1 \cdot 10^4$ Gy		●	V-2		
iglidur® A160	$1 \cdot 10^5$ Gy		●	HB		
iglidur® UW160	$3 \cdot 10^2$ Gy			HB		
iglidur® T220	$3 \cdot 10^2$ Gy		●	HB		
iglidur® AX500	$3 \cdot 10^2$ Gy		●	V-1		
iglidur® Q2	$3 \cdot 10^2$ Gy			HB		
iglidur® Q3E	$3 \cdot 10^2$ Gy			HB		
iglidur® Q	$3 \cdot 10^2$ Gy			HB		
iglidur® Q290	$3 \cdot 10^2$ Gy			HB		
iglidur® M210	$3 \cdot 10^2$ Gy			HB		
iglidur® M260	$3 \cdot 10^2$ Gy			V-2		
igutex® TX1						
igutex® TX2						
igutex® TX3						
iglidur® F	$3 \cdot 10^2$ Gy	●		HB		
iglidur® F2	$3 \cdot 10^2$ Gy	●		HB		
iglidur® H4	$2 \cdot 10^2$ Gy			V-0		
iglidur® UW	$3 \cdot 10^2$ Gy			HB		
iglidur® J UV	$3 \cdot 10^2$ Gy			HB		
iglidur® N54	$1 \cdot 10^4$ Gy			HB		
iglidur® G V0	$3 \cdot 10^2$ Gy			V-0	●	
iglidur® J2	$3 \cdot 10^2$ Gy			HB		
iglidur® AB	$3 \cdot 10^2$ Gy			HB		
iglidur® RW370				V-0		

Material properties

Material	General properties					Mechanical properties				
	Density [g/cm³]	Max. moisture absorption at +23°C and 50% relative humidity [% weight]	Max. total moisture absorption [% weight]	Coefficient of sliding friction, dynamic against steel [µ]	pv value, max. (dry) [MPa · m/s]	Flexural modulus [MPa]	Flexural strength at +20°C [MPa]	Compressive strength [MPa]	Max. permissible surface pressure at 20°C [MPa]	Shore D hardness
iglidur® G	1.46	0.7	4.0	0.08-0.15	0.42	7,800	210	78	80	81
iglidur® G1	1.58	0.2	1.7	0.08-0.15	0.60	11,486	178	115	91	81
iglidur® M250	1.14	1.4	7.6	0.18-0.40	0.12	2,700	112	52	20	79
iglidur® P210	1.40	0.3	0.5	0.07-0.19	0.40	2,500	70	50	50	75
iglidur® P	1.58	0.2	0.4	0.06-0.21	0.39	5,300	120	66	50	75
iglidur® K	1.52	0.1	0.6	0.06-0.21	0.30	3,500	80	60	50	72
iglidur® GLW	1.36	1.3	5.5	0.10-0.24	0.30	7,700	235	74	80	78
iglidur® J	1.49	0.3	1.3	0.06-0.18	0.34	2,400	73	60	35	74
iglidur® W300	1.24	1.3	6.5	0.08-0.23	0.23	3,500	125	61	60	77
iglidur® J3	1.42	0.3	1.3	0.06-0.20	0.50	2,700	70	60	45	73
iglidur® J3B	1.42	0.3	1.3	0.09-0.23	0.50	2,895	65		44	76
iglidur® J350	1.44	0.3	1.6	0.10-0.20	0.45	2,000	55	60	60	80
iglidur® J260	1.35	0.2	0.4	0.06-0.20	0.35	2,200	60	50	40	77
iglidur® W360	1.34	0.2	1.6	0.07-0.21	0.35	3,829	119		75	
iglidur® L250	1.50	0.7	3.9	0.08-0.19	0.40	1,950	67	47	45	68
iglidur® L500	1.53	0.1	0.3	0.19-0.26	4.00	12,015	201	70	70	81
iglidur® R	1.39	0.2	1.1	0.09-0.25	0.27	1,950	70	68	23	77
iglidur® D	1.40	0.3	1.1	0.08-0.26	0.27	2,000	72	70	23	78
iglidur® J200	1.72	0.2	0.7	0.11-0.17	0.30	2,800	58	43	23	70
iglidur® E7	1.05	0.1	0.1	0.08-0.17	0.22	1,477	22	18	18	61
iglidur® E	1.50	0.2	1.7	0.08-0.23	0.25	2,975	79		37	78
iglidur® X	1.44	0.1	0.5	0.09-0.27	1.32	8,100	170	100	150	85
iglidur® Z	1.40	0.3	1.1	0.06-0.14	0.84	2,400	95	65	150	81
iglidur® X6	1.53	0.1	0.5	0.09-0.25	1.35	16,000	290	190	150	89
iglidur® V400	1.51	0.1	0.2	0.15-0.20	0.50	4,500	95	47	45	74
iglidur® HSD350	1.39	0.6	1.2	0.07-0.23	0.30	2,150	67	44	30	77
iglidur® UW500	1.49	0.1	0.5	0.20-0.36	0.35	16,000	260	140	140	86
iglidur® H1	1.53	0.1	0.3	0.06-0.20	0.80	2,800	55	78	80	77
iglidur® H370	1.66	0.1	0.1	0.07-0.17	0.74	11,100	135	79	75	82
iglidur® H	1.71	0.1	0.3	0.07-0.20	1.37	12,500	175	81	90	87
iglidur® C500	1.37	0.3	0.5	0.07-0.19	0.70	3,300	100	110	80	80
iglidur® H2	1.72	0.1	0.2	0.07-0.30	0.58	10,300	210	109	110	88
iglidur® H3	1.41	0.2	0.5	0.08-0.17	0.70	2,760	68		40	75
iglidur® H5	1.41	0.1	0.7	0.08-0.24	0.70	6,400	150		80	72
iglidur® A181	1.38	0.2	1.3	0.10-0.21	0.31	1,913	48	60	31	76
iglidur® A350	1.42	0.6	1.9	0.10-0.20	0.40	2,000	110	78	60	76
iglidur® A500	1.28	0.3	0.5	0.26-0.41	0.28	3,600	140	118	120	83
iglidur® A180	1.46	0.2	1.3	0.05-0.23	0.31	2,300	88	78	28	76
iglidur® A200	1.14	1.5	7.6	0.10-0.40	0.09	2,500	116	54	18	81
iglidur® A160	1.00	0.1	0.1	0.09-0.19	0.25	1,151	19	37	14	60
iglidur® UW160	1.04	0.1	0.1	0.17-0.31	0.22	1,349	22	32	20	60
iglidur® T220	1.28	0.3	0.5	0.20-0.32	0.28	1,800	65	55	40	76
iglidur® AX500	1.52	0.3	0.5	0.08-0.22	0.90	6,170	115		69	81
iglidur® Q2	1.46	1.1	4.6	0.22-0.42	0.70	8,370	240	130	120	80
iglidur® Q3E	1.46-1.69	1.5	5.0	0.22-0.42	0.70		235		135	80
iglidur® Q	1.40	0.9	4.9	0.05-0.15	0.55	4,500	120	89	100	83
iglidur® Q290	1.27	3.0	9.3	0.14-0.26	0.70	3,074	97	68	55	80
iglidur® M210	1.40	0.3	0.5	0.08-0.20	0.50	2,200	65	50	50	75
iglidur® M260	1.35	0.2	0.4	0.08-0.16	0.35	2,200	60	50	40	77
igutex® TX1	2.10	0.2	0.5	0.09-0.37	1.25	12,000	55	220	200	94
igutex® TX2	1.77	1.0	1.3		2.80			180	180	91
igutex® TX3	1.90	0.1	0.1		2.80				180	91
iglidur® F	1.25	1.8	8.4	0.10-0.39	0.34	11,600	260	98	105	84
iglidur® F2	1.52	0.2	0.4	0.16-0.22	0.31	7,418	93	61	47	72
iglidur® H4	1.79	0.1	0.2	0.08-0.25	0.70	7,500	120	50	65	80
iglidur® UW	1.52	0.2	0.8	0.15-0.35	0.11	9,600	90	70	40	78
iglidur® J UV	1.49	0.3	1.3	0.08-0.19	0.30	2,400	72		34	74
iglidur® N54	1.13	1.6	3.6	0.15-0.23	0.50	1,800	70	30	35	74
iglidur® G V0	1.53	0.7	4.0	0.07-0.20	0.50	7,900	140	100	75	80
iglidur® J2	1.44	0.2	1.3	0.11-0.27	0.23	3,605	101	77	46	
iglidur® AB	1.11	0.8	1.6	0.18-0.31	0.25	1,850	50	40	25	70
iglidur® RW370	1.34	0.3	1.2	0.13-0.17	1.20	2,997	100	129	75	80

Material	Physical and thermal properties					Electrical properties	
	Max. long-term application temperature [°C] [°C]	Max. short-term application temperature [°C] [°C]	Minimum application temperature [°C]	Thermal conductivity [W/m · K]	Coefficient of thermal expansion at +23°C [K⁻¹ · 10⁻⁵]	Specific contact resistance [Ωcm]	Surface resistance [Ω]
iglidur® G	+130	+220	-40	0.24	9.0	$>10^{13}$	$>10^{11}$
iglidur® G1	+180	+220	-40	0.46	3.5	$>10^{9}$	$>10^{11}$
iglidur® M250	+80	+170	-40	0.24	10.0	$>10^{13}$	$>10^{11}$
iglidur® P210	+100	+160	-40	0.25	8.0	$>10^{12}$	$>10^{11}$
iglidur® P	+130	+200	-40	0.25	4.0	$>10^{13}$	$>10^{12}$
iglidur® K	+170	+240	-40	0.25	3.0	$>10^{12}$	$>10^{12}$
iglidur® GLW	+100	+160	-40	0.24	17.0	$>10^{11}$	$>10^{11}$
iglidur® J	+90	+120	-50	0.25	10.0	$>10^{13}$	$>10^{12}$
iglidur® W300	+90	+180	-40	0.24	9.0	$>10^{13}$	$>10^{12}$
iglidur® J3	+90	+120	-50	0.25	13.0	$>10^{12}$	$>10^{12}$
iglidur® J3B	+90	+110	-50	0.30	12.7	$>10^{12}$	$>10^{12}$
iglidur® J350	+180	+220	-100	0.24	7.0	$>10^{13}$	$>10^{10}$
iglidur® J260	+120	+140	-100	0.24	13.0	$>10^{12}$	$>10^{10}$
iglidur® W360	+180	+200	-40	0.24	6.0	$>10^{13}$	$>10^{12}$
iglidur® L250	+90	+180	-40	0.24	10.0	$>10^{10}$	$>10^{11}$
iglidur® L500	+250	+315	-100	0.45	6.0	$>10^{10}$	$>10^{12}$
iglidur® R	+90	+110	-50	0.25	11.0	$>10^{12}$	$>10^{12}$
iglidur® D	+90	+110	-50	0.25	11.0	$>10^{14}$	$>10^{14}$
iglidur® J200	+90	+120	-50	0.24	8.0	$>10^{8}$	$>10^{8}$
iglidur® E7	+70	+90	-50	0.24	25.0	$>10^{9}$	$>10^{9}$
iglidur® E	+90	+120	-50	0.25	10.0	$>10^{12}$	$>10^{12}$
iglidur® X	+250	+315	-100	0.60	5.0	$<10^{5}$	$<10^{3}$
iglidur® Z	+250	+310	-100	0.62	4.0	$>10^{11}$	$>10^{11}$
iglidur® X6	+250	+315	-100	0.55	1.1	$>10^{5}$	$>10^{3}$
iglidur® V400	+200	+240	-50	0.24	3.0	$>10^{12}$	$>10^{12}$
iglidur® HSD350	+180	+210	-40	0.24	7.0	$>10^{13}$	$>10^{14}$
iglidur® UW500	+250	+300	-100	0.60	4.0	$<10^{9}$	$<10^{9}$
iglidur® H1	+200	+240	-40	0.24	6.0	$>10^{12}$	$>10^{11}$
iglidur® H370	+200	+240	-40	0.50	5.0	$<10^{5}$	$<10^{5}$
iglidur® H	+200	+240	-40	0.60	4.0	$<10^{5}$	$<10^{2}$
iglidur® C500	+250	+300	-100	0.24	9.0	$>10^{14}$	$>10^{13}$
iglidur® H2	+200	+240	-40	0.24	4.0	$>10^{15}$	$>10^{14}$
iglidur® H3	+200	+240	-40	0.25	6.0	$>10^{12}$	$>10^{12}$
iglidur® H5	+200	+240	-40	0.25	7.0	$>10^{12}$	$>10^{12}$
iglidur® A181	+90	+110	-50	0.25	11.0	$>10^{12}$	$>10^{12}$
iglidur® A350	+180	+210	-100	0.24	8.0	$>10^{11}$	$>10^{11}$
iglidur® A500	+250	+300	-100	0.24	9.0	$>10^{14}$	$>10^{13}$
iglidur® A180	+90	+110	-50	0.25	11.0	$>10^{12}$	$>10^{11}$
iglidur® A200	+80	+170	-40	0.24	10.0	$>10^{13}$	$>10^{12}$
iglidur® A160	+90	+100	-50	0.30	11.0	$>10^{12}$	$>10^{12}$
iglidur® UW160	+90	+100	-50	0.50	18.0	$>10^{12}$	$>10^{12}$
iglidur® T220	+100	+160	-40	0.24	11.0	$>10^{10}$	$>10^{10}$
iglidur® AX500	+250	+300	-100	0.26	9.0	$>10^{5}$->10^{11}	$>10^{5}$->10^{11}
iglidur® Q2	+130	+200	-40	0.24	8.0	$>10^{13}$	$>10^{11}$
iglidur® Q3E	+100	+140	-30			$>10^{12}$	$>10^{12}$
iglidur® Q	+135	+155	-40	0.23	5.0	$>10^{15}$	$>10^{12}$
iglidur® Q290	+140	+180	-40	0.24	7.0	$>10^{12}$	$>10^{12}$
iglidur® M210	+100	+160	-40	0.25	8.0	$>10^{11}$	$>10^{11}$
iglidur® M260	+120	+140	-100	0.24	13.0	$>10^{10}$	$>10^{10}$
igutex® TX1	+120	+170	-60	0.24	3.0	$>10^{11}$	$>10^{13}$
igutex® TX2	+130	+140	-20	0.25		Insulating	Insulating
igutex® TX3	+130	+140	-20	0.25		Insulating	Insulating
iglidur® F	+140	+180	-40	0.65	12.0	$<10^{3}$	$<10^{2}$
iglidur® F2	+120	+165	-40	0.61	5.0	$<10^{9}$	$<10^{9}$
iglidur® H4	+200	+240	-40	0.24	5.0	$>10^{13}$	$>10^{12}$
iglidur® UW	+90	+110	-50	0.60	6.0	$<10^{5}$	$<10^{5}$
iglidur® J UV	+90	+120	-50	0.30	10.0	$>10^{13}$	$>10^{13}$
iglidur® N54	+80	+120	-40	0.24	9.0	$>10^{13}$	$>10^{11}$
iglidur® G V0	+130	+210	-40	0.25	9.0	$>10^{12}$	$>10^{11}$
iglidur® J2	+90	+110	-50	0.25	7.0	$>10^{13}$	$>10^{12}$
iglidur® AB	+70	+140	-40	0.24	10.0	$>10^{12}$	$>10^{12}$
iglidur® RW370	+170	+190	-50	0.22	5	$>10^{12}$	$>10^{12}$

Tolerances and measurement system

Installation tolerances
iglidur® plain bearings are standard bearings for shafts with h-tolerance (recommended minimum h9). The bearings are designed for press-fit into a housing machined to a H7 tolerance. After being assembled into a nominal size housing, in standard cases the inner diameter automatically adjusts to the correct tolerances. In the case of certain dimensions, the tolerance differs depending on the wall thickness.

Tolerances and measurement system
The installation dimensions and tolerances of the iglidur® plain bearings are a function of the material and wall thicknesses. For each material, the moisture absorption and the thermal expansion are decisive factors. Plain bearings with low moisture absorption can be designed with a minimal amount of bearing clearance. The rule for wall thickness: the thicker the wall of the bearings, the larger the clearances must be. Thus, different tolerance classes exist for iglidur® plain bearings.
Within these tolerances, iglidur® plain bearings can operate in the permissible temperature range and in humidity conditions up to 70% according to the installation recommendations. Should higher air moisture levels be present, or the bearing is used under water, we provide advice with regard to applications, in order to help you use your bearings correctly.

Measuring of the inner diameter of a press-fitted bearing

ISO tolerances for iglidur® plain bearings [mm]

Diameter d1	Housing H7	Shaft h9
up to 3	+0.000 +0.010	-0.025 +0.000
> 3 up to 6	+0.000 +0.012	-0.030 +0.000
> 6 up to 10	+0.000 +0.015	-0.036 +0.000
> 10 up to 18	+0.000 +0.018	-0.043 +0.000
> 18 up to 30	+0.000 +0.021	-0.052 +0.000
> 30 up to 50	+0.000 +0.025	-0.062 +0.000
> 50 up to 80	+0.000 +0.030	-0.074 +0.000
> 80 up to 120	+0.000 +0.035	-0.087 +0.000
> 120 up to 180	+0.000 +0.040	-0.100 +0.000

Diameter d1	Tolerances according to ISO 3547-1				
	E10	E11	F10	F11	D11
up to 3	+0.014 +0.054	+0.014 +0.074	+0.006 +0.046	+0.006 +0.066	+0.020 +0.080
> 3 up to 6	+0.020 +0.068	+0.020 +0.095	+0.010 +0.058	+0.010 +0.085	+0.030 +0.105
> 6 up to 10	+0.025 +0.083	+0.025 +0.115	+0.013 +0.071	+0.013 +0.103	+0.040 +0.130
> 10 up to 18	+0.032 +0.102	+0.032 +0.142	+0.016 +0.086	+0.016 +0.126	+0.050 +0.160
> 18 up to 30	+0.040 +0.124	+0.040 +0.170	+0.020 +0.104	+0.020 +0.150	+0.065 +0.195
> 30 up to 50	+0.050 +0.150	+0.050 +0.210	+0.025 +0.125	+0.025 +0.185	+0.080 +0.240
> 50 up to 80	+0.060 +0.180	+0.060 +0.250	+0.030 +0.150	+0.030 +0.220	+0.100 +0.290
> 80 up to 120	+0.072 +0.212	+0.072 +0.292	+0.036 +0.176	+0.036 +0.256	+0.120 +0.340
> 120 up to 180	+0.085 +0.245	+0.085 +0.335	+0.043 +0.203	+0.043 +0.293	+0.145 +0.395

Material	Installation tolerances	Dimensions in accordance with DIN
iglidur® G	E10	ISO 3547
iglidur® G1	F10	ISO 3547
iglidur® M250	D10	ISO 2795
iglidur® P210	E10	ISO 3547
iglidur® P	E10	ISO 3547
iglidur® K	E10	ISO 3547
iglidur® GLW	E10	ISO 3547
iglidur® J	E10	ISO 3547
iglidur® W300	E10	ISO 3547
iglidur® J3	E10	ISO 3547
iglidur® J3B	E10	ISO 3547
iglidur® J350	F10	ISO 3547
iglidur® J260	E10	ISO 3547
iglidur® W360	E10	ISO 3547
iglidur® L250	E10	ISO 3547
iglidur® L500	F10	ISO 3547
iglidur® R	E10	ISO 3547
iglidur® D	E10	
iglidur® J200	E10	
iglidur® E7	E10	ISO 3547
iglidur® E	E10	ISO 3547
iglidur® X	F10	ISO 3547
iglidur® Z	F10	ISO 3547
iglidur® X6	F10	ISO 3547
iglidur® V400	F10	ISO 3547
iglidur® HSD350	F10	ISO 3547
iglidur® UW500	F10	ISO 3547
iglidur® H1	F10	ISO 3547
iglidur® H370	F10	ISO 3547
iglidur® H	F10	ISO 3547
iglidur® C500	F10	ISO 3547
iglidur® H2	F10	
iglidur® H3	F10	ISO 3547
iglidur® H5	F10	ISO 3547
iglidur® A181	E10	ISO 3547
iglidur® A350	F10	ISO 3547
iglidur® A500	F10	ISO 3547
iglidur® A180	E10	ISO 3547
iglidur® A200	D11	ISO 2795
iglidur® A160	E10	ISO 3547
iglidur® UW160	E10	ISO 3547
iglidur® T220	E10	
iglidur® AX500	F10	ISO 3547
iglidur® Q2	E10	ISO 3547
iglidur® Q3E	E11	
iglidur® Q	E10	ISO 3547
iglidur® Q290	E11	ISO 3547
iglidur® M210	D11	ISO 2795
iglidur® M260	D11	ISO 2795
igutex® TX1	F11	ISO 2795
igutex® TX2	F11	ISO 2795
igutex® TX3	F11	ISO 2795
iglidur® F	D11	ISO 3547
iglidur® F2	E10	ISO 3547
iglidur® H4	F10	ISO 3547
iglidur® UW	E10	ISO 3547
iglidur® J UV	E10	ISO 3547
iglidur® N54	E10	ISO 3547
iglidur® G V0	E10	ISO 3547
iglidur® J2	E10	ISO 3547
iglidur® AB	E10	ISO 3547
iglidur® RW370	F10	ISO 3547

iglidur® sleeve bearings

Sleeve Plain bearings

IGL-A-0001

iglidur® G
The classic all-rounder

Temperature	+130°C
Surface pressure	80MPa
Price index	

IGL-A-0002

iglidur® G1
More universal

Temperature	+180°C
Surface pressure	91MPa
Price index	

IGL-A-0003

iglidur® M250
The robust all-rounder according to ISO 2795

Temperature	+80°C
Surface pressure	210MPa
Price index	

IGL-A-0004

iglidur® P210
Specialist for pivoting, rolling applications and more

Temperature	+100°C
Surface pressure	50MPa
Price index	

IGL-A-0005

iglidur® P
The cost-effective outdoor all-rounder

Temperature	+130°C
Surface pressure	50MPa
Price index	

IGL-A-0006

iglidur® K
Versatile and cost-effective

Temperature	+170°C
Surface pressure	50MPa
Price index	

IGL-A-0007

iglidur® GLW
Low-cost material for high-volume production

Temperature	+100°C
Surface pressure	80MPa
Price index	

IGL-A-0008

iglidur® J
The versatile endurance runner

Temperature	+90°C
Surface pressure	35MPa
Price index	

IGL-A-0009

iglidur® W300
The classic endurance runner up to 60MPa

Temperature	+90°C
Surface pressure	60MPa
Price index	

IGL-A-0010

iglidur® J3
Specialist for pivoting and pulsating loads

Temperature	+90°C
Surface pressure	45MPa
Price index	

IGL-A-0011

iglidur® J3B
Proven long-life material in black

Temperature	+90°C
Surface pressure	44MPa
Price index	

IGL-A-0012

iglidur® J350
Endurance runner with high dimensional stability at high temperatures

Temperature	+180°C
Surface pressure	60MPa
Price index	

IGL-A-0013

iglidur® J260
Ideal for plastic shafts

Temperature	+120°C
Surface pressure	40MPa
Price index	

IGL-A-0014

iglidur® W360
Endurance runner up to +180°C

Temperature	+180°C
Surface pressure	75MPa
Price index	

IGL-A-0015

iglidur® L250
For fast rotating applications

Temperature	+90°C
Surface pressure	45MPa
Price index	

IGL-A-0017

iglidur® L500
For extreme rotational speeds

Temperature	+250°C
Surface pressure	70MPa
Price index	

IGL-A-0018

iglidur® R
Low-cost

Temperature	+90°C
Surface pressure	23MPa
Price index	

IGL-A-0019

iglidur® D
Low-cost with silicone

Temperature	+90°C
Surface pressure	23MPa
Price index	

IGL-A-0020

iglidur® J200
Specialist for aluminium shafts

Temperature	+90°C
Surface pressure	23MPa
Price index	

IGL-A-0021

iglidur® E7
Ideal for pivoting movement

Temperature	+70°C
Surface pressure	18MPa
Price index	

IGL-A-0022

iglidur® E
Wear-resistant

Temperature	+90°C
Surface pressure	37MPa
Price index	

IGL-A-0023

iglidur® X
The chemicals and temperature specialist

Temperature	+250°C
Surface pressure	150MPa
Price index	

IGL-A-0024

iglidur® Z
Long service life under extreme conditions

Temperature	+250°C
Surface pressure	150MPa
Price index	

iglidur® sleeve bearings

iglidur® X6
The high-temperature specialist up to +250°C

Temperature	+250°C
Surface pressure	150MPa
Price index	

iglidur® V400
For soft shafts and high temperatures

Temperature	+200°C
Surface pressure	45MPa
Price index	

iglidur® HSD350
All-rounder for steam sterilisation

Temperature	+180°C
Surface pressure	30MPa
Price index	

iglidur® UW500
For hot liquids

Temperature	+250°C
Surface pressure	140 MPa
Price index	

iglidur® H1
Endurance runner with high media resistance

Temperature	+200°C
Surface pressure	80MPa
Price index	

iglidur® H370
Long service life under water

Temperature	+200°C
Surface pressure	75MPa
Price index	

iglidur® H
The classic with high resistance to media and temperature

Temperature	+200°C
Surface pressure	90 MPa
Price index	

iglidur® C500
High temperature endurance runner

Temperature	+250°C
Surface pressure	80MPa
Price index	

iglidur® H2
The low-cost specialist for chemicals and temperatures

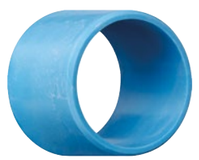
Temperature	+200°C
Surface pressure	110MPa
Price index	

iglidur® H3
Chemical resistance

Temperature	+200°C
Surface pressure	40MPa
Price index	

iglidur® H5
Resistant to temperature and chemicals

Temperature	+200°C
Surface pressure	80MPa
Price index	



iglidur® A181
The universal bearing for food contact

Temperature	+90°C
Surface pressure	31MPa
Price index	

iglidur® A350
The endurance runner at higher temperatures in the food sector

Temperature	+180°C
Surface pressure	60MPa
Price index	

iglidur® A500
The media and temperature specialist in the food sector

Temperature	+250°C
Surface pressure	120MPa
Price index	

iglidur® A180
The all-rounder for food

Temperature	+90°C
Surface pressure	28MPa
Price index	

iglidur® A200
The "food-classic" for low duty

Temperature	+80°C
Surface pressure	18MPa
Price index	

iglidur® A160
Food bearing with media resistance up to +90°C

Temperature	+90°C
Surface pressure	14MPa
Price index	

iglidur® UW160
Suitable for contact with drinking water

Temperature	+90°C
Surface pressure	210MPa
Price index	

iglidur® T220
For the tobacco industry

Temperature	+100°C
Surface pressure	40MPa
Price index	

iglidur® AX500
Conductive and resistant

Temperature	+250°C
Surface pressure	69MPa
Price index	

iglidur® Q2
The durable heavy-duty bearing

Temperature	+130°C
Surface pressure	120MPa
Price index	

iglidur® Q3E
Cost-effective heavy-duty bearing

Temperature	+100°C
Surface pressure	135MPa
Price index	

iglidur® Q
The peak of stability

Temperature	+135°C
Surface pressure	100MPa
Price index	

iglidur® Q290
Heavy-duty on soft shafts

Temperature	+140°C
Surface pressure	55MPa
Price index	

iglidur® sleeve bearings

iglidur® M210
For medium-sized loads

Temperature	+100°C
Surface pressure	50MPa
Price index	

iglidur® M260
For heavy duty

Temperature	+120°C
Surface pressure	40MPa
Price index	

iglidur® TX1
The robust all-rounder

Temperature	+120°C
Surface pressure	200MPa
Price index	

iglidur® TX2
The technical shafts specialist

Temperature	+130°C
Surface pressure	180MPa
Price index	

iglidur® TX3
The endurance runner for the highest loads

Temperature	+130°C
Surface pressure	180MPa
Price index	

iglidur® F
Electrically conductive

Temperature	+140°C
Surface pressure	105MPa
Price index	

iglidur® F2
ESD-compatible all-rounder

Temperature	+120°C
Surface pressure	47MPa
Price index	

iglidur® H4
The automotive standard

Temperature	+200°C
Surface pressure	65MPa
Price index	

iglidur® UW
For fast rotation under water

Temperature	+90°C
Surface pressure	40MPa
Price index	

iglidur® J UV
For continuous direct sunlight

Temperature	+90°C
Surface pressure	34MPa
Price index	

iglidur® N54
The biopolymer

Temperature	+80°C
Surface pressure	36MPa
Price index	

iglidur® G V0
Low-cost all-rounder for fire protection

Temperature	+130°C
Surface pressure	75MPa
Price index	

iglidur® flanged bearings

iglidur® J2
Versatile and cost-effective

Temperature	+90°C
Surface pressure	46MPa
Price index	

iglidur® AB
The first antibacterial iglidur® plain bearing

Temperature	+70°C
Surface pressure	25MPa
Price index	

iglidur® RW370
Complies with DIN EN 45545 HL3, R22/R23

Temperature	+170°C
Surface pressure	75MPa
Price index	

Sleeve Flanged bearings

iglidur® G
The classic all-rounder

Temperature	+130°C
Surface pressure	80MPa
Price index	

iglidur® G1
More universal

Temperature	+180°C
Surface pressure	91MPa
Price index	

iglidur® M250
The robust all-rounder according to ISO 2795

Temperature	+80°C
Surface pressure	210MPa
Price index	

iglidur® P210
Specialist for pivoting, rolling applications and more

Temperature	+100°C
Surface pressure	50MPa
Price index	

iglidur® P
The cost-effective outdoor all-rounder

Temperature	+130°C
Surface pressure	50MPa
Price index	

iglidur® K
Versatile and cost-effective

Temperature	+170°C
Surface pressure	50MPa
Price index	

iglidur® GLW
Low-cost material for high-volume production

Temperature	+100°C
Surface pressure	80MPa
Price index	

iglidur® J
The versatile endurance runner

Temperature	+90°C
Surface pressure	35MPa
Price index	

iglidur® flanged bearings

IGL-B-0009

iglidur® W300

The classic endurance runner up to 60MPa

Temperature	+90°C
Surface pressure	60MPa
Price index	

IGL-B-0010

iglidur® J3

Specialist for pivoting and pulsating loads

Temperature	+90°C
Surface pressure	45MPa
Price index	

IGL-B-0011

iglidur® J3B

Proven long-life material in black

Temperature	+90°C
Surface pressure	44MPa
Price index	

IGL-B-0012

iglidur® J350

Endurance runner with high dimensional stability at high temperatures

Temperature	+180°C
Surface pressure	60MPa
Price index	

IGL-B-0013

iglidur® J260

Ideal for plastic shafts

Temperature	+120°C
Surface pressure	40MPa
Price index	

IGL-B-0014

iglidur® W360

Endurance runner up to +180°C

Temperature	+180°C
Surface pressure	75MPa
Price index	

IGL-B-0015

iglidur® L250

For fast rotating applications

Temperature	+90°C
Surface pressure	45MPa
Price index	

IGL-B-0017

iglidur® L500

For extreme rotational speeds

Temperature	+250°C
Surface pressure	70MPa
Price index	

IGL-B-0018

iglidur® R

Low-cost

Temperature	+90°C
Surface pressure	23MPa
Price index	

IGL-B-0019

iglidur® D

Low-cost with silicone

Temperature	+90°C
Surface pressure	23MPa
Price index	

IGL-B-0020

iglidur® J200

Specialist for aluminium shafts

Temperature	+90°C
Surface pressure	23MPa
Price index	

IGL-B-0021

iglidur® E7

Ideal for pivoting movement

Temperature	+70°C
Surface pressure	18MPa
Price index	

IGL-B-0022

iglidur® E

Wear-resistant

Temperature	+90°C
Surface pressure	37MPa
Price index	

IGL-B-0023

iglidur® X

The chemicals and temperature specialist

Temperature	+250°C
Surface pressure	150MPa
Price index	

IGL-B-0024

iglidur® Z

Long service life under extreme conditions

Temperature	+250°C
Surface pressure	150MPa
Price index	

IGL-B-0025

iglidur® X6

The high-temperature specialist up to +250°C

Temperature	+250°C
Surface pressure	150MPa
Price index	

IGL-B-0026

iglidur® V400

For soft shafts and high temperatures

Temperature	+200°C
Surface pressure	45MPa
Price index	

IGL-B-0027

iglidur® HSD350

All-rounder for steam sterilisation

Temperature	+180°C
Surface pressure	30MPa
Price index	

IGL-B-0028

iglidur® UW500

For hot liquids

Temperature	+250°C
Surface pressure	140 MPa
Price index	

IGL-B-0029

iglidur® H1

Endurance runner with high media resistance

Temperature	+200°C
Surface pressure	80MPa
Price index	

IGL-B-0030

iglidur® H370

Long service life under water

Temperature	+200°C
Surface pressure	75MPa
Price index	

IGL-B-0031

iglidur® H

The classic with high resistance to media and temperature

Temperature	+200°C
Surface pressure	90 MPa
Price index	

IGL-B-0032

iglidur® C500

High temperature endurance runner

Temperature	+250°C
Surface pressure	80MPa
Price index	

IGL-B-0033

iglidur® H2

The low-cost specialist for chemicals and temperatures

Temperature	+200°C
Surface pressure	110MPa
Price index	

iglidur® flanged bearings

IGL-B-0034

iglidur® A181
The universal bearing for food contact

Temperature	+90°C
Surface pressure	31MPa
Price index	

IGL-B-0035

iglidur® A350
The endurance runner at higher temperatures in the food sector

Temperature	+180°C
Surface pressure	60MPa
Price index	

IGL-B-0036

iglidur® A500
The media and temperature specialist in the food sector

Temperature	+250°C
Surface pressure	120MPa
Price index	

IGL-B-0037

iglidur® A180
The all-rounder for food

Temperature	+90°C
Surface pressure	28MPa
Price index	

IGL-B-0038

iglidur® A200
The "food-classic" for low duty

Temperature	+80°C
Surface pressure	18MPa
Price index	

IGL-B-0039

iglidur® A160
Food bearing with media resistance up to +90°C

Temperature	+90°C
Surface pressure	14MPa
Price index	

IGL-B-0040

iglidur® UW160
Suitable for contact with drinking water

Temperature	+90°C
Surface pressure	210MPa
Price index	

IGL-B-0041

iglidur® T220
For the tobacco industry

Temperature	+100°C
Surface pressure	40MPa
Price index	

IGL-B-0042

iglidur® AX500
Conductive and resistant

Temperature	+250°C
Surface pressure	69MPa
Price index	

IGL-B-0043

iglidur® Q2
The durable heavy-duty bearing

Temperature	+130°C
Surface pressure	120MPa
Price index	

IGL-B-0044

iglidur® Q
The peak of stability

Temperature	+135°C
Surface pressure	100MPa
Price index	

IGL-B-0045

iglidur® F
Electrically conductive

Temperature	+140°C
Surface pressure	105MPa
Price index	

IGL-B-0046

iglidur® F2
ESD-compatible all-rounder

Temperature	+120°C
Surface pressure	47MPa
Price index	

IGL-B-0047

iglidur® H4
The automotive standard

Temperature	+200°C
Surface pressure	65MPa
Price index	

IGL-B-0048

iglidur® UW
For fast rotation under water

Temperature	+90°C
Surface pressure	40MPa
Price index	

IGL-B-0049

iglidur® J UV
For continuous direct sunlight

Temperature	+90°C
Surface pressure	34MPa
Price index	

IGL-B-0050

iglidur® N54
The biopolymer

Temperature	+80°C
Surface pressure	36MPa
Price index	

IGL-B-0051

iglidur® G V0
Low-cost all-rounder for fire protection

Temperature	+130°C
Surface pressure	75MPa
Price index	

IGL-B-0052

iglidur® J2
Versatile and cost-effective

Temperature	+90°C
Surface pressure	46MPa
Price index	

IGL-B-0053

iglidur® AB
The first antibacterial iglidur® plain bearing

Temperature	+70°C
Surface pressure	25MPa
Price index	

iglidur® thrust washers and guide rings

Thrust washers

iglidur® G
The classic all-rounder

Temperature	+130°C
Surface pressure	80MPa
Price index	

iglidur® M250
The robust all-rounder according to ISO 2795

Temperature	+80°C
Surface pressure	210MPa
Price index	

iglidur® J
The versatile endurance runner

Temperature	+90°C
Surface pressure	35MPa
Price index	

iglidur® W300
The classic endurance runner up to 60MPa

Temperature	+90°C
Surface pressure	60MPa
Price index	

iglidur® X
The chemicals and temperature specialist

Temperature	+250°C
Surface pressure	150MPa
Price index	

iglidur® Z
Long service life under extreme conditions

Temperature	+250°C
Surface pressure	150MPa
Price index	

iglidur® A200
The "food-classic" for low duty

Temperature	+80°C
Surface pressure	18MPa
Price index	

iglidur® Q
The peak of stability

Temperature	+135°C
Surface pressure	100MPa
Price index	

Guide rings

iglidur® J
The versatile endurance runner

Temperature	+90°C
Surface pressure	35MPa
Price index	

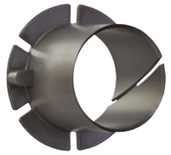
Split bearings

iglidur® slot bearings-, double flange bearings and two hole flange bearings

Split bearings, anti-rotation feature

iglidur® M250
The robust all-rounder according to ISO 2795

Temperature	+80°C
Surface pressure	210MPa
Price index	



iglidur® M250
The robust all-rounder according to ISO 2795

Temperature	+80°C
Surface pressure	210MPa
Price index	

Double flange bearings

iglidur® A230
For sheets in the food industry

Temperature	+110°C
Surface pressure	18MPa
Price index	

iglidur® K230
Low coefficient of friction and wear

Temperature	+110°C
Surface pressure	38MPa
Price index	

iglidur® M250
The robust all-rounder according to ISO 2795

Temperature	+80°C
Surface pressure	210MPa
Price index	

Two hole flange bearings

iglidur® G
The classic all-rounder

Temperature	+130°C
Surface pressure	80MPa
Price index	

iglidur® A180
The all-rounder for food

Temperature	+90°C
Surface pressure	28MPa
Price index	

iglidur® J
The versatile endurance runner

Temperature	+90°C
Surface pressure	35MPa
Price index	

iglidur® X
The chemicals and temperature specialist

Temperature	+250°C
Surface pressure	150MPa
Price index	

iglidur® sleeve bearings and disc springs

Preloaded sleeve bearings

IGL-I-0001

iglidur® J
The versatile endurance runner

Temperature	+90°C
Surface pressure	35MPa
Price index	

Preloaded flanged bearings

IGL-J-0001

iglidur® J
The versatile endurance runner

Temperature	+90°C
Surface pressure	35MPa
Price index	

Disc springs

IGL-K-0001

iglidur® J
The versatile endurance runner

Temperature	+90°C
Surface pressure	35MPa
Price index	

IGL-K-0002

iglidur® V400
For soft shafts and high temperatures

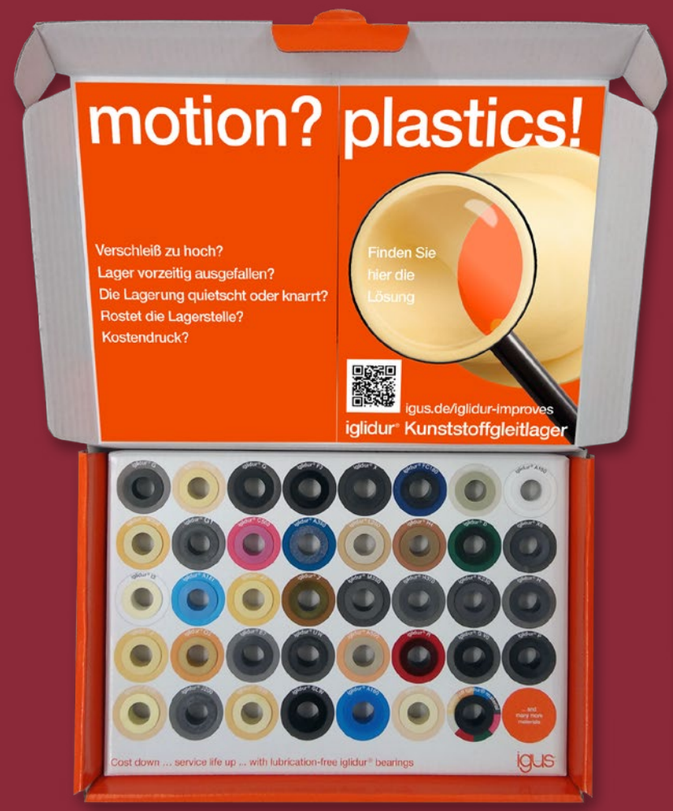
Temperature	+200°C
Surface pressure	45MPa
Price index	

Imperial dimensions

IGL-INCH

Free sample box

- 38 plastic bearings made of the most important iglidur® materials
- Templates for finding the perfect material for your application
- iglidur® bearing technology catalogue



igus.eu/iglidur-sample-box

igus® toolmaking

iform: In-house toolmaking offers FastLine service

In order to be able to produce high-quality components from plastics, precise moulds are also required. This is why igus® manufactures the tools for injection moulding itself in the company's own tool shop, iform.

From development to production and sampling to quality control, everything is handled by igus®. And short distances require less time. This also makes it possible to realise individual components at short notice and in high quality.

Main tasks

- Development, production and sampling of tool technology for all igus® injection moulding products
- Enabling the fastest possible repair and maintenance tool to ensure delivery capability for our customers
- Design of technical innovations together with sales, development and production

Since 2021, iform has been offering the FastLine service, which enables fast delivery of injection moulded special plain bearings within just seven days. In order to reduce overall costs, not only the suitable materials can be selected, but also the appropriate manufacturing processes. Depending on the order volume, a mould can also be created as a print2mold® in 3D printing - also from the proven high-performance plastics and in a short time.

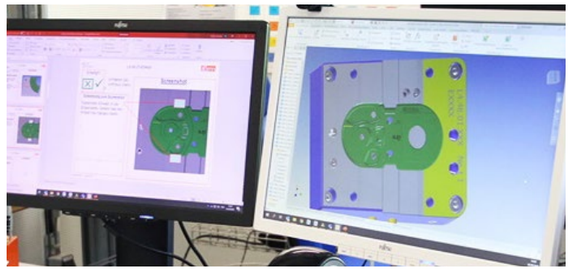
With the "iglidur® designer" online tool, the customer can simply enter the dimensions of the plain bearing, select the required material, define the quantity and they will be shown an overview of the manufacturing processes with the appropriate costs.

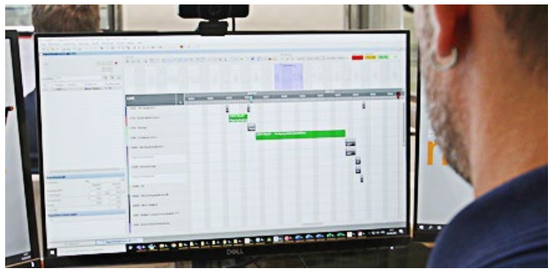
igus.eu/fastline

Best toolmaker of the year
Every year, the "Excellence in Production" competition is organised by the Machine Tool Laboratory WZL of RWTH Aachen University and the Fraunhofer Institute for Production Technology IPT. We are proud to have won this year in the category "Internal toolmaking with over 50 employees". Short throughput times, FastLine service and process standardisation convinced the jury.

iform

Step by step to the finished tool





Tool simulation and development
The combination of detailed simulation of the parts and decades of design experience of our employees enables tailor-made tool concepts. On the basis of early co-ordination between part and tool design, the production effort can be optimised, saving time and costs.

Project planning
Our digital project planning forms the basis for high resource efficiency. The virtual representation of all production processes in real time makes it possible to plan the project process taking into account all available machine and employee capacities. In this way, it is possible to achieve optimum machine utilisation and to reduce throughput times to a minimum.

Tool production
Our machinery, comprising 27 systems, is equipped with state-of-the-art processing machines and a wide range of production technologies. Thanks to the networking of machines and the use of automation, we are able to produce the most demanding components in the shortest possible time while complying with the tightest tolerances.

Sampling in the technical centre
The process stability of the tools is validated in iform's own technical centre. Injection moulding machines with up to 100t clamping force are available for commissioning and optimisation of the injection process. The top priority when sampling the tools is always to achieve the optimum in terms of economy and component quality.

Quality assurance
By using tactile 3D measurement and advanced computer tomography (CT) we ensure the best possible quality and function of our products. The extensive possibilities of part-to-CAD comparison, inclusion analysis and assembly inspection support us in correcting the tools as required.

Application example

Receive long-lasting bearings in special dimensions for ergometers after just 4 days

Maintenance-free plain bearings as a fast and economical solution for ergometers from ergoline GmbH
Ergometers are not only popular in gyms or as exercise machines at home - they are also used in medical technology for diagnosing heart diseases. One of its leading manufacturers is ergoline GmbH.

Problem
One of the special devices that ergoline GmbH manufactures is the ergoselect 1200 model. This reclining ergometer was developed for special examination of the heart: dynamic stress echocardiography. The angle of the inclination of the device can be electrically adjusted between 0 and 45°. This allows special ultrasound examinations of the heart during an ergometric stress of the patient. This adjustment in height and for tilting of the ergometer is exactly what, Dominik Huber, the Head of Design at ergoline, was looking for in a plain bearing. These must be durable and withstand a wide range of loads such as acceleration and high load. In addition, the hygiene requirements must be guaranteed by the products. Finally, there was a tight time frame for production. In order to bring the product out, time and money needed to be saved.

Solution
After consultation, the customer decided on plain bearings made of the material iglidur® P210, which are ideal for pivoting movements on various shaft materials. Especially for loads up to 20MPa, it is extremely wear-resistant, and it is also well suited for edge loads. By dispensing with external lubricants, the plastic bearing also meets the most demanding hygiene requirements in medical technology. In the ergometer application, iglidur® P210 has the maximum service life, which is also shown by the service life calculation that igus® offers with the calculator.

As the bearings selected from the catalogue had too much bearing clearance, another solution was required for the start of volume production. Here we offered the FastLine service to the customer. Due to investment in our production line for custom parts with CNC technology, we were able to produce plain bearings for ergoline in the required shape in a very short time. The time from order to delivery was just four days. And the price was also much lower than the customer expected.

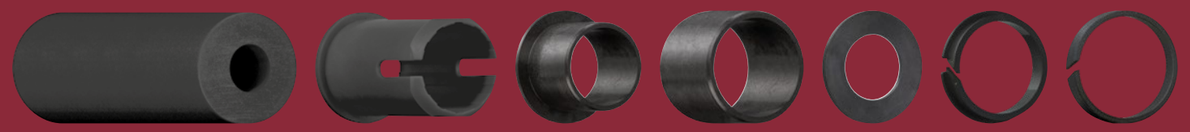
igus.eu/ergometer

motion on demand

The most cost-effective solution from all motion plastics® materials and igus® manufacturing processes

Up to 68 times longer service life than with conventional plastics. Upload CAD model or enter geometry, select manufacturing process and material - done. You can immediately see the price and delivery time, calculate the service life of the component in your application and order directly online.

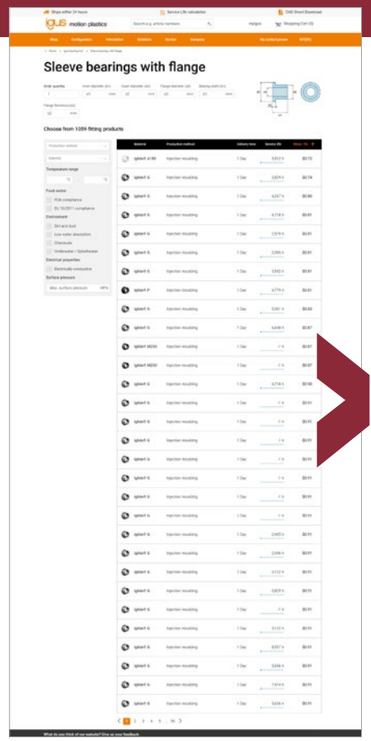
The igus® FastLine service gives you customised injection-moulded plain bearings and thrust washers within seven days.

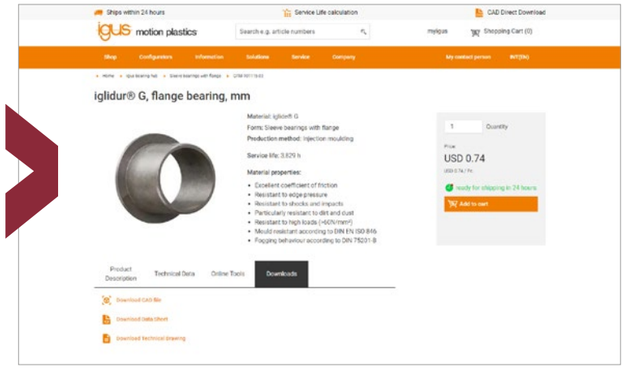


igus.eu/motion-on-demand

Online tool

iglidur® bearing hub





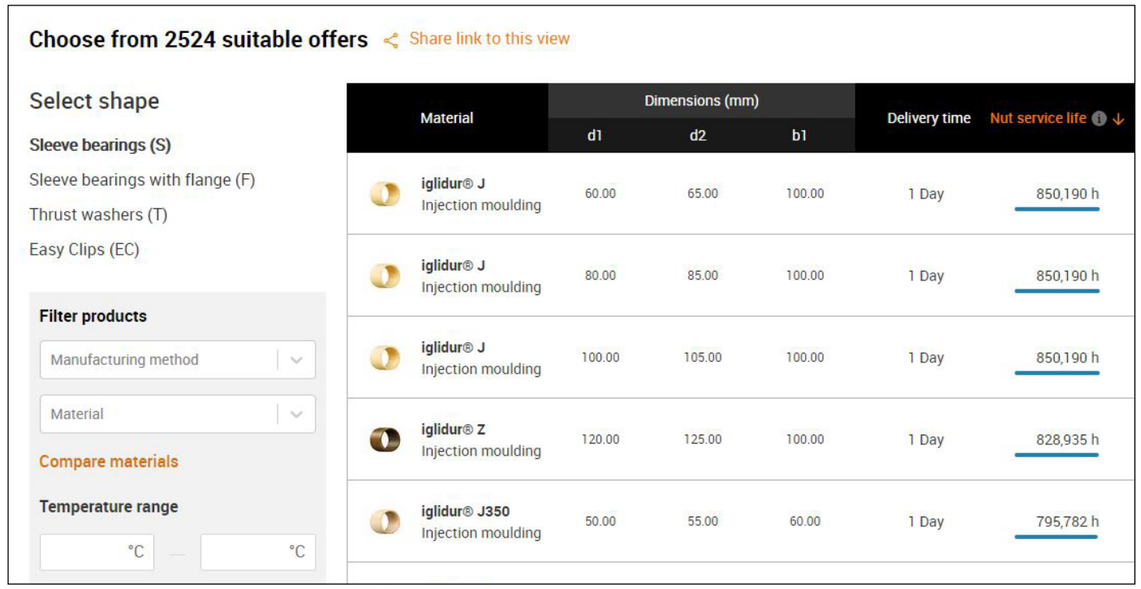
Digital merging of catalogue and special parts

Who wants unnecessary custom-made products? The new iglidur® bearing hub is revolutionising online plain bearing procurement. You will receive a real-time overview of existing and similar catalogue components for the information you have provided and - if necessary - immediate prices for your custom-made products.

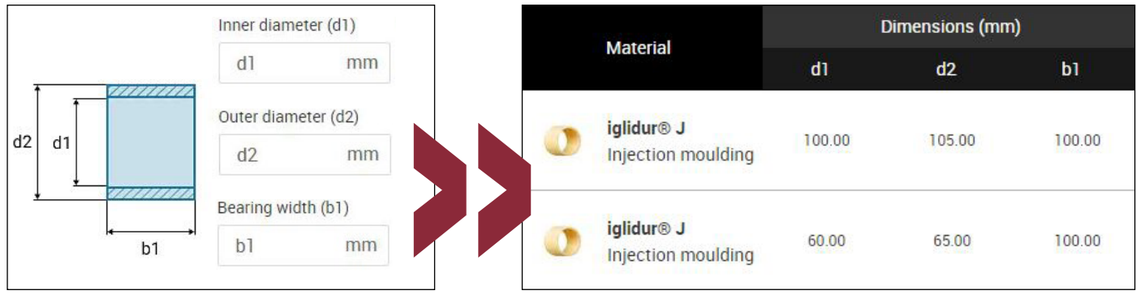
- Individually optimised or suitable standardised components at the touch of a button
- Reduces unnecessary costs for custom-made products by showing existing alternatives
- Find out for yourself: igus.eu/iglidur-shop
- Avoids resource consumption by making it easier to use identical parts
- Uses digital services to optimise the procurement process

All products and dimensions at a glance with integrated service life calculator

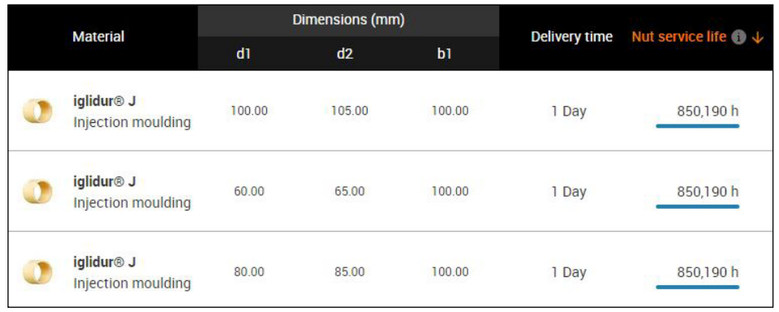
Compare, filter and identify customised products



Intelligent dimensional filter with integrated special parts service
With the intelligent dimension filter, you get the right products in every selection. You decide which dimensions are most important to you.



As soon as it is determined that a suitable catalogue solution for your required dimensions is unavailable, you will automatically and without delay receive prices, delivery times and a pre-calculated component service life for suitable custom-made products. Injection moulding, bar stock processing, 3D printing and cost-effective parts shortened from existing catalogue parts.
No minimum order value and no minimum order quantity.



dry-tech® | Lubrication-free made easy ...

iglidur® rollers

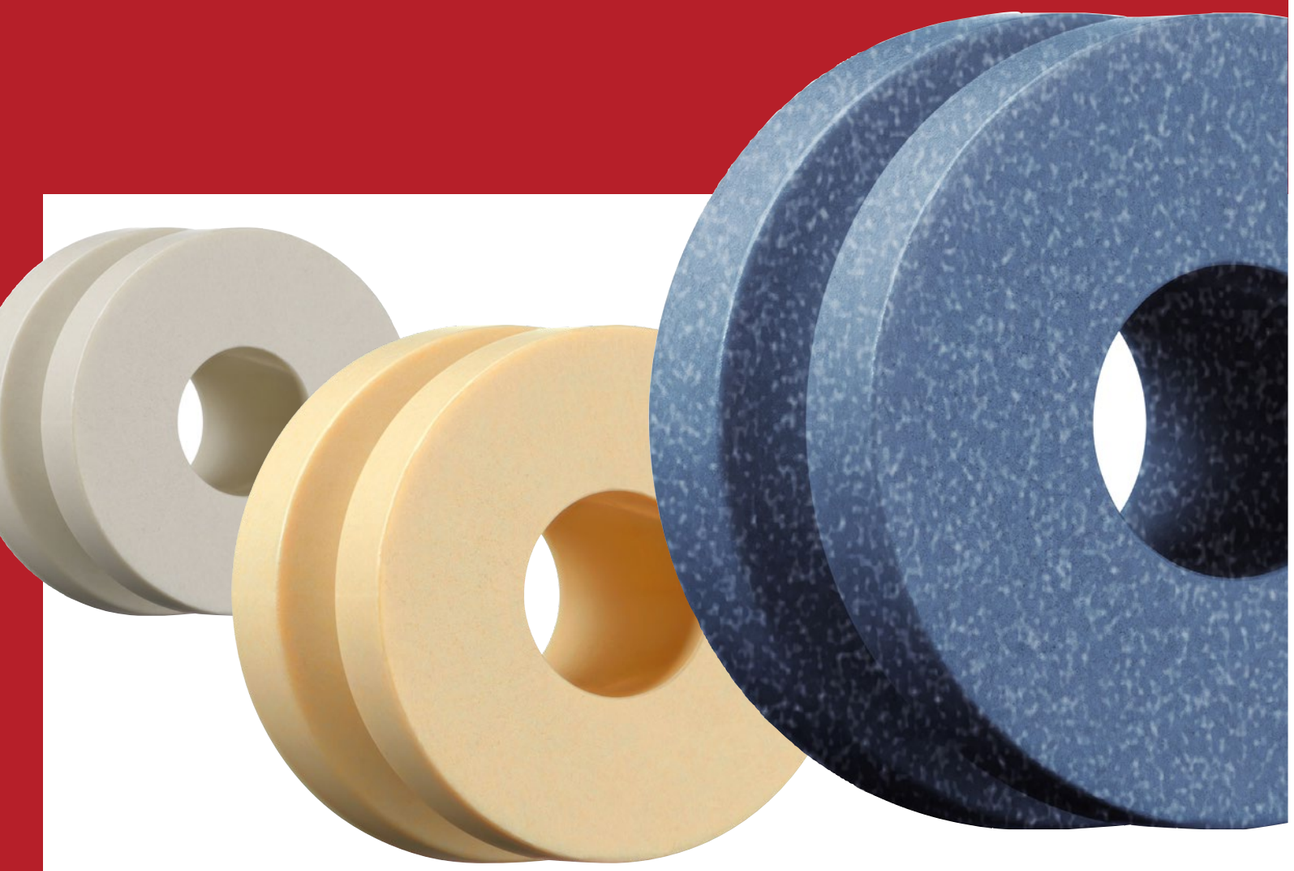
Guide rollers

Knife edge rollers

igus.eu/rollers

iglidur® bearing technology

Guide rollers



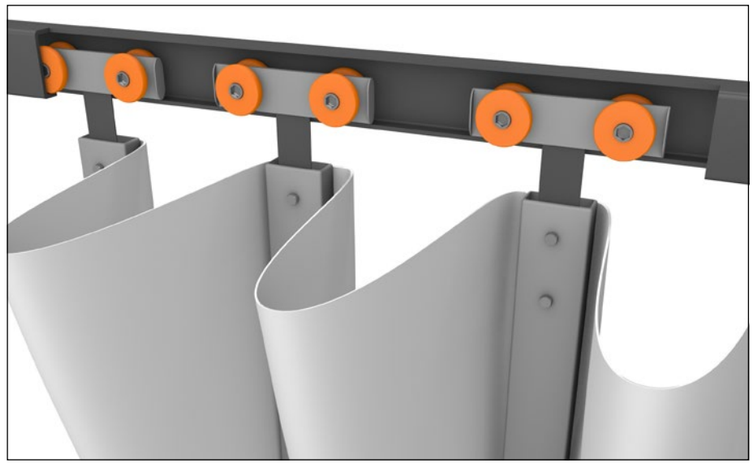
High wear resistance for dynamic applications

You will find the right solution with individual or catalogue dimensions. With our rollers made of different iglidur® materials, we will identify the best combination for your needs.

- Wear-resistant
- High running performance
- Tested extensively in the laboratory
- Lubrication-free dry operation eliminates the need for lubricants

The main difference with a plain bearing

What is rotating...and how do they operate



Smooth and quiet operation, with guide rollers from igus®

Benefits
- Low coefficient of friction and wear on almost every shaft
- Low moisture absorption
- Wear-resistant especially up to 20MPa in pivoting applications

Typical application areas
- Vending machinery
- Beverage industry
- Textile industry
- Packaging industry
- Agricultural engineering
- Mechanical engineering

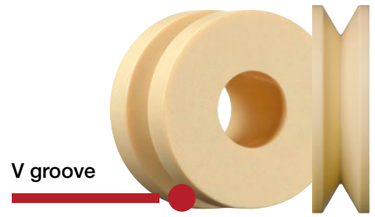
A plain bearing is usually installed in such a way that it is firmly pressed into a housing bore. A shaft then rotates in this fixed bearing. We speak of a roller when the plain bearing moves around the rigid shaft, which is then called an axis, as it does not transmit torque. Then it rolls around along the outer diameter. For example, on a guide rail, link roller guide or any other surface. Another possibility that is encountered in practice is a mixture of the two.

Rolling instead of sliding.
Or rolling and sliding?
A sliding door on a cabinet mounted on rollers. Rollers are attached to the door, which in turn roll on rails. Viewed in detail, we have small locked axes on which the rollers rotate. The requirement is that the rollers rotate on their axis when the door is pushed. Everything is fine. The situation would be different if the roller did not unroll but stopped and slid over the rail instead. The door would become stiff, as the resistance would be higher. After all, the weight of the door rests on the very small contact surface between the roller and the rail and slides around on it.

Without drifting deep into the physics of rollers and rolling friction at this point, here are some helpful tips on the design of one-piece rollers made of plastic:
- Select the largest possible outer diameter with the smallest possible inner diameter
- Increase the friction between the outer diameter and the rolling surface.
- Use rollers with elastomeric bandage (e. g. TPE)

Choosing the right material
While a plain bearing is designed to carry a load applied by the shaft and to generate as little heat as possible when moving with as little friction as possible...the whole thing looks a little different in a roller application. As the bearing does not sit "comfortably" in a housing bore, which in the best case supports half the bearing circumference, only the support point on the roller track is available for a roller. So, the resulting surface pressure on the outer diameter is high. And it almost doesn't matter what material the roller is made of. The so-called "Hertzian compression" forces pretty much every material to its knees to varying degrees. The result: a flattening. The remedy: reinforcing fibres in the plastic.

U groove

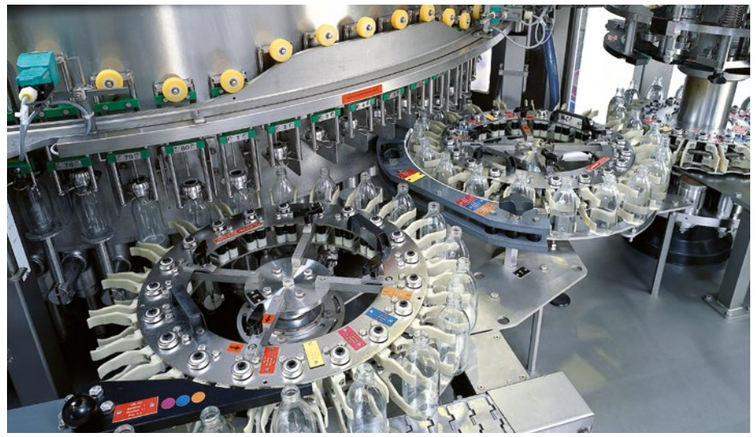


V groove

90 degree groove

Application example

Wear-resistant plastic rollers in clamping star wheels



Krones AG relies on iglidur® J rollers from igus® in filling machines

Service life doubled: newly developed two-component rollers in filling machines prove themselves in continuous operation.

The demand for packaged beverages is increasing. In order to make the handling of the different sized glass and PET bottles quick and reliable, the so-called clamping star wheels play an essential role in the complex beverages bottling lines. They are exposed to very high loads especially in the high output range. Since they have been equipped with double-component plastic rollers, their life has almost doubled.

Problem

Krones AG is one of the world's leading suppliers of beverage bottling and packaging technology. The company plans, develops and manufactures machines and complete plants for the fields of process, filling and packaging technology and material handling. Krone AG strives to find the right solution for every requirement.

Example: Inspection, filling and labelling of glass and PET bottles. Here, the so-called clamping star wheels prove their efficiency, especially in the field of inspection technology. On a carousel, the bottles are led past cameras at a high speed, which detect the condition and type of the individual bottle, as well as potential contamination. The bottles are then passed via a clamping star wheel to other areas, for example to the labelling. A PEEK rotary axis passes between the individual clamping units of the clamping star wheel, which ensures the opening and closing of the clamps by means of a control bolt. The rollers in particular used to wear out quickly here, so that system downtimes and complaints from customers became more frequent. This is problematic precisely because the clamping star wheel is highly stressed in the day-to-day operations of breweries. A clamping star wheel compensates for a diameter tolerance of 20 mm and therefore grips different bottle sizes without having to be changed. In the upper output range, up to 66,000 bottles are guided through per hour in large breweries, which equates to 66,000 opening and closing cycles per hour. In order to increase the service life of the roller, therefore, numerous attempts have been carried out with a variety of materials. Krones initially contacted various plastics suppliers, but the desired results did not materialise.

Solution

The solution to the problems came from the use of two-component rollers in the spring clips. These were jointly developed by Krones and igus® for the clamping star wheel, with the aim of significantly extending the service life.

For the inside roller, the polymer material iglidur® J was selected, which has proven itself for years in all industrial sectors of the packaging and bottling equipment. It is complemented by a TPU outer jacket.

Initial trials with rollers made of iglidur® J material first found that the coefficient of friction from the inside outwards was not big enough to permanently provide for wear-free movements on the expensive PEEK cam. Only the new double-component model with a good coefficient of friction inside and a poor friction coefficient outside led to success. The iglidur® J roller with TPU outer jacket has turned out to be the ideal solution for the requirements on site, because it rotates smoothly and above all wear-free on the axis and ensures a smooth operation. Krones no longer has any complaints and the service life is significantly extended.

Before the two-component rollers were installed in Krones' first plants, they were tested for almost a year. While orange colour was selected for the TPE outer jacket initially, this is now delivered in the corporate colour blue. The blue colour matches the machines better and also has RoHS approval, which is why these rollers have been installed since summer 2009. The tribo-optimised plastic rollers are supplied in six different installation sizes.
It has something to do with the size of the bottles and thus the opening angle of the clamps. The rollers are available for bottle diameters from 50mm to 110mm. The opening angle for a 3-litre Coke bottle, which is customary in the American market, has to be correspondingly large for effective handling. Due to the size and heaviness of the bottle "only" 20,000 bottles can be channeled per hour via the multifunction star wheel in these bottling plants.

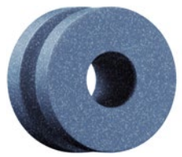
Bearing technology

Guide rollers

Guide rollers

iglidur® A180
All-rounder for food, FDA-compliant

Max. permissible surface pressure (static) **28MPa**



iglidur® A350
Endurance runner at higher temperatures in the food sector

Max. permissible surface pressure (static) **60MPa**

iglidur® H1
Endurance runner with high media resistance

Max. permissible surface pressure (static) **80MPa**

iglidur® P210
Low coefficient of friction and wear on almost every shaft

Max. permissible surface pressure (static) **50MPa**

More information on guide rollers

Submit an enquiry for your individual component

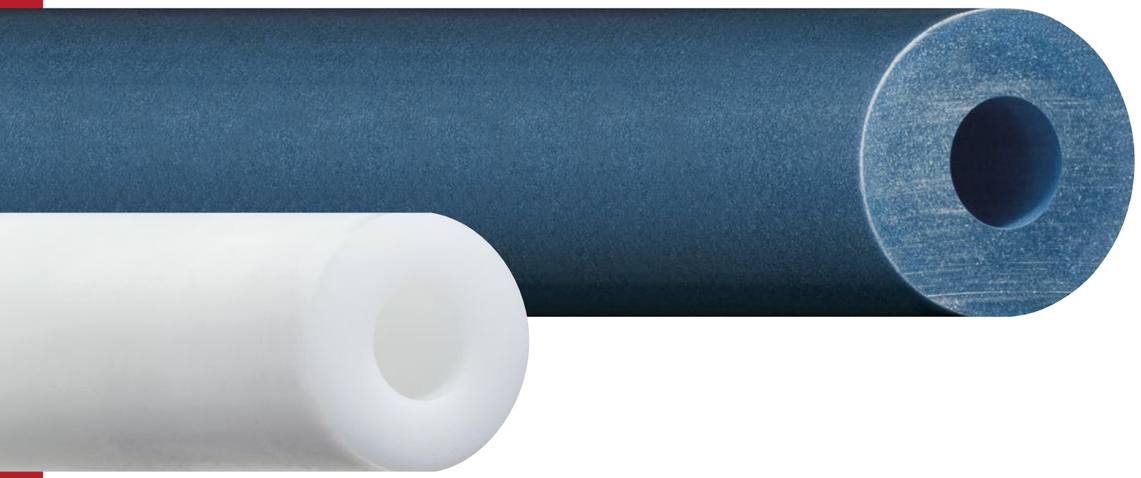
If you have the idea, we implement it! Simply upload a CAD file and describe the special features of your application.

Your data will of course be treated confidentially.

igus.eu/special-parts

iglidur® bearing technology

Knife edge rollers



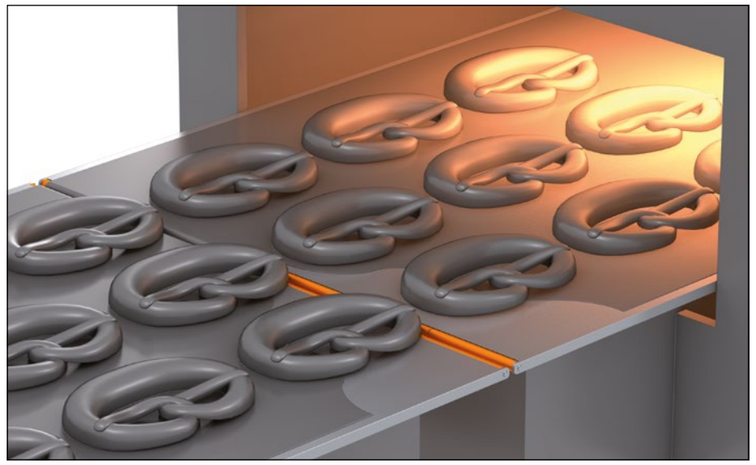
Lubrication-free rollers for rolling knife edges

With the help of the knife edge rollers from igus®, conveyor belts can be closely deflected to minimise gaps between two belts. This means that the products to be transported can be transferred safely from one belt to the next. Various standard materials cover the majority of typical application areas.

- Tight belt deflection
- Long service life
- Tested in the igus® laboratory
- Environmentally friendly, no additional lubricants needed

Introduction

Why igus® knife edge rollers?



Precise and smooth movements optimise the production process

Benefits
- Low coefficient of friction and wear on almost every shaft
- Low moisture absorption
- Wear-resistant especially up to 20MPa in pivoting applications

Typical application areas
- Vending machinery
- Beverage industry
- Textile industry
- Packaging industry
- Agricultural engineering
- Mechanical engineering

Our plastic knife edge rollers set new standards in the industry. Compared to their metal counterparts, they offer unbeatable advantages: maintenance-free, low wear and long operating times without lubrication. These specifications enable you to reduce costs and minimise downtime. This gives you more time and resources to concentrate on the essentials - your core business!

Our knife edge rollers are made from high-performance plastics that have been specially developed for demanding applications, even in difficult environments. Our iglidur® materials offer high abrasion resistance and reduce friction to a minimum.
The result? Incredibly precise and smooth movements that optimise your production processes and extend your system's service life. Whether you need linear movement, lateral guidance or a combination of both, our guide rollers offer you the flexibility and adaptability you need.

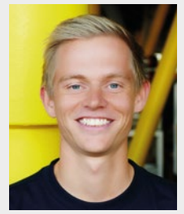
Our plastic rollers are not only durable, but also surprisingly light. This means a reduced load on your machines and improved energy efficiency. The high strength value of these rollers enables them to withstand heavy loads without compromising on performance. For applications in the food industry, we also offer our guide rollers in FDA and EU 10/2011-compliant materials, which are completely food-safe and can be detected optically and magnetically in the event of a crash or misuse of the system thanks to the industry-standard blue colour.

We also manufacture plastic guide rollers in your required design, quantity and material, as the suitable dimensions and materials are not always included in our standard product range. There are various manufacturing processes to choose from, and we will find the right one for you in a personal consultation.

Our materials undergo rigorous testing in our own state-of-the-art laboratory, where they are put through their paces under a wide range of parameters. The result? Only the best is good enough for your requirements.

We understand that every application is unique. That is why we not only offer you tried-and-tested materials, but also the option of taking special application parameters into account. Thanks to our flexible approach, we can often even carry out customised tests at short notice. Your satisfaction is what drives us, and your individual needs are at the centre of our efforts.

Rely on our expertise and years of experience to find the perfect material solution for your project. Quality, versatility and customised support - that's what we guarantee. Don't wait any longer, contact us today and let's discover the ideal material for your requirements together!



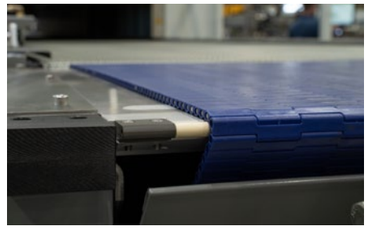
Lars Kleist
Product Manager iglidur® rollers
lkleist@igus.net

Failure-free worldwide

Plastic knife edge rollers in beverage systems

Polymer knife edge rollers at Krones AG ensure maintenance-free conveyor belts.

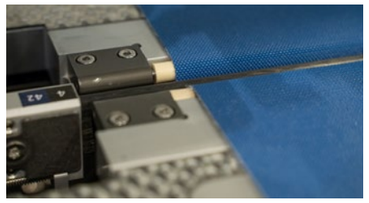
Krones AG produces systems and machines for manufacturing, filling, and packaging beverages and liquid food. The industry never sleeps. So it is hardly surprising that Krones systems have to break their own speed records again and again. It only becomes a problem when a part cannot withstand the pressure and there is no more powerful alternative. Therefore, we have developed knife edge rollers made of tribopolymers for Krones, which helped them achieve new top results.



Conveyor belt deflection

Problem

In 2005, Krones faced a challenge with Variopac Pro, a fully automatic all-round packaging system: its performance had to be increased by 20 packs per minute. Hence, there was an urgent need for action during the deflection of the conveyor belts. Originally, metal rollers with needle roller bearings had been in use here, but they couldn't meet the higher performance requirements and were cost-intensive.



Injection-moulded solid plastic rollers ensure maintenance-free conveyor belts

But there were also other technical challenges that needed to be solved. Variopac Pro packages tins and glass or PET bottles in sizes of 0.2 to 5 litres with cardboard and/or foil.

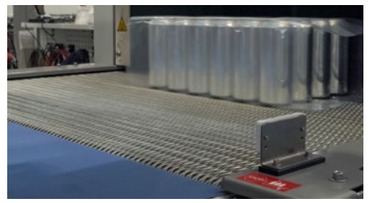
The system operates around the clock and subjects the components to a lot of stress. Furthermore, sugar particles can be found in the surroundings due to production, which have a similar effect to sandpaper on the components. And all this at conveyor belt speeds of up to 0.9m/s. Dust, sand and moisture are business as usual wherever the Variopac Pro is used. But that is not all. Right at the system's shrink tunnel, conveyor belts are continuously exposed to temperatures of up to +100°C. Despite these environmental conditions and the performance requirements, the new solution for deflecting the conveyor belts should have a service life of at least one year. The problem: at that time, there was no product that fulfilled these performance requirements.

Solution

In working with Krones AG to reach the desired result, igus® tested various approaches in its test laboratory before they were used in the Variopac Pro. The result: an injection-moulded solid plastic roller, made of a material specifically developed for this application.

The best test results were achieved with the material iglidur® P210. The iglidur® knife edge roller is characterised by its high wear resistance, a low coefficient of friction and resulting low drive power of the conveyor belts. Just like all iglidur® materials, this one is suitable for maintenance-free and lubrication-free operations. Because it can also be used in a variety of applications, this material fulfilled all requirements. When it was clear that knife edge rollers made of iglidur® P210 far exceeded the required one-year service life, Krones decided to install them in the Variopac Pro. It was a great success. According to Krones, the systems - which are used across the globe - work without failure. The iglidur® knife edge rollers operate reliably, wear is hardly noticeable.

In addition, they are easy to assemble, and the customer does not need to laboriously maintain them. Krones now installs iglidur® knife edge rollers in the Variopac Pro wherever there is a transition between two conveyor belts or plastic modular chains. Because the knife edge roller diameters are small, conveyor belts and modular chains can be deflected very close together, so the gap between two belts is very small. Even if the system operates at low speed, iglidur® knife edge rollers prevent the packages from tipping.



Variopac Pro, a fully automatic all-round packaging system from Krones AG

Bearing technology

Knife edge rollers

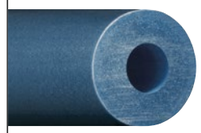
Knife edge rollers

iglidur® A180
FDA-compliant, up to +90°C

Outer diameter	**9 - 20mm**
Length	**50, 70mm**

iglidur® A250
Wear-resistant deflection, up to +90°C

Outer diameter	**9 - 16mm**
Length	**50, 70, 77mm**

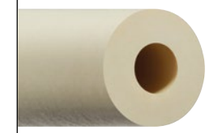


iglidur® A350
FDA-compliant, up to+180°C

Outer diameter	**9, 12, 14, 18mm**
Length	**50, 70mm**

iglidur® H1
For higher transport speeds, up to +200°C

Outer diameter	**9 - 20mm**
Length	**50, 70mm**

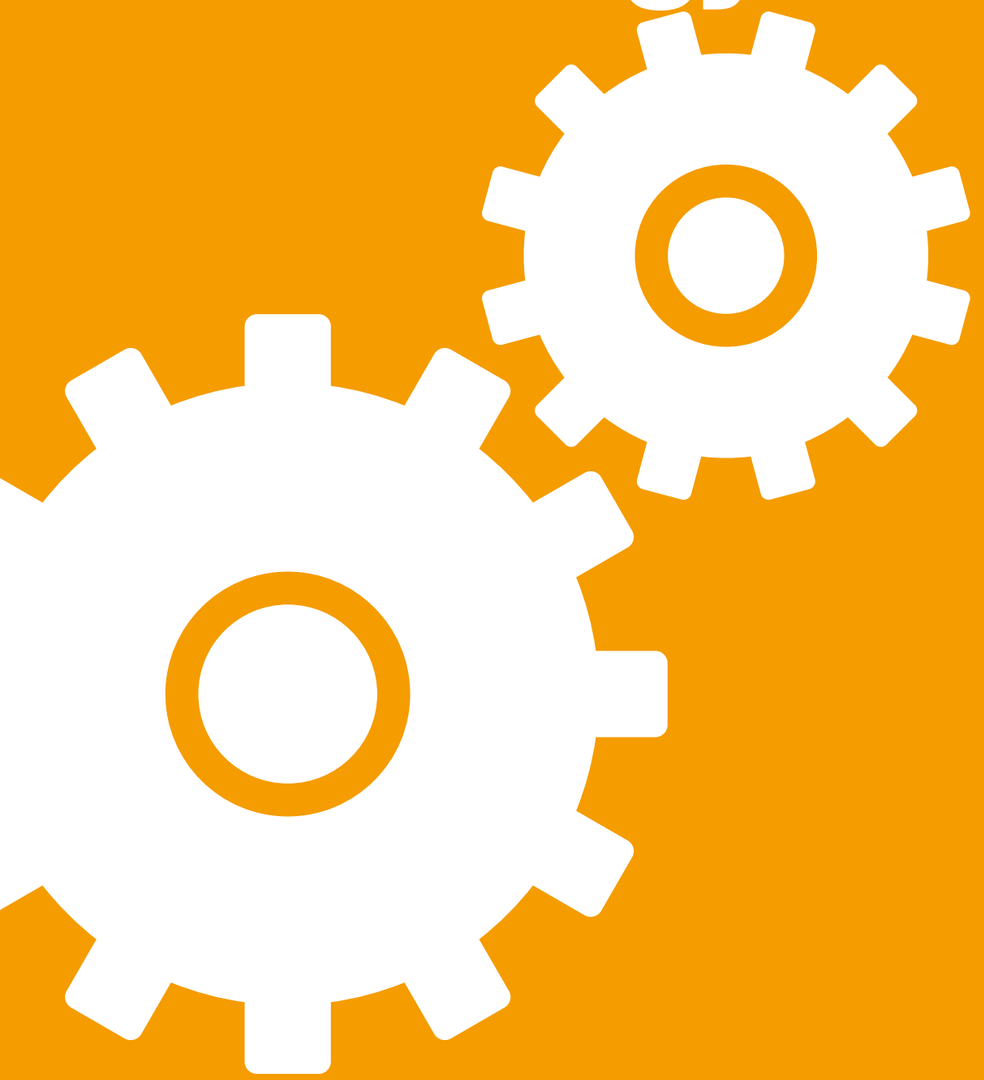


iglidur® P210
Universal, up to +100°C

Outer diameter	**9 - 20mm**
Length	**50, 70, 77mm**

dry-tech® | Lubrication-free made easy ...

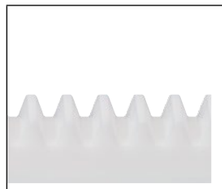
drygear® gear and gearbox technology



igus.eu/drygear

GRS-A

Spur gears



GRS-B

Gear racks

GRS-C

Bevel gears

DRG-A

drygear® modular gearbox system

DRG-B

Apiro® modular gearbox system

drygear® gear and gearbox technology

Gears and racks

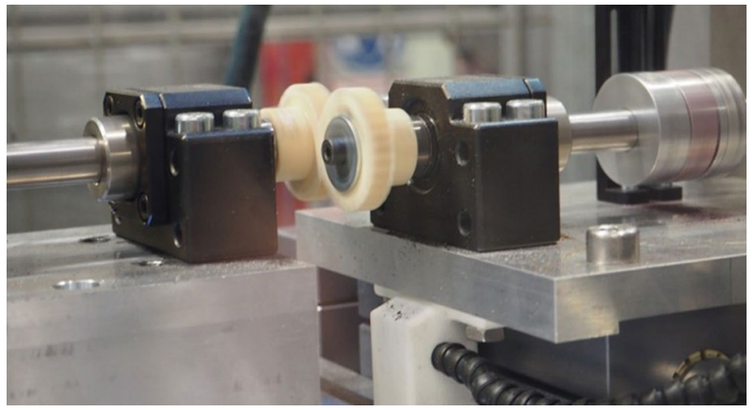
From a single part to high-volume production

The gears made of the tribologically optimised iglidur® high-performance polymers prove that a significantly longer service life is possible over gears made of commercially available plastics. Due to fine-tuned additives of reinforcement materials and solid lubricants, they do not require additional lubrication.

- High wear resistance
- Economic high-volume production
- Up to 4 times more wear-resistant than POM*
- Environmentally friendly, no additional lubricants needed

Introduction

Gears and racks made of iglidur® plastic



Gear test rig in the iglidur® laboratory

The iglidur® materials are tested in our own test laboratory thoroughly and extensively. In accordance with the parameters in your application, we provide you with free advice on the right material and manufacturing and tool technology needed to make your individual gear (toothed component) in a reliable process without obligation.

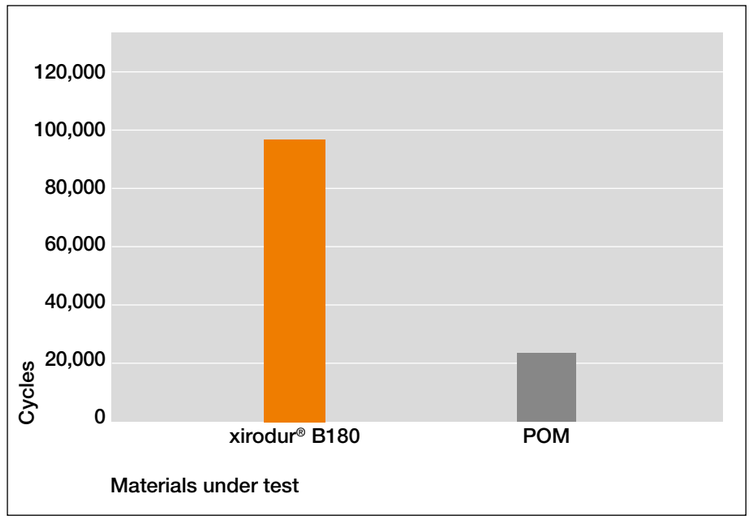
For example, torque fluctuations, efficiency and backlash of the gearboxes with polymer gears are electrically measured and evaluated.

The gathered empirical values allow for continuous optimisation of our gears and use in wear-intensive continuous application.

iglidur® gears are characterised by their special wear resistance. This extends maintenance intervals and reduces expensive downtime minutes.

You can place an order with igus® without any minimum order quantity.

***POM vs. xirodur® B180**



Average number of cycles at 200rpm and 2Nm to tooth root break.

Benefits
- Maintenance-free dry operation
- Quiet
- Corrosion-free
- Resistant to dirt

Typical application areas
- Rail industry
- Automotive industry
- Medical technology
- Food/beverage industry
- Vending machinery
- Packaging industry

Gears
8 different modules
12-150 teeth

Racks
9 different modules
250-1,000mm

Bevel gears
6 transmission ratios
7 different modules

Application example

Gears in actuators

Gears made of iglidur® materials increase efficiency and minimise noise in actuators.

Our gears have already successfully proven themselves in different applications.

The proportion of electronic or electromechanical components in vehicles has been growing steadily for years. The increased comfort and the growing safety requirements promote this development. The cable harness, which is responsible for supplying all these components, is thus the second heaviest component in many automobiles, right after the engine.

Actuators make up a large share of the elements to be supplied with power and signals. The small units convert electrical signals and impulses into mechanical movements and are responsible, for example, for actuating the throttle valve(s) when accelerating, for automatically closing boot lids and doors or shifting and positioning a seat. The areas of application are versatile, actuators can be found in all areas of the vehicle.

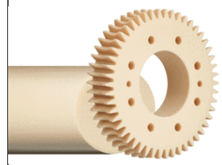
Among other things, gears with mostly complex geometries ensure the transmission of movement and power. To increase the efficiency of actuators and minimise noise, igus® has also been offering gears and gearing elements made of well-known and proven tribologically optimised iglidur® materials since the start of 2021. Thanks to the innovative formulations of the iglidur® high-performance plastics, we achieve smoother operation, lower torque and thus lower power consumption in the drive unit with improved material properties.

The aim is to eliminate the greases used in the assembly process. This is to prevent failures due to missing or incorrectly dosed grease. The manufacturing process of an actuator is simplified and less expensive.

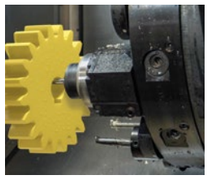
According to the parameters prevailing in your application, we provide advice about the right material and tool technology in order to give shape to your individual gear (toothed component) in injection moulding in a process-safe way. We pay particular attention to achieving the required toothing quality, because this geometric feature, in addition to the material properties, determines the quality of the actuator, especially in terms of acoustics.

Injection-moulded gears
- Manufactured from our largest possible variety of iglidur® materials
- Standard dimensions available
- Economic high-volume production

3D printed gears
- Delivery time from one to three days
- No minimum order quantity
- CAD configurator for gears and racks online



Machined gears
- Manufactured from iglidur® bar stock
- Economically efficient in the case of small to medium-sized quantities
- For high-volume gears

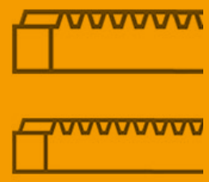


Post-processing
Our standard gears can be individually adapted to your requirements, e. g.: hole diameter, hub design, etc.

Wear-resistant polymer gears

From a single part to high-volume production

Bevel gears
Ratio: 1:1 - 1:5
Module: 1 - 3.5



Racks
Module: 0.5 - 4
Length: 250 - 1,000mm

Spur gears
Number of teeth: 12 - 150
Module: 0.5 - 3

igus.eu/gears

Spur gears

Spur gears

GRS-A-0001

iguform S270
Low moisture absorption

Temperature	**-40°C up to +90°C**
Module	**0.5 - 3**
Number of teeth	**12 - 120**

GRS-A-0002

igutek P360
Tough

Temperature	**-30°C up to +110°C**
Module	**0.5 - 3**
Number of teeth	**12 - 120**

GRS-A-0003

iglidur® S200
Long service life

Temperature	**-50 up to +90°C**
Module	**1**
Number of teeth	**20-50**

GRS-A-0004

iglidur® A500
High temperature resistance

Temperature	**-100 to +250°C**
Module	**1**
Number of teeth	**20-40**

GRS-A-0005

iglidur® F
High wear resistance

Temperature	**-40 up to +140°C**
Module	**1**
Number of teeth	**20-40**

GRS-A-0006

xirodur® B180
Low-cost material for high-volume production

Temperature	**-40°C up to +90°C**
Module	**1**
Number of teeth	**20-50**

GRS-A-0007

iguform A270
FDA- and EU10/2011-compliant

Temperature	**-40°C up to +90°C**
Module	**0.5 - 3**
Number of teeth	**12 - 120**

Tolerances for plastic gears
The hole diameters d1 for cylindrical gears made of plastic are reamed. It should be noted that due to the behaviour of the material, as well as temperature influences, the holes of the gears may change by 0.02-0.04. The tolerance for the bore diameter d1 is given as H10.

Combination of plain bearings and gears

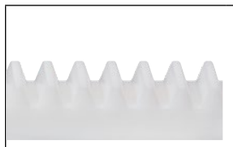
Smooth operation and high strength

In the inner diameter, an insert made of iglidur® H1 ensures the best tribological behaviour, while our proven xirodur® B180 provides the necessary strength in the tooth profile.

- Good coefficient of friction in the inner diameter combined with high tooth strength
- No additional assembly steps necessary due to overmoulding
- Tested in the igus® test laboratory
- Environmentally friendly, no additional lubricants needed

Gear racks and bevel gears

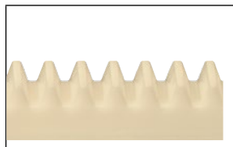
Gear racks



GRS-B-0001

iguform S270
Low moisture absorption

Temperature	-40°C up to +90°C
Module	0.5-4
Length	250-1,000mm



GRS-B-0002

igutek P360
Tough

Temperature	-30°C up to +110°C
Module	0.5 - 3
Length	250mm

GRS-B-0003

xirodur® S180
Gear rack elements

Temperature	-40°C up to +100°C
Module	1
Length	variable

GRS-B-0004

Assembly tool
Fast assembly process. Support in assembling the rack elements.

Bevel gears

GRS-C-0001

iguform S270
Low moisture absorption

Temperature	-40°C up to +90°C
Module	0.5-3.5
Transmission	1:1-1:5

GRS-C-0002

igutek P360
Tough

Temperature	-30°C up to +110°C
Module	0.5-3.5
Transmission	1:1-1:5

Gear checklist for enquiries

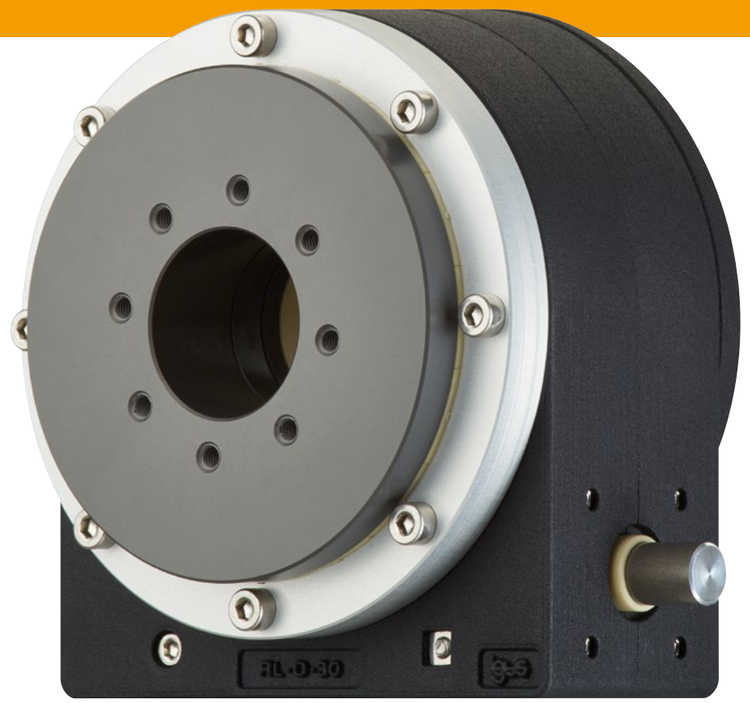
Do you need gears with special geometries?

We have many different ways of manufacturing the exact gear you need. We are happy to advise you regarding the most technically and economically efficient manufacturing method and will also recommend the suitable plastic material.

igus.eu/gear-special-parts

drygear® gear and gearbox technology

Plastic gearbox



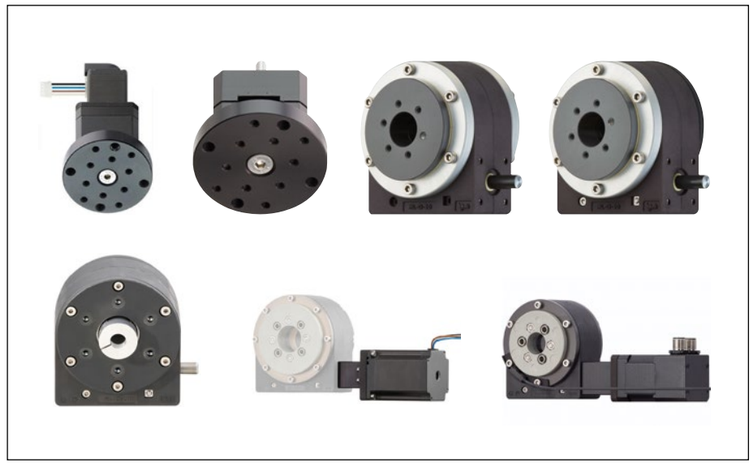
Gearbox made of plastic - lightweight and low-wear

In a lot of applications, gearboxes are the link between manual operation or a motor and a machine part that is to perform a planned movement. The advantage of drygear® gearboxes is that they are made of high-performance plastic. This makes them lubrication-free, lightweight and impact-resistant.

- The gearboxes do not require any external lubricants and are therefore insensitive to dirt
- Production with injection moulding or 3D printing guarantees cost efficiency
- 50 in-house drygear® test rigs are available for individual customer tests
- There is no need for external lubricants

Introduction

Versatility for efficiency



Our drygear® gearboxes made of high-performance plastic: lubrication-free, lightweight and shock-resistant

Benefits
- Maintenance-free in dry operation
- Particularly lightweight thanks to motion plastics®
- Up to 100kg payload
- With or without motors
- Different transmissions available
- With or without self-locking feature
- Backlash 0.5°

Typical application areas
- Automation, such as rotary axes
- Measuring stations
- Positioning

The world of igus® gearbox technology
Gearbox technology is all about adapting the speed and torque of motors so that they fulfil the specific requirements of machines and processes.

Our innovative drygear® gearboxes made of high-performance plastic are the answer to these challenges. They are lubrication-free, lightweight and resistant to impacts. All igus® plastic gearboxes have a modular design, which means that they can be expanded and integrated into existing systems.

These specifications make drygear® gearboxes particularly attractive for various applications. They are often used in robotic systems for quality control and sorting. Furthermore, they are ideal for rotary axes, sliding applications, pusher systems and format adjustments.

Our gearboxes offer the perfect solution for a wide range of automation processes.

Strain wave gear:
Compact, quiet and efficient. Ideal for precise motion transmission.

Apiro® modular gearbox system:
Modular and customisable for individual requirements. Lightweight construction for a wide range of applications.

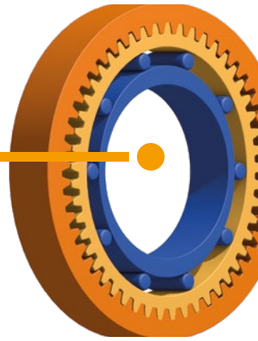
Worm gear:
Robust and durable, for applications with high torque. Wide transmission ratio range can be realised in a single stage (4:1 - 70:1).

Rotary axis with motor:
Compact and easy to install, enables 360° movement.

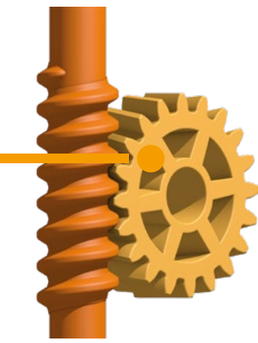
Planetary gearbox:
Compact design and very high efficiency.

Our different versions reflect the range of application areas. From precise movements in robots, push movements in industrial manufacturing or automation to high torque, our drygear® gearboxes offer solutions that fit seamlessly into your individual processes.

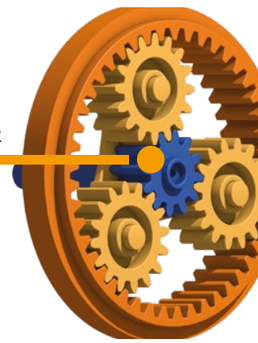
Strain wave gear



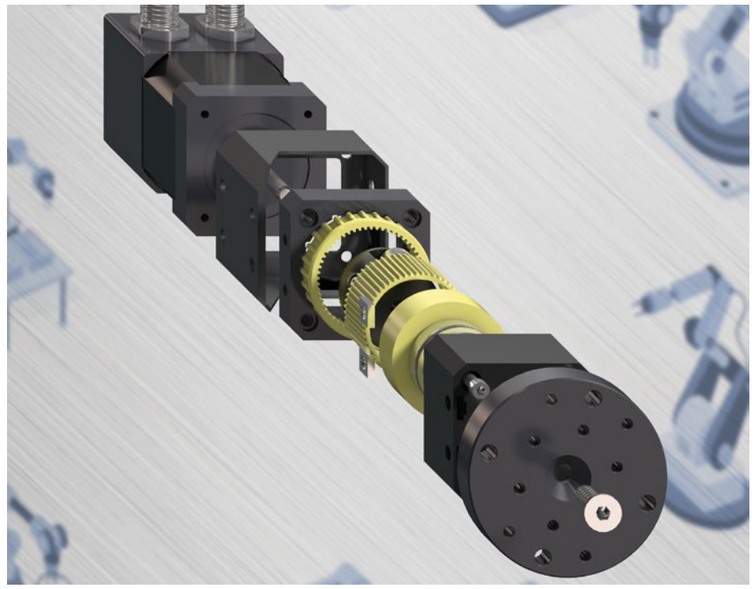
Worm gear



Planetary gearbox



Gearboxes made of plastic: reliable and maintenance-free



Compact plastic strain wave gear, prepared for stepper motors with installation size NEMA17

The igus® drygear® gearboxes also offer a number of advantages that make them an attractive choice for a wide range of applications:

1. Versatile areas of application:
From automation and robotics to medical technology – drygear® gearboxes can be used in various industries.

2. Lightweight construction:
The use of motion plastics® enables an ultra-lightweight design, which reduces energy consumption and loads.

3. Long service life:
Thanks to the engineering plastics, drygear® gearboxes are low-wear and offer a long service life, which minimises maintenance work and downtime.

4. Resistance to corrosion:
Plastics are insensitive to moisture and corrosive environments, which increases the service life of the gearboxes.

5. Modularity:
The modular Apiro® gearbox system allows for a flexible configuration and customisation to individual requirements.

6. Cost efficiency:
The ability to replace individual components as required reduces the total cost of ownership.

7. Resistance to dirt:
The lubrication-free design protects the gearboxes from failure due to contamination and enables use in demanding environments, as dirt does not adhere to the grease.

8. Easy installation:
Due to their design, drygear® gearboxes are easy to install and save time.

9. Energy efficiency:
The low friction of the plastics contributes to improved energy efficiency.

10. Precise motion transmission:
The high-quality materials and manufacturing processes guarantee precise, corrosion-free and reliable motion transmission.

DRG-A-0009

Worm gear
- Robust and long-lasting
- Areas of application: high torque, slow movement, secure position holding
- Suitable for: conveyor technology, robotics, lifting systems, swivel drives

DRG-A-0023

Rotary axis with motor
- Compact and easy to install
- Areas of application: applications with 360° movement
- Suitable for: rotary table for installation applications, camera panning in photography

DRG-A-0006

Planetary gearbox
- High transmission ratios
- Areas of application: high torque in a compact design
- Suitable for: CNC machines, robotics, packaging machines

DRG-A-0002

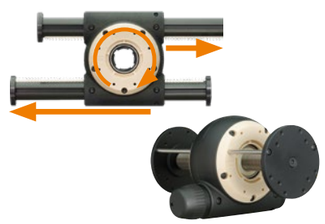
Strain wave gear
- Compact, quiet and efficient
- Areas of application: precise motion transmission, low torques
- Suitable for: small robot arms

When do I use which gearbox?

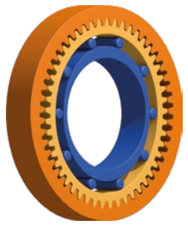
Choosing the right gearbox type depends on the specific requirements and areas of application. Below, you will find a general overview of when to use which type of gearbox:

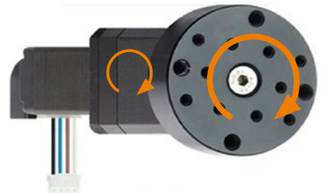
Worm gear
- Robust system and therefore insensitive to external influences and load peaks, such as impacts on the drive/output
- Particularly wide range of transmission ratios up to 70:1

Linear actuators
- Different transmissions available
- Power transmission from rotary to linear
- Racks or lead screw actuators



Strain wave gear
- Torque increase due to plastic strain wave gear
- Transmission 28:1
- Precise motion transmission, high torque, light weight





Planetary gearbox
- Transmission: 4:1 / 16:1
- Robust system and therefore insensitive to external influences and load peaks
- Particularly smooth operation
- Torque transmission from motor to planetary gearbox

Bevel gear
- Bevel gear torque transmission ratio 1:1

Angular gearbox
- Tooth module 1
- 5 transmission ratios from 1:1 to 5:1
- Customised adjustment of the direction of movement
- For restrictions and special challenges in the available installation space

Modular gearbox system

Strain wave gears

RL-S-17-28-AA-N11-00
drygear® strain wave gear, installation size 17 with NEMA 11 motor

Max. tightening torque	0.8 Nm
Max. speed	25rpm

RL-S-17-28-AA-N17-00
drygear® strain wave gear, installation size 17 with NEMA 17 motor

Max. tightening torque	3Nm
Max. speed	21rpm

RL-S-17-28-AA
drygear® strain wave gear, installation size 17

Max. tightening torque	3Nm
Max. speed	35rpm

RL-S-17-28-AA-01
drygear® strain wave gear, installation size 17 with drive shaft

Max. tightening torque	3Nm
Max. speed	35rpm

RL-S-17-IK-01
Proximity switch kit for drygear® strain wave gear

Kind of output	PNP
Connection	M8

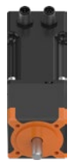
Planetary gears

RL-P-17-4-AA
drygear® planetary gearbox, installation size 17

Max. tightening torque	3Nm
Max. speed	100rpm

DG-PLI-56-AD-AST
drygear® planetary gearbox, installation size 23

Max. tightening torque	6Nm
Max. speed	100rpm



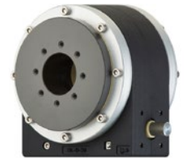
DG-PLI-56-AD-AST-ST56-020-MC
drygear® planetary gearbox with stepper motor

Max. tightening torque	6Nm
Max. speed	100rpm

Worm gear **symmetric**

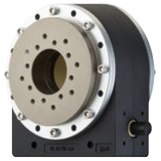
RL-D-20-101-38-01033
drygear® PRT worm gear, installation size 20, symmetric

Max. tightening torque	5Nm
Max. speed	12rpm



RL-D-30-102-50-01035
drygear® PRT worm gear, installation size 30, symmetric

Max. tightening torque	10Nm
Max. speed	9rpm



RL-D-50-101-48-01033
drygear® PRT worm gear, installation size 50, symmetric

Max. tightening torque	25Nm
Max. speed	6rpm

RL-D-20-105-38-010BB
drygear® BB worm gear, installation size 20, symmetric

Max. tightening torque	5Nm
Max. speed	12rpm

RL-D-30-105-30-010BB
drygear® BB worm gear, installation size 30, symmetric

Max. tightening torque	10Nm
Max. speed	9rpm

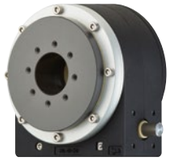
RL-D-50-105-38-010BB
drygear® BB worm gear, installation size 50, symmetric

Max. tightening torque	25Nm
Max. speed	6rpm

Worm gear **asymmetric**

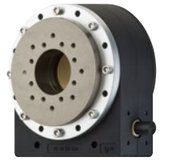
RL-D-20-102-38-01035
drygear® PRT worm gear, installation size 20, asymmetric

Max. tightening torque	5Nm
Max. speed	12rpm



RL-D-30-102-30-01035
drygear® PRT worm gear, installation size 30, asymmetric

Max. tightening torque	10Nm
Max. speed	9rpm



RL-D-50-102-48-01035
drygear® PRT worm gear, installation size 50, asymmetric

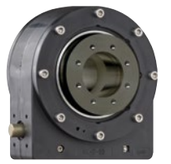
Max. tightening torque	25Nm
Max. speed	6rpm

RL-D-20-106-38-010B5
drygear® BB worm gear, installation size 20, asymmetric

Max. tightening torque	5Nm
Max. speed	12rpm

RL-D-30-106-30-010B5
drygear® BB worm gear, installation size 30, asymmetric

Max. tightening torque	10Nm
Max. speed	9rpm



RL-D-50-106-48-010B5
drygear® BB worm gear, installation size 50, asymmetric

Max. tightening torque	25Nm
Max. speed	6rpm

Modular gearbox system

drygear® robot joints

RL-D-20-103-38-010K5-08
drygear® D robot joint,
installation size 20, gearbox version

Max. tightening torque	**5Nm**
Max. speed	**12rpm**

RL-D-30-103-50-010K5-10
drygear® D robot joint,
installation size 30, gearbox version

Max. tightening torque	**10Nm**
Max. speed	**9rpm**

RL-D-50-103-48-010K5-14
drygear® D robot joint,
installation size 50, gearbox version

Max. tightening torque	**25Nm**
Max. speed	**6rpm**

RL-D-30-102-70-K0128
drygear® worm gear,
installation size 30

Max. tightening torque	**5Nm**
Max. speed	**9rpm**

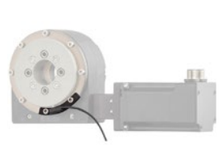
Worm gear accessories

RL-D-20-MK-C-N17-000
drygear® D, stepper motor kit

Holding torque	**3.5Nm**
Nominal voltage	**24V**

RL-D-30-MK-C-DC03-04
drygear® D, DC motor kit

Holding torque	**1.8Nm**
Nominal voltage	**24V**



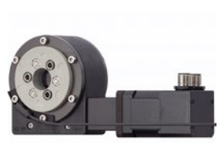
RL-D-20-IK-001
Proximity switch kit for
drygear® RL-D worm gear

Voltage	**24V**
Gearshift	**PNP**

RL-D-20-MK-C-N17-NM
drygear® D coupling housing

Motor size	**NEMA17 to NEMA24**

Turntable with motor

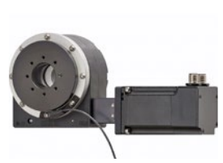


RL-D-20-A0206
drygear® D, rotary axis with
stepper motor,
RL-D-20-A0206 module

Max. tightening torque	**5Nm**
Max. speed	**12rpm**

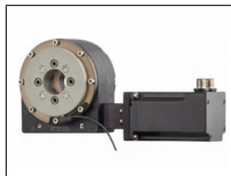
RL-D-20-A0202
drygear® D, rotary axis with
DC motor, RL-D-20-A0202 module

Max. tightening torque	**5Nm**
Max. speed	**6rpm**



RL-D-30-A0171
drygear® D, rotary axis with
stepper motor,
RL-D-30-A0171 module

Max. tightening torque	**10Nm**
Max. speed	**9rpm**



RL-D-30-A0207
drygear® D, rotary axis with
stepper motor,
RL-D-30-A0207 module

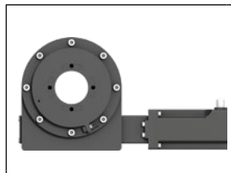
Max. tightening torque	**10Nm**
Max. speed	**9rpm**

RL-D-30-A0203
drygear® D, rotary axis with
DC motor, RL-D-30-A0203 module

Max. tightening torque	**10Nm**
Max. speed	**5rpm**

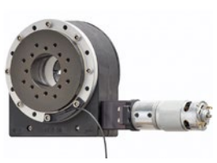
RL-D-50-A0129
drygear® D, rotary axis with
stepper motor,
RL-D-50-A0129 module

Max. tightening torque	**25Nm**
Max. speed	**6rpm**



RL-D-50-A0210
drygear® D, external rotary axis,
RL-D-50-A0210 module

Max. tightening torque	**25Nm**
Max. speed	**6rpm**



RL-D-50-A0204
drygear® D, rotary axis with
DC motor, RL-D-50-A0204 module

Max. tightening torque	**20Nm**
Max. speed	**5rpm**

Angular gearbox

iguform S270
Low moisture absorption

Temperature	**-40°C up to +90°C**
Transmission	**1:1-1:5**

igutek P360
Tough

Temperature	**-30 up to +90 °C**
Transmission	**1:1-1:5**

drygear® gear and gearbox technology

Apiro® modular gearbox system

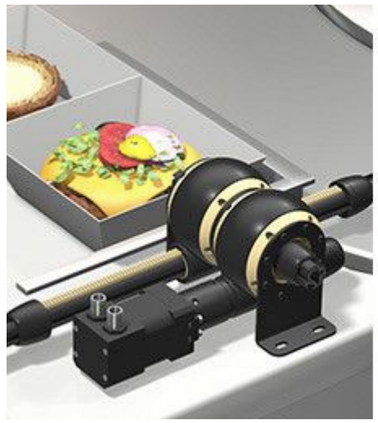
Apiro® gearbox solutions

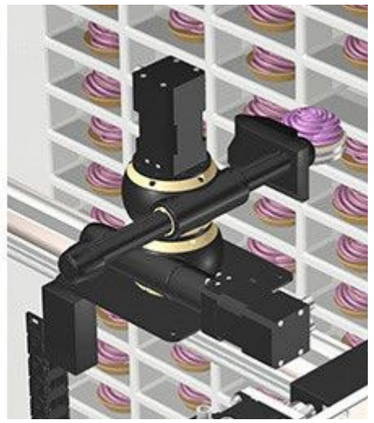
The modular gearbox Apiro® offers a wide range of products based on the combination of various drive and output gearbox designs. In addition to the version with bevel gear or worm gear in various reductions, the configuration as a linear gearbox is a key strength of the modular system. With Apiro®, rotating movements are possible – either self-locking by means of configuration with a lead screw or not self-locking as a gear rack. A wide range of accessories rounds off the overall system. Thanks to the modular design and the simple connection of all individual components, an infinite number of applications can be realised quickly and, above all, cost-effectively. Hence the name: "Apiro" is the Greek word for "infinite". Apiro® can also be used to implement special solutions quickly and inexpensively.

- High flexibility to design your application so that it meets your requirements exactly
- Thanks to its modularity, you can expand an existing Apiro® system at any time
- Tested in our test laboratory for gearboxes
- No external lubrication

Hours become minutes - minimise set-up times with Apiro®

Synchronised format adjustment - a variety of cost-saving solutions





Cranking once instead of screwing ten times

The benefits at a glance
Whether manual or motorised drive - thanks to the Apiro® format adjustment, you save money with every future changeover process. Another important advantage is that due to the position indicators attached to the drive or proximity switches for the motorised drive, you are able to easily document and replicate the perfect lane width setting. Thanks to the infinitely variable adjustment, there is no time for readjustment and the products are guided safely. The self-lubricating Apiro® gearbox promises a fast ROI and can also be easily and quickly integrated into existing systems.

igus.eu/apiro-format-adjustment

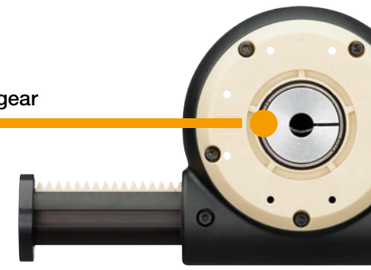
Introduction/problem/field of application
Every day, billions of containers are transported and processed in expensive and complex packaging machines. A large part of the handling takes place fully automatically and without disruptions. And yet costly machine downtimes due to set-up times are not rare. In times of a growing number of variants and ever shorter production cycles, the flexible adaptation of the machines to new series is becoming increasingly important. In addition to minimising downtime, the focus is on making production more flexible with high process reliability. One reason for lengthy set-up times is the large number of adjustment points on long production lines. Many wing screws often have to be adjusted manually. This takes time and often requires the readjustment of individual screws along the line. igus® GmbH offers solutions for this problem - also for retrofitting on existing machines.

Motorised or manual drive - synchronised rack gears
Are you looking for a solution to change the format of your products? Then the use of Apiro® rack gears is a cost-effective and flexible option. In this structure, several rack gears move in parallel and thus laterally adjust the width of their transport lanes. The rack gears are synchronised via a continuous drive shaft. Thanks to the integrated coupling, it can be connected to the drive shaft in just one movement. Another advantage of this system: the shaft can be driven both by a motor and manually via an Apiro® worm gear.

Robust solution with self-locking
Do you transport heavy products in your system, or do you expect large forces against the railings of your system? These requirements often arise when handling bottles and require a robust system. The Apiro® modular gearbox system offers several solutions here as well. To implement lateral adjustments, the Apiro® lift/push drive is connected in series. The centric and synchronous adjustment of one or more lanes from above is made possible by synchronising drylin® linear axes with a built-in R/L spindle. Both systems are particularly robust due to their self-locking. Forces arising from potential jamming are absorbed directly on the railing and are not passed on to the drive shaft. The systems are usually driven by motors.

Worm gear

Rack gear



Bevel gear

Apiro® modular gearbox system

Worm gears

RL-A10.0204
drygear® Apiro gearbox with coupling

Max. tightening torque	2.5 Nm
Max. speed	80rpm

RL-A10.0183
drygear® Apiro® gearbox for connecting linear axes

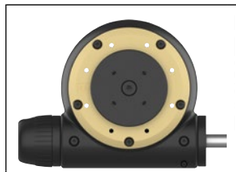
Max. tightening torque	2.5 Nm
Max. speed	80rpm

RL-A10.0194
drygear® Apiro, connection to dryspin® lead screws

Max. tightening torque	2.5 Nm
Max. speed	80rpm

RL-A10.0114
drygear® Apiro gearbox with turntable

Max. tightening torque	2.5 Nm
Max. speed	80rpm



RL-A10.0211
drygear® Apiro® gearbox with turntable on both sides

Max. tightening torque	2.5 Nm
Max. speed	80rpm

RL-A10.0106
drygear® Apiro® gearbox with hollow shaft

Max. tightening torque	2.5 Nm
Max. speed	80rpm

RL-A10.0129
drygear® Apiro® gearbox with manual clamp, position indicator and hand wheel

Max. tightening torque	2.5 Nm
Max. speed	80rpm

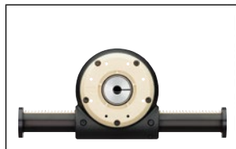
RL-A18.0101
drygear® Apiro®, lift/push drive

Force	250N
Feed rate	5mm/s

RL-A10.0111
drygear® Apiro® gearbox with manual clamp and position indicator

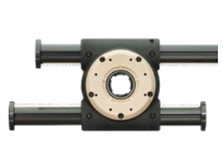
Max. tightening torque	2.5 Nm
Max. speed	80rpm

Rack gears



RL-A14.0114.3
drygear® Apiro® rack gears with coupling

Force	50N
Feed rate	500mm/s



RL-A15.0100.3
drygear® Apiro® rack gears with double axis

Force	50N
Feed rate	500mm/s

RL-A16.0102.3
drygear® Apiro® rack gear with planetary gearbox

Force	25N
Feed rate	500mm/s

RL-A14.0107.3
drygear® Apiro® rack gears

Force	50N
Feed rate	500mm/s

Bevel gears

RL-A22.0101
drygear® Apiro® bevel gears 1:1 for connection to linear axis

Max. tightening torque	1Nm
Max. speed	80rpm

RL-A22.0100
drygear® Apiro® bevel gear 1:1

Max. tightening torque	1Nm
Max. speed	80rpm

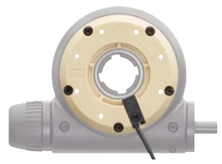
Accessories

RL-A51.0117
drygear® Apiro® motor kit DC motor

Holding torque	1.8Nm
Nominal voltage	24V

RL-A51.0101
drygear® Apiro® stepper motor

Holding torque	3.5Nm
Nominal voltage	24-48V

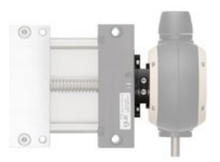


RL-A52.0100
drygear® proximity switch kit for Apiro® gearbox

Voltage	24V
Gearshift	PNP

RL-A52.0101
drygear® proximity switch kit for Apiro® rack gears

Voltage	24V
Gearshift	PNP



RL-A54.0121
drygear® adapter for Apiro® connection to drylin® SLW, SHT

Material	Aluminium
Diameter	8-14mm

Apiro® modular gearbox system

RL-A54.0100
drygear® Apiro® vertical assembly option, flange

Material	**Steel sheet powdered**

RL-A54.0103
drygear® Apiro® horizontal assembly option, plate

Material	**Steel sheet powdered**

RL-A400.0100.XXX
drygear® Apiro® multi-functional profile

Diameter	**20mm**
Length	**up to 3,000mm**

RL-A400.0106.XXX
drygear® Apiro® multi-functional profile

Diameter	**20mm**
Length	**up to 3,000mm**

RL-A420.0108.500
drygear® Apiro® flexible shaft

Diameter	**8mm**
Length	**up to 2,000mm**

SHT-HR-8-80-75-FG
drylin® hand wheel

Various outer diameters and handle types possible

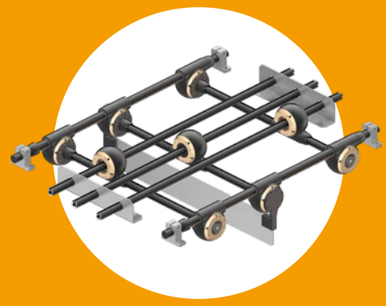
Modular kits

RL-A starter kit
drygear® Apiro® starter kit

RL-A9.0200
Robotics kit of the Apiro® modular gearbox system for educational institutions

Apiro® iDeas

Simply recreate ideas for automation systems



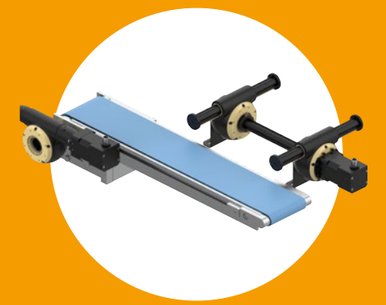
Lane adjustment

Our "Apiro®" gearbox system for a wide variety of kinematic elements and superstructures was named after the Greek word for "infinite". This allows individual applications to be implemented in an modular and cost-effective manner.

Curve adjustment

Typical areas of application are

- Lane adjustments
- Pusher tasks
- Gearbox with different ratios
- Rotary tables and rotary axes



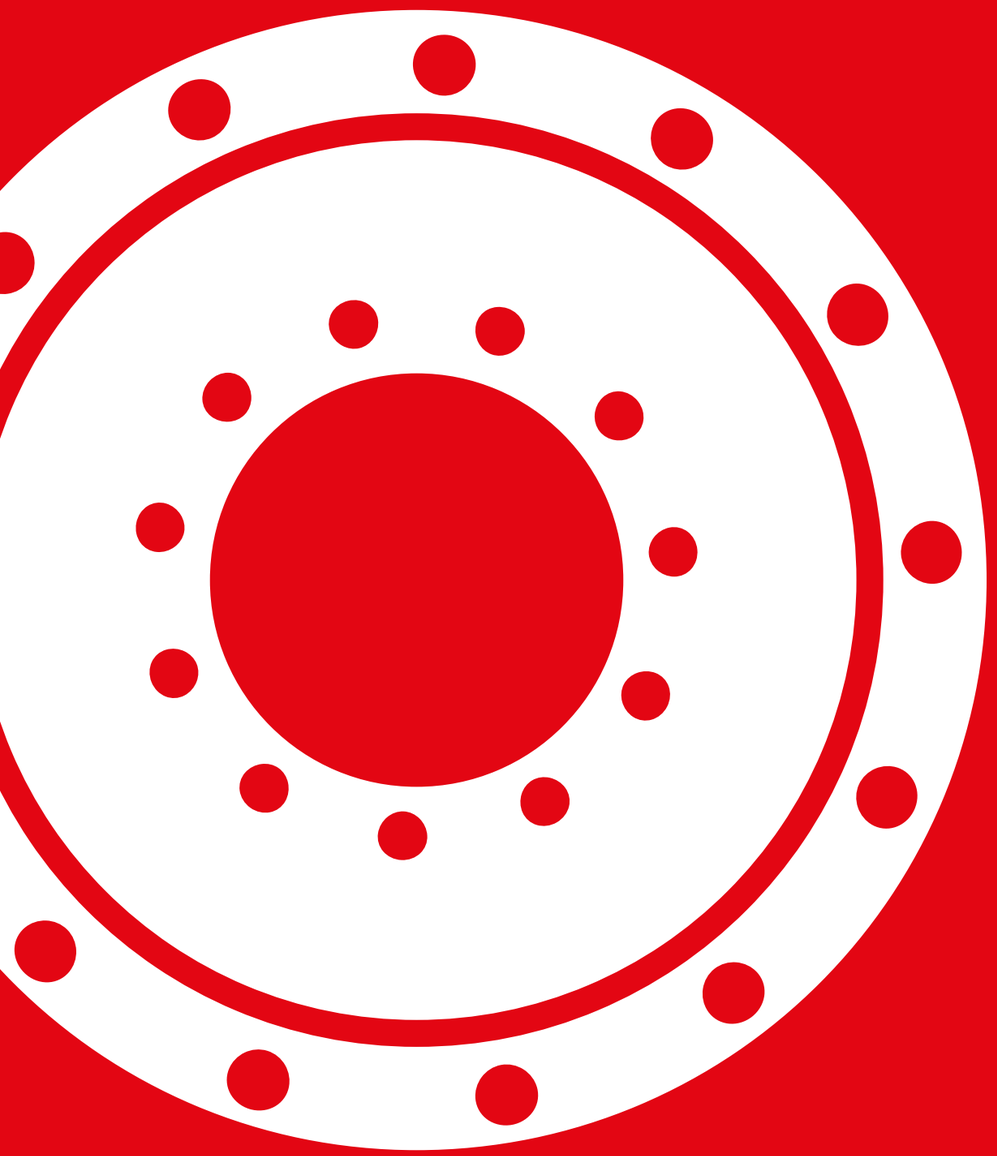
Apiro® in conveyor technology

Height adjustment

igus.eu/apiro-ideas

dry-tech® | Lubrication-free made easy ...

iglidur® slewing ring bearings



igus.eu/prt

PRT-A

Type 01
Standard

PRT-B

Type 02
Lightweight

PRT-C

Type 03
Low-cost

PRT-D

Type 04
Low profile

PRT-E

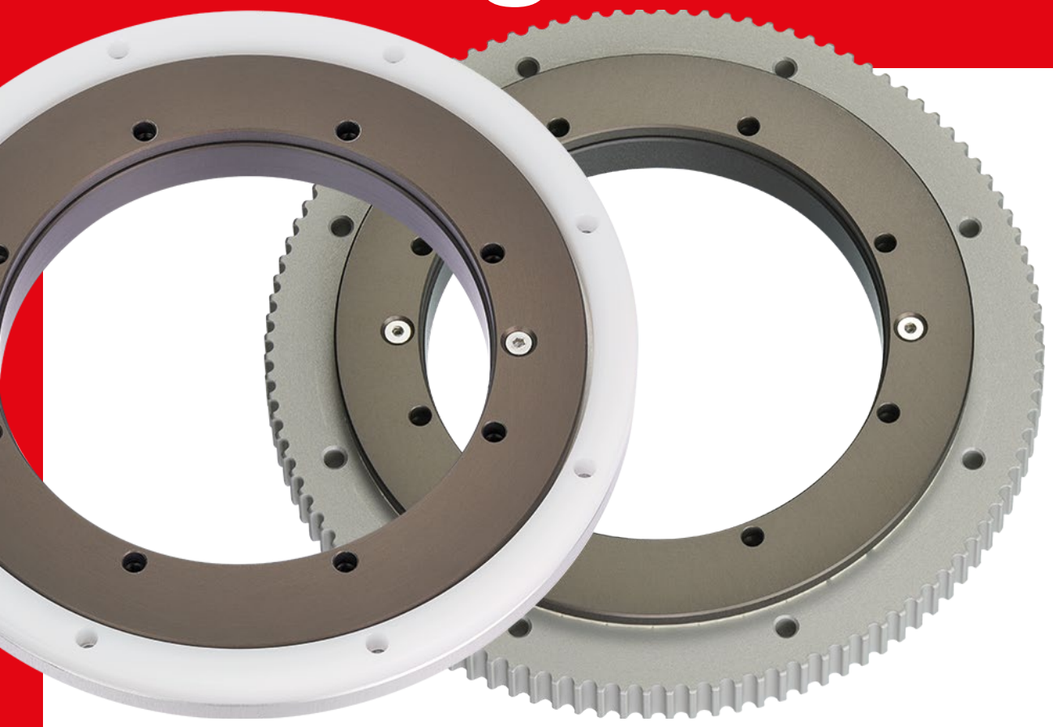
Type 05
Solid plastic

IGU-L

Accessories

iglidur® bearing technology

Slewing ring bearings

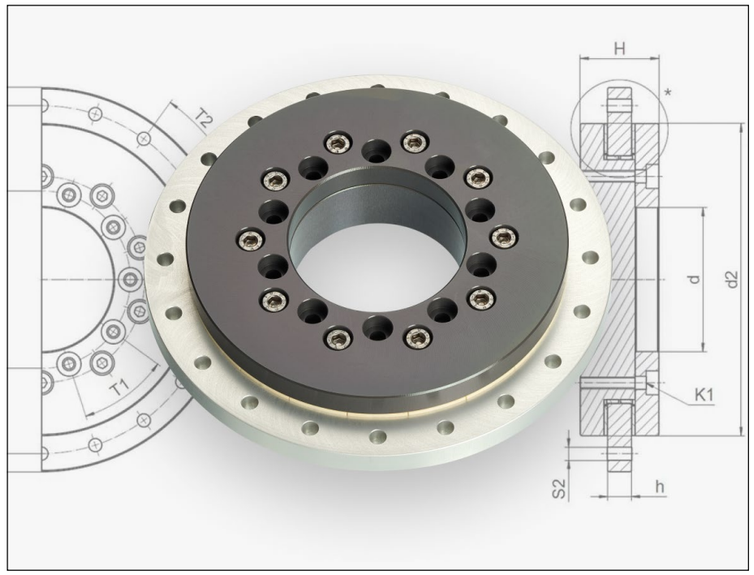


Plastic PRT slewing rings - maintenance-free and robust

iglidur® PRT slewing rings are ready-to-install bearings for lubrication-free dry operation. The design is not based on re-circulating components, but on maintenance-free sliding elements made of tribologically optimised iglidur® materials and rings made of lightweight anodised aluminium, stainless steel or solid plastic.

- Varied product range and durable material combinations
- Ready-to-install complete solution, replaceable sliding elements
- Tested in the igus® laboratory for load and wear
- Environmentally friendly, no additional lubricants are needed - igus® supports the circular economy of plastics and is investing in chemical recycling

Precise movement control and consistent



Benefits
- Completely maintenance-free and lubrication-free
- Ready-to-install and easy to assemble
- Replaceable sliding elements
- Various outer and inner drive tooth profile
- Angle stop, snap mechanism, and much more
- High wear resistance
- For high loads, high rigidity
- Stainless steel versions available

Typical application areas
- Material handling and automation technology
- Stage and lighting technology
- Furniture construction
- Medical industry
- Assembly stations

Perfect performance in lubrication-free dry operation

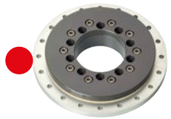
The iglidur® PRT slewing ring bearings were developed for smooth, lubrication-free dry operation to fulfil the highest demands in a wide range of applications. Thanks to their innovative design, for example made of aluminium, stainless steel or even solid plastic, the iglidur® PRT slewing ring bearings offer an impressive combination of versatility, performance and durability.

In contrast to conventional bearings, which are often based on re-circulating components, the iglidur® PRT slewing ring bearings rely on sliding elements made of high-performance polymers. These materials were specially developed to offer outstanding performance even under extreme conditions such as high temperatures, humidity, chemical exposure and even in the food sector. This opens up a wide range of applications in which conventional bearing solutions reach their limits.

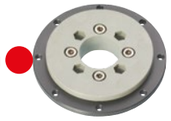
The lubrication-free design of the iglidur® PRT slewing ring bearing not only reduces the maintenance, but also offers a high resistance to dirt and dust. This makes them an ideal choice for demanding environments where continuous maintenance is not practical. Thanks to their ingenious design, these bearings offer a remarkable service life.

The focus on technological innovation, precise design and sophisticated material science makes the iglidur® PRT slewing ring bearings a reliable solution for various industries. Whether in robotics, automation, mechanical engineering or other applications - these bearings not only offer a high level of functionality, but also optimum adaptability to the individual requirements of each situation.

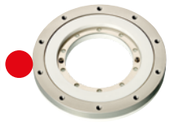
Type 01
High torsional rigidity



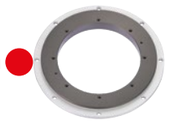
Type 02
Lightweight



Type 03
Cost-effective



Type 04
Compact, lightweight and cost-effective



Type 05
Low cost made of solid plastic

Extensive accessories
Special geometries and accessories

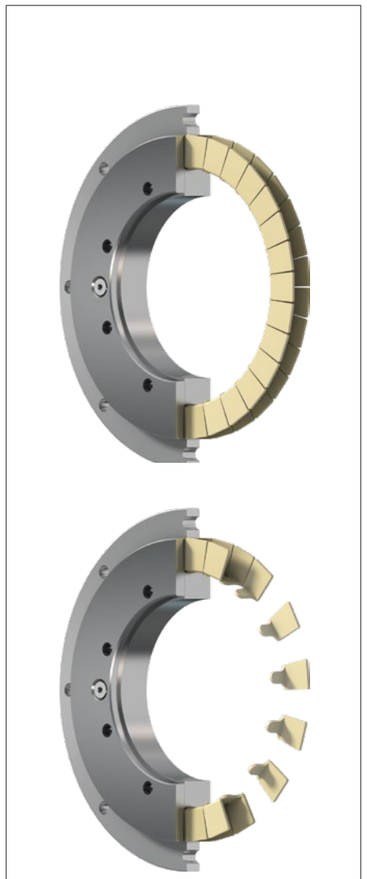
Universal sliding elements
Customise your own slewing ring system

Discover numerous possibilities

The iglidur® PRT system

The broad and versatile product range of iglidur® PRT slewing ring bearings, which covers various application areas, is at the centre of attention.

The slewing ring bearings offer many specifications and options that guarantee flexibility to meet even special challenges.



Structure of a PRT using the example of PRT-04

The iglidur® PRT slewing ring bearings are designed to fulfil your specific requirements. With the ability to customise your application, you get a tailor-made solution that is perfectly suited to your project.

The bearings are available in various outer and inner drive ring designs, which enables precise movement control and ensures smooth interaction with other components in your system.

The iglidur® PRT slewing ring bearings can also be equipped with a variety of additional functions, including angle stops, detent functions and other customised and tailored options. This gives your applications an additional dimension of versatility.

The slewing ring bearings are supplied as a ready-to-install complete solution and are easy to install. This simple integration into your systems saves time and costs, which in turn increases the efficiency of your projects.

The freedom from maintenance and lubrication of the iglidur® PRT slewing ring bearings is a great advantage. This specification minimises maintenance and servicing requirements and ensures long-lasting, reliable performance without the need for regular checks.

With a large selection of eight sizes in total, the product range covers a wide spectrum of applications. From small, precise systems to large industrial applications, the iglidur® PRT slewing ring bearings offer the right size for every challenge.

The iglidur® PRT slewing ring bearings are not just simple components. They are essential components that bring seamless movement, precision and durability to your applications. The product range combines flexibility, functionality and adaptability to meet the diverse requirements of modern industrial environments.

Standard
Polymer slewing rings

Tooth profile
Polymer slewing rings with gear teeth

Positioning
Polymer slewing rings with snap function, locking and limitation

Specialists
Suitable for FDA- and ESD-compliant use

Slewing ring bearings

Available variants

Available variants	PRT-01	PRT-02	PRT-03	PRT-04	PRT-05
Materials					
Stainless steel	ES	ES	-	ES	-
Black Edition	-	-	-	BE	-
Low cost made of solid plastic	-	LC	P	-	PC
Assembly options					
M4 thread	-	-	-	M4	-
Square flange	SQ	-	-	-	-
Spacer ring	DR	-	-	DR	-
Large outer ring	M-ARG	-	-	G	-
Top plate with slot nut profile	-	-	-	T	-
Inner ring with clamping function	C	-	-	-	-
Drive					
Drive shaft, machined end	DP	-	-	DP	-
Outer drive ring	TO-ST / -HTD5M / -HTD8M / -AT10	-	-	TO-ST / -HTD5M / -HTD8M / -AT10	-
Inner drive teeth	-	-	-	TI-ST	-
Function					
Manual clamp	-	-	-	HK	-
Position monitoring	-	-	-	ART-PD	-
Angle limit	AA	-	-	TS	-
Angle measurement	-	-	-	AM	-
Pre-load	P	-	-	PL	-
Latching	-	-	-	R	-
Locking mechanism	-	-	-	ART	-
Locking mechanism and remote trigger	-	-	-	ART-RC	-
Both-sided seal	DD	-	-	-	-
One-sided seal	D	-	-	-	-
Felt cover	-	-	-	SG	-

Order example: PRT-04-50-ES-A180

PRT = Slewing ring
04 = Type
50 = Inner diameter [mm]
ES = Body material
A180 = Sliding element

iglidur® PRT slewing ring bearings

Type 01
Standard

PRT-A-0001

PRT-01-100
High torsional stability

Housing	**Aluminium, stainless steel**
Sliding elements	**A180, A181, J, H1, F2**
Inner diameter	**20 - 300mm**

PRT-A-0002

PRT-01-100-TO-ST
With outer drive ring

Housing	**Aluminium, stainless steel**
Sliding elements	**A180, A181, J, H1, F2**
Inner diameter	**20 - 300mm**

PRT-A-0003

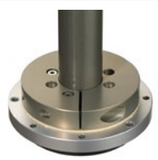
PRT-01-100-AA
With angle limit

Housing	**Aluminium, stainless steel**
Sliding elements	**A180, A181, J, H1, F2**
Inner diameter	**20 - 300mm**

PRT-A-0004

PRT-01-100-HK
With manual clamp

Housing	**Aluminium, stainless steel**
Sliding elements	**A180, A181, J, H1, F2**
Inner diameter	**20 - 300mm**



PRT-A-0005

PRT-01-20-C
Inner ring with clamping function

Housing	**Aluminium**
Sliding elements	**J**
Inner diameter	**20, 30mm**

Type 02
Lightweight

PRT-B-0001

PRT-02-20-AL
Lightweight

Housing	**Aluminium, stainless steel, A180, J4, iguton G**
Inner diameter	**20 - 60mm**

PRT-B-0002

PRT-02-30-ECO
Solid plastic variant

Housing	**M260, P4**
Inner diameter	**30mm**

Type 03
Low-cost

PRT-C-0001

PRT-03-80
Low-cost version

Housing	**Aluminium**
Sliding elements	**POM**
Inner diameter	**80mm**

Type 04
Low profile

PRT-D-0001

PRT-04-100
Compact, lightweight and cost-effective

Housing	**Aluminium, stainless steel**
Sliding elements	**A180, A181, J, H1, F2**
Inner diameter	**20 - 300mm**

PRT-D-0002

PRT-04-100-TO-ST
Tooth profile

Housing	**Aluminium, stainless steel**
Sliding elements	**A180, A181, J, H1, F2**
Inner diameter	**20 - 300mm**

PRT-D-0003

PRT-04-100-TI-ST
With inner drive teeth

Housing	**Aluminium, stainless steel**
Sliding elements	**A180, A181, J, H1, F2**
Inner diameter	**20 - 300mm**

PRT-D-0004

PRT-04-100-TS
With angle stop

Housing	**Aluminium, stainless steel**
Sliding elements	**A180, A181, J, H1, F2**
Inner diameter	**20 - 300mm**

PRT-D-0005

PRT-04-100-HK
With manual clamp

Housing	**Aluminium, stainless steel**
Sliding elements	**A180, A181, J, H1, F2**
Inner diameter	**20 - 300mm**

PRT-D-0006

PRT-04-100-R
With locking mechanism

Housing	**Aluminium, stainless steel**
Sliding elements	**A180, A181, J, H1, F2**
Inner diameter	**20 - 300mm**

PRT-D-0007

PRT-04-100-ART
With locking device

Housing	**Aluminium, stainless steel**
Sliding elements	**A180, A181, J, H1, F2**
Inner diameter	**20 - 300mm**

PRT-D-0008

PRT-04-100-DP
With assembled drive pin

Housing	**Aluminium, stainless steel**
Sliding elements	**A180, A181, J, H1, F2**
Inner diameter	**20 - 300mm**

PRT-D-0009

PRT-04-100-BE
Black Edition

Housing	**Aluminium**
Sliding elements	**A180, A181, J, H1, F2**
Inner diameter	**20 - 300mm**

PRT-D-0010

PRT-04-100-T
Slot nut profile

Housing	**Aluminium, stainless steel**
Sliding elements	**A180, A181, J, H1, F2**
Inner diameter	**20 - 300mm**

PRT-D-0011

PRT-04-100-G
Installation solution

Housing	**Aluminium, stainless steel**
Sliding elements	**A180, A181, J, H1, F2**
Inner diameter	**20 - 300mm**

PRT-D-0012

PRT-04-100-DRI
Installation solution

Housing	**Aluminium, stainless steel**
Sliding elements	**A180, A181, J, H1, F2**
Inner diameter	**20 - 300mm**

iglidur® PRT slewing ring bearings and accessories

PRT-D-0013

PRT-04-60-AM
With position indicator

Housing	**Aluminium, stainless steel**
Sliding elements	**A180, A181, J, H1, F2**
Inner diameter	**20 - 300mm**

PRT-D-0014

PRT-04-00
For the smallest applications

Housing	**Aluminium**
Sliding elements	**J**

Type 05
Solid plastic

PRT-E-0001

PRT-05-15-PC
Low cost made of solid plastic

Housing	**M260, P4**
Inner diameter	**15mm**

Accessories

PRT-F-0001

PRT-04-AD-SG-100
Felt seal for PRT-04

Material	**Aluminium**
Seal	**Felt**
For sizes	**20 - 300mm**

PRT-F-0002

PRT-HK-100
Manual clam for PRT-01

Material	**Aluminium**
For sizes	**30 – 300 mm**

PRT-F-0003

PRT-01-100-DR-POM
PRT-04 spacer ring

Material	**Aluminium**
Inner diameter	**20 - 300mm**

PRT-F-0004

PRT-04-100-DR
PRT-04 spacer ring

Material	**Aluminium**
Inner diameter	**20 - 300mm**

PRT-F-0005

PRT-01-100-KIT-J
PRT-01 sliding element replacement kits

Material	**J, A180, F1, H1**

PRT-F-0006

PRT-04-100-KIT-J
PRT-04 sliding element replacement kits

Material	**J, A180, A181, F2, H1**

PRT-F-0007

JRS-500-Z
Universal sliding elements

Material	**J**

Application example

Personal robot with maintenance-free rear axis

A robot that works regardless of weather conditions - be it rain, sunshine, variable temperatures - exposes its components to considerable loads. Even in coastal areas, where the air is salty, "Willow" has to withstand adverse factors when it is used. These demanding environments have prompted the company EEVE to rely on igus® components. The initial spark for this fruitful collaboration came from a sample set of iglidur® plain bearings that attracted the attention of Gilmartin some time ago. He recognised even then that these components would play a decisive role in the future.

Initially, iglidur® thrust washers were installed in the EEVE robots on the rear axis to minimise friction when the rear wheel rotates. During the upgrade of a customer's robot, an iglidur® PRT slewing ring bearing was used on the axis for the first time.
Today, an iglidur® PRT-02-20 can be found in the rear axis of the robot.
In order to fully meet the specific requirements of EEVE, igus® has developed a customised solution that requires a reduced drive torque. This adaptation allows the rear wheel to rotate freely even under the most adverse conditions, without any maintenance.

The service life of the slewing ring bearing was calculated by igus® in advance for EEVE using the free online tool iglidur® PRT expert **igus.eu/prt-expert**. All the data collected in the igus® test laboratory on the service life of the slewing ring bearings is incorporated into this tool and enables an exact prediction of the product's service life. "In our case, the actual service life far exceeds our initial construction requirements," says Gilmartin. "The PRT slewing ring bearing is the only bearing option we wanted to consider. Compared to ball bearing slewing rings, it offers clear cost advantages," he adds.

It should also be noted that ball bearings need to be replaced sooner due to the accumulation of dirt and dust and, to the detriment of our environment, need to be lubricated regularly. "Even under the most demanding environmental conditions, our slewing ring bearings offer robust and maintenance-free operation for at least ten years. In the case of the application at EEVE, the service life reaches an impressive 90 years," explains Joren Kestens, sales engineer at igus®.

igus.eu/prt-robot

PRT-B-0001

PRT-02-20
Lightweight, aluminium outer ring with iglidur® J4 inner rings

Improve what moves

motion plastics®

- iglidur® plain bearings
- iglidur® rollers
- iglidur® slewing ring bearings
- iglidur® bar stock
- drygear® gear and gearbox technology
- iglidur® 3D printing
- igubal® spherical bearings
- xiros® ball bearings
- drylin® linear technology
- dryspin® lead screw technology
- drylin® drive technology
- Low Cost Automation
- Bicycle components
- e-chains® and e-chain systems®
- smart plastics
- chainflex® cables
- readycable® readychain®
- Connectors

Everything at a glance

dry-tech® bearing technology

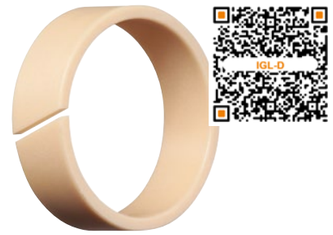
iglidur® plain bearings

Sleeve bearings

Flanged bearings

Thrust washers

Two hole flange bearings



Guide rings

Clip bearings

iglidur® rollers

Guide rollers

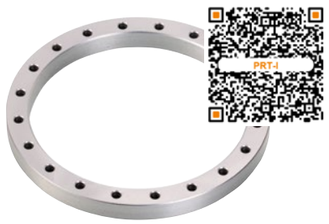
Knife edge rollers

Coating powder

iglidur® slewing ring bearings

Slewing rings

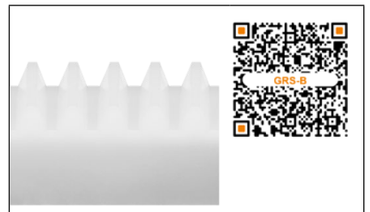
Toothed slewing rings



Accessories

drygear® gear and gearbox technology

Spur gears



Racks

Bevel gears

Angular gearbox

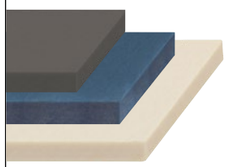
Modular gearbox system

iglidur® bar stock

Round bars

Hollow bars

Sheets



Plates

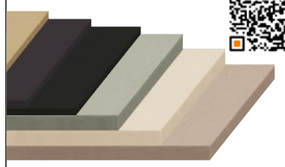


Plate strips

iglidur® 3D printing

Filaments

Selective Laser Sintering

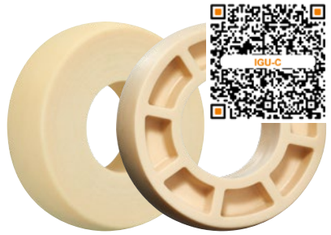
Resin

Accessories

igubal® spherical bearings

Rod end bearings

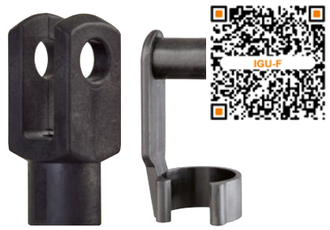
Spherical balls



Spherical insert bearings

Double joints

Coupling joints



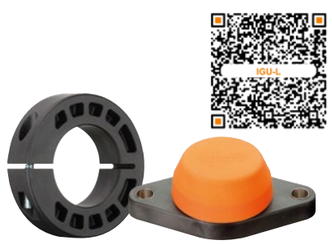
Clevis joints

Flange mounted bearings

Spherical bearings

Pillow block bearings

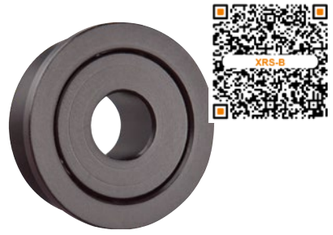
Angled and in-line ball and socket joints



Accessories

xiros®
ball bearings

Radial deep groove ball bearings



Flanged ball bearings

Ball transfer units

Conveyor rollers

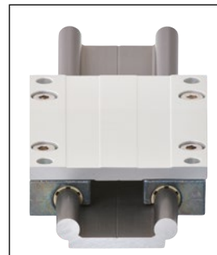
Thrust bearings

Pillow block ball bearings

Slewing ring ball bearings

Other types

drylin®
linear technology



W profile guides

N low-profile linear guides

T rail guides

R shaft guides

Q square linear guides

NT telescopic rails

Complete systems with measuring technology

dryspin® lead screw technology

Lead screw nuts

Lead screws

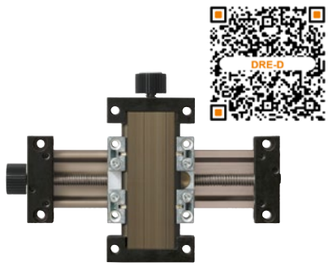
Accessories

drylin® drive technology

Linear modules with lead screw

Linear modules with toothed belt

Linear modules with racks

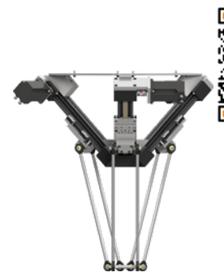


XY-tables

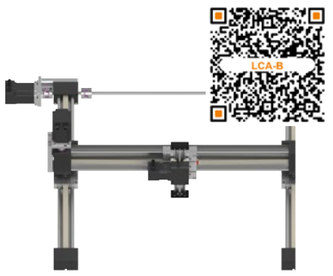
Electric motors

Low Cost Automation

Cobot



Delta robot



Linear robots

SCARA robot

Robotic arm

Robot modular system

Control systems

RBTX by igus®

RBTX®
Marketplace for Low Cost-Robotics

Everything at a glance

igus® bicycle components

Bicycle components

Injection moulded frames

Modular frames

Rotomoulded frames

Injection moulded wheels

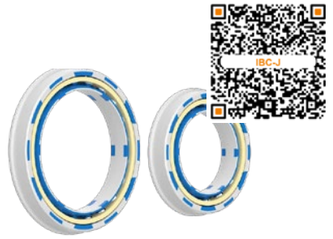
Rotomoulded wheels

Handlebars

Freewheeling

Planetary crank gearbox

Pulleys



Bicycle wheel bearings

Pedal cranks

Plain bearings

igus® Corner

motion plastics® sample box

Equipped with igus® samples on site as required

Would you like to always have the latest igus® products on hand to try out? Then simply order the igus® corner for your premises. A sales colleague will bring the display unit to you, set it up on request and equip the compartments with the products of your choice.

You can use the corner as a permanent exhibition or for a limited period of time. We will also pick it up again or refill it if you need supplies or want to try other products.

Learn more about it and order your own igus® Corner:

igus.eu/igus-corner

Everything at a glance

e-chains® and e-chain systems®

e-chains® and e-chain systems®

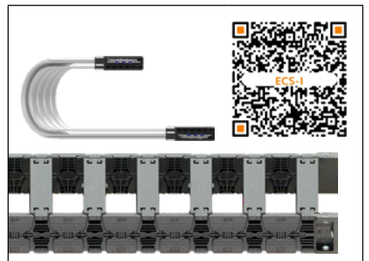
Energy chains for linear motion

Protection against dirt and swarf

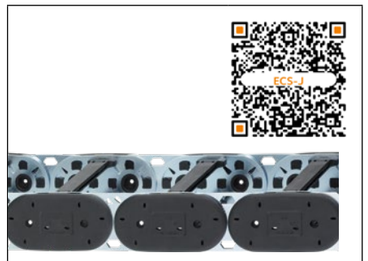
Smooth running, cleanroom

Plastic-steel hybrid energy chains

Special solutions



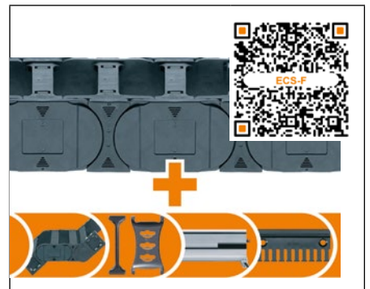
For multi-axis motion



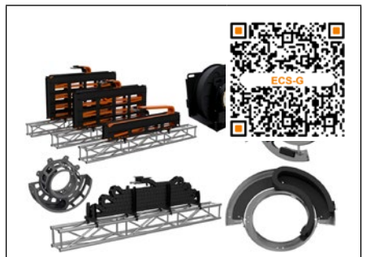
Rotary movements

triflex® multi-axis energy chains for robots

Accessories



Complete set



Project planning / Engineering / Installation

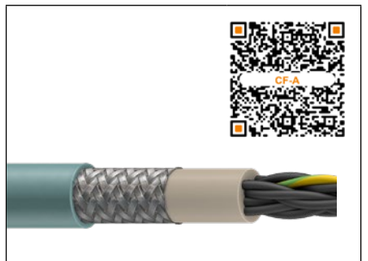
smart plastics

Condition monitoring | i.Sense

Predictive maintenance | i.Cee

Complete system solutions

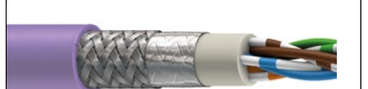
chainflex® cables



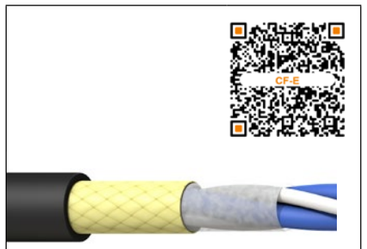
Control cables

Data cables

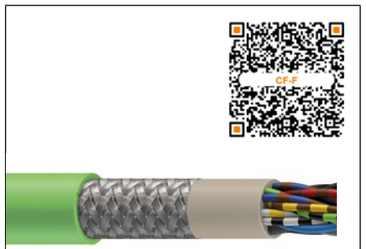
Coaxial cables



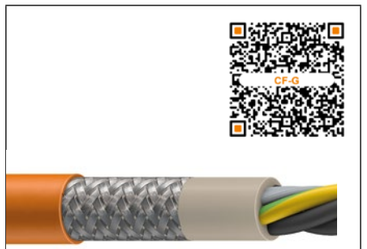
Bus cables



Fibre Optic Cables



Measuring system cables



Servo cables

Sensor and actuator cables

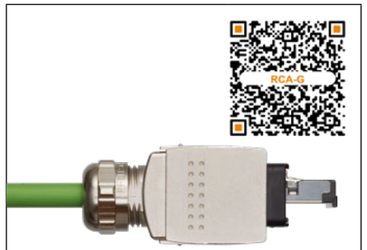
Cables with HARTING industrial plug-in connectors

Cables for robots

Hybrid cables

Motor cables

Robot cables



AIDA Standard

Connectors

Plug-in connectors (signal and power)

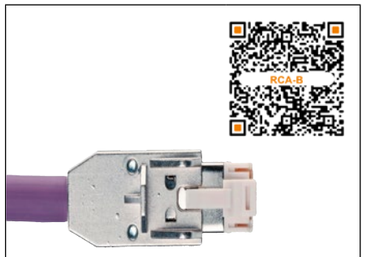
Special cables

Clean room elements

readycable®
readychain®

Tools, accessories

Drive cables suitable for 40 manufacturer standards



Network, Ethernet, fieldbus cables

Video, vision, bus technology

Everything at a glance

Catalogues and online tools

Catalogues

dry-tech® bearings technology
MAT0075591.20

dry-tech® linear technology
MAT0075592.20

e-chains® catalogue
MAT0072320.20

chainflex® catalogue
MAT0070582.20

New products journal spring 2024
MAT0075538.20

Autumn new products journal
MAT0075602.20

igus® online kiosk

Online tools

Energy supply systems

Cables

Linear technology

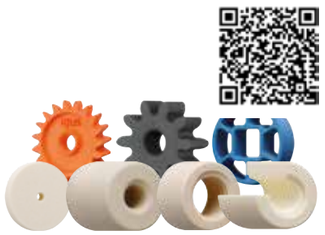
Electric motors

Bearing technology

Gears

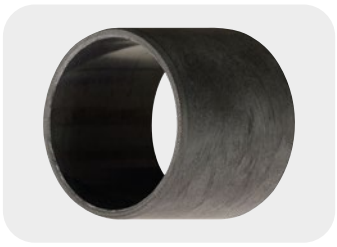
Robotics and automation

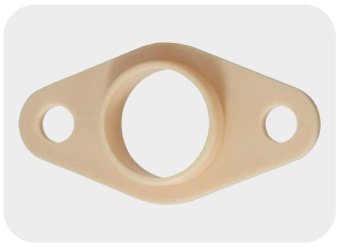
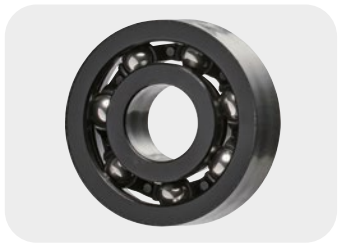
Coating



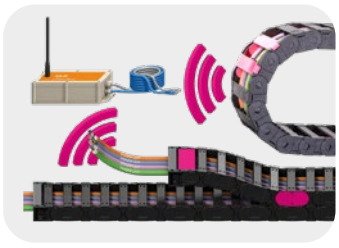
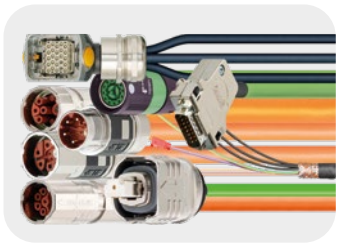
Individual components

motion plastics®



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