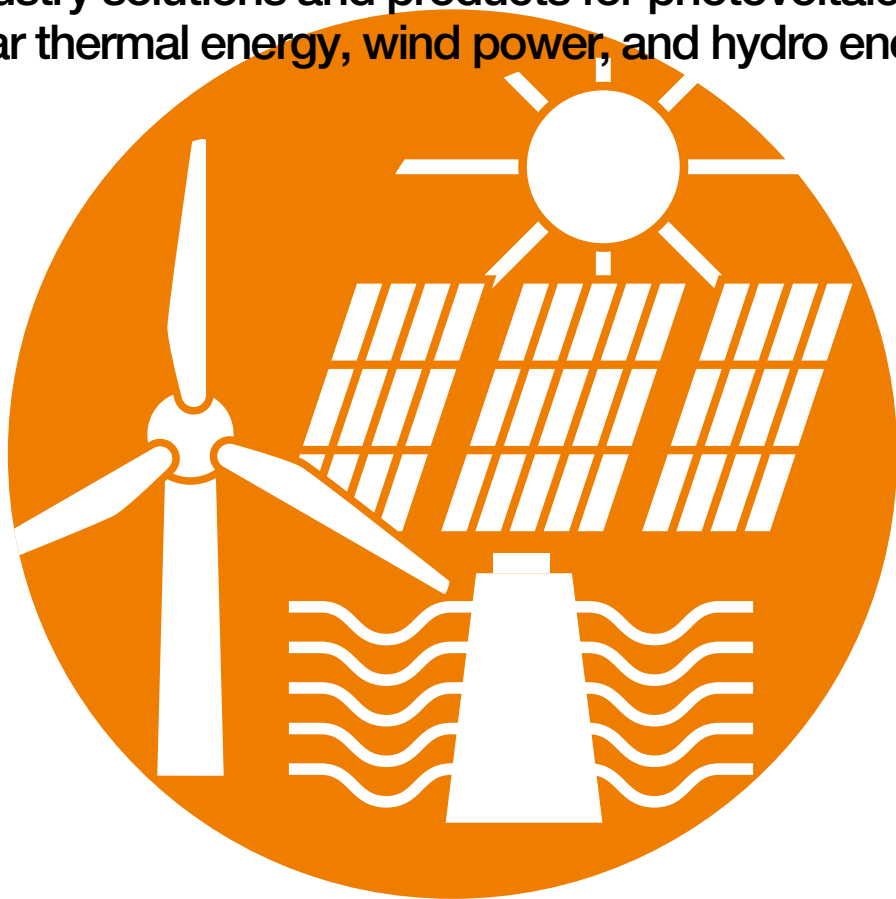


Renewable energy

Industry solutions and products for photovoltaics, solar thermal energy, wind power, and hydro energy



• Tech up, cost down. It's our job.

igus[®].eu

www.igus.eu/renewable-energy

Reliable, maintenance-free solutions for long-term energy generation

Generating energy, especially from renewable sources, requires reliable, durable technological solutions. In the process, the various systems are often exposed to extreme environmental conditions such as UV radiation, temperature fluctuations, strong winds, and dirt and dust, which they have to withstand for years.

Tailored to the specific system, we offer you special solutions made of high-performance polymers, which can help you improve your technology, optimise your system and reduce costs.

I would be happy to answer any questions you may have about renewable energies.



Richard Won
Renewable Energy Industry Manager
Phone: +49 (0) 22 03 96 49 70 76
rwon@igus.net

Tech up, cost down. It's our job.

Your benefits at a glance:

- Requires no maintenance or lubrication
- UV-resistant
- Insensitive to dirt and dust
- Weather-resistant
- Corrosion-resistant
- Long predictable service life
- Customised solutions

Photovoltaics

Lubrication-free bearing technology for tracking systems, floating PV and cleaning systems

Solar thermal energy

Maintenance-free plain and spherical bearings for parabolic troughs, Fresnel solar panel systems, and solar power towers

Wind power

Robust bearing technology and energy supply for blade adjustments, brake systems and more

Hydro energy

Components for wave power plants, hydropower turbines, and screening plants





Intense UV radiation, heat, wind, dust: Solar systems must function under extreme environmental conditions. igus® offers various customised solutions that meet these requirements. Our motion plastics® feature long service life, freedom from maintenance, and low costs. Application scenarios for dirt-insensitive, lubricant-free plain and spherical bearings include tracker systems, floating photovoltaic systems (floating PV), and cleaning systems.

Advantages of igus® solutions

- UV-resistant and requires no lubrication or maintenance
- Quiet operation without torque fluctuations
- Extremely low coefficients of friction thanks to tribo-optimised plastics
- For tight installation spaces
- Insensitive to dirt and dust
- Long predictable service life
- Low costs
- More than 17 years of experience in the solar industry



Split pillow block bearing for square profiles

ESQM, igubal®

- Split housing and spherical ball design
- Compensation of misalignment
- Easy assembly and disassembly
- For long service life under high loads
- 25-year guarantee

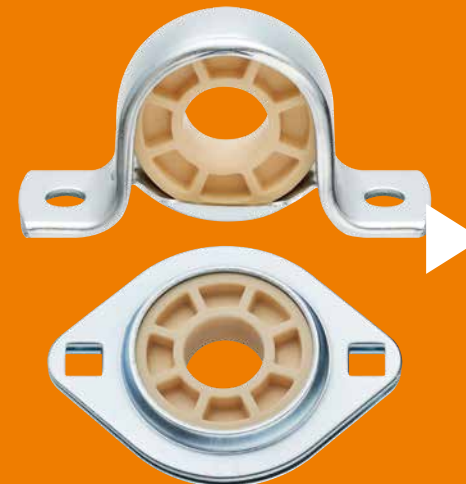
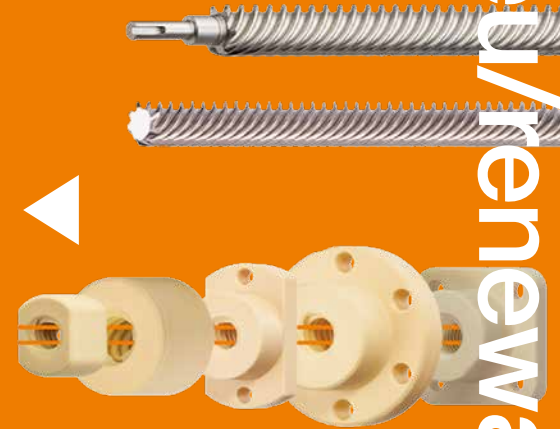
 www.igus.eu/esqm

Lead screw and lead screw nut dimensions

dryspin® lead screw technology

- Quiet, no vibration due to rounded tooth geometry, and up to 30% longer service life than conventional lead screws
- Maintenance-free thanks to self-lubricating lead screw nuts and cost-effective manufacture (injection moulding)

 www.igus.eu/dryspin



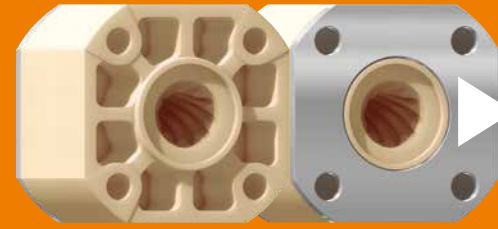
Low-cost bearing use

igubal® spherical bearings

- Made of iglidur® high-performance plastics
- Maintenance-free alternative to pivoting bearings in metallic pillow block and fixed flange bearings
- Available for sheet metal housings in sizes PP204-208
- Resistant to dirt

 www.igus.eu/spherical-insert-bearing

Maintenance-free products Photovoltaic



Heavy-duty lead screw nut

drylin® JGRM with stainless steel plate, right-hand thread

- Light and cost-effective alternative to metallic ball screw nuts
- Two installation sizes for threads Ø 14/16 and 18/20
- For axial loads of up to 6MPa

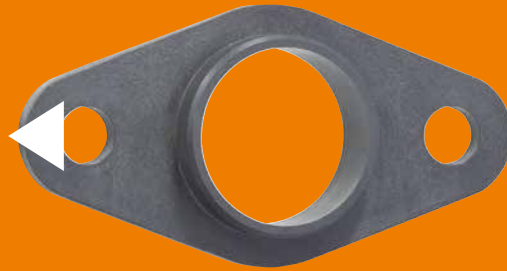
 www.igus.eu/drylin-jgrm

High-performance plain bearings

iglidur® G two hole flange bearing

- Wear-resistant
- Lightweight
- Lubrication-free

 www.igus.eu/flange_bearing

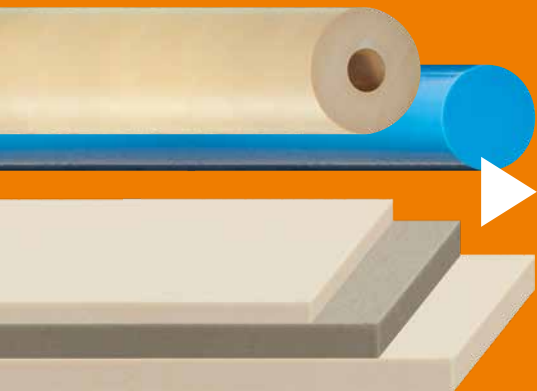


Fixed flange bearings with two mounting holes

EFOM igubal®, iglidur® W300 spherical ball

- Compensation of misalignment
- Absolute corrosion resistance
- Lightweight
- Maintenance-free dry operation

 www.igus.de/flanschlager



Plastic bar

- 100% free of maintenance and lubrication
- Excellent wear resistance
- Resistant to dirt, dust, and moisture
- No minimum order value or quantity

 www.igus.eu/bar-stock/plastic-bar-stock



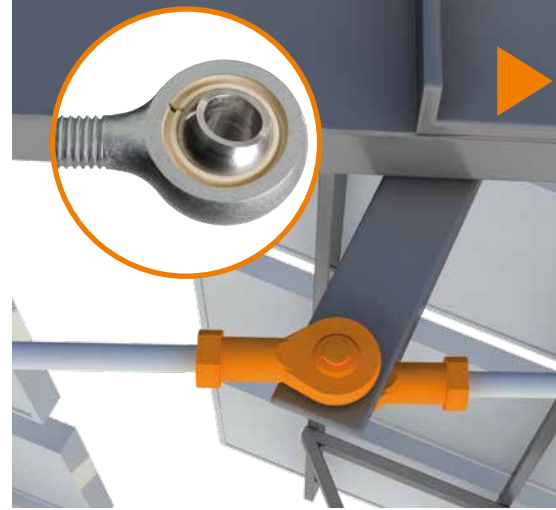
Wear-resistant gears for continuous operation

iglidur® F gears

- Wear-resistant material for continuous operation
- Electrically discharging thanks to iglidur® F
- Longest service life among iglidur® gears
- For axial loads of up to 6MPa

 www.igus.eu/gears

Areas of use Photovoltaics

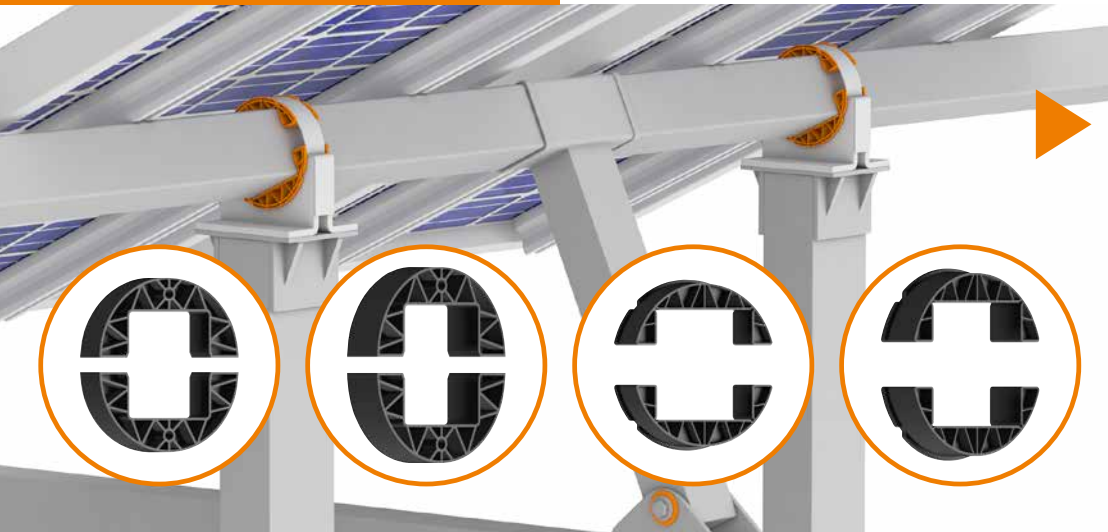


Metal rod end with male thread

KARM, iglidur® J bearing ring

- For rotating, oscillating, and linear movements
- Suitable for temperatures from -40°C to +90°C in long-term use
- Insensitive to dirt, dust, and wet conditions
- Lubrication-free dry operation

 www.igus.eu/karm-igidur-j

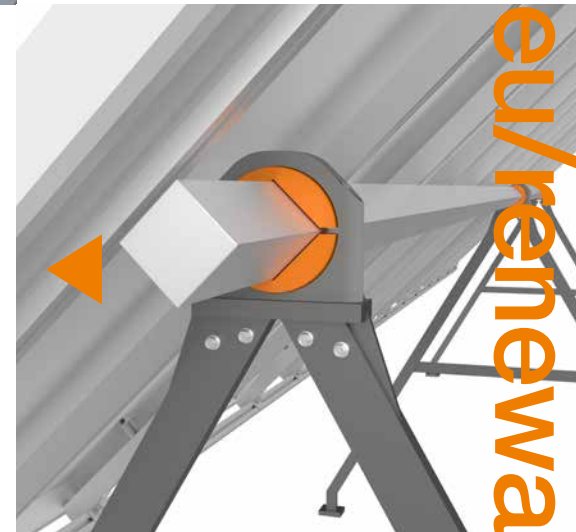


igidur® half-shells for solar trackers

ESQM iglidur® Solar pillow block bearings

- Three times the UV stability of igumid G and iglidur® J4
- Tested according to ASTM G154 for 2,000 hours
- Longer service life thanks to greater material stability

 www.igus.eu/esqm

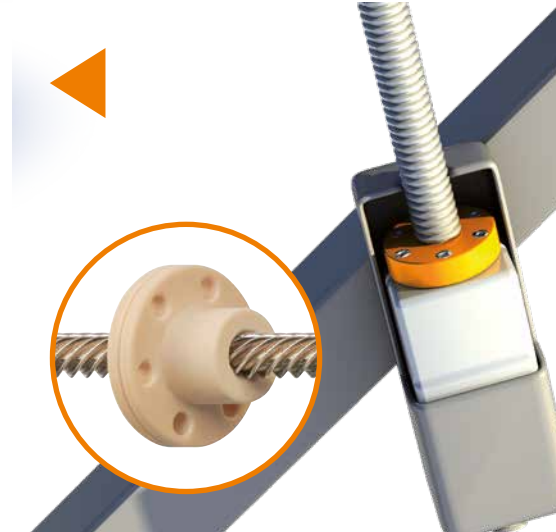


Dry-operating lead screw technology

drylin® lead screw technology

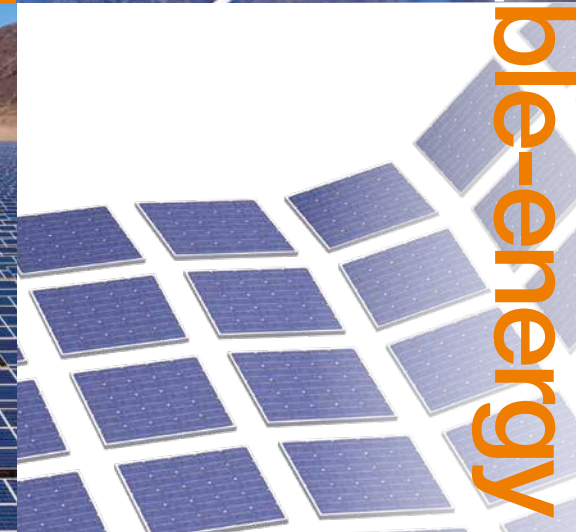
- Lubrication and maintenance-free
- Insensitive to dirt, dust, and wet conditions
- Temperature-resistant
- Various shapes

 www.igus.eu/dryspin



Successfully in use Photovoltaics

- 1 Tracker systems
- 2 Floating PV
- 3 Cleaning systems
- 4 Fixed installation



www.igus.eu/renewable-energy

Solar thermal energy



Change your bearing now ...

igidur® plastic plain bearings from igus® are lubrication-free, maintenance-free, cost-effective, and versatile.

They are suitable for mass-produced automotive products or special machines, underwater applications, the food and packaging industries, applications requiring extreme resistance to chemicals and temperature fluctuations, and simple metal-sheet bearings: iglidur® plain bearings always offer a solution – either from the catalogue product range or as a special customised plain bearing solution – no minimum order quantity!

For more than 35 years, RoHS-compliant iglidur® plain bearings have been a technically and economically advantageous alternative to metal bearings of all kinds.

Longer service life, the elimination of lubrication and maintenance, and cost-effective manufacturing add up to an average savings of 40%.

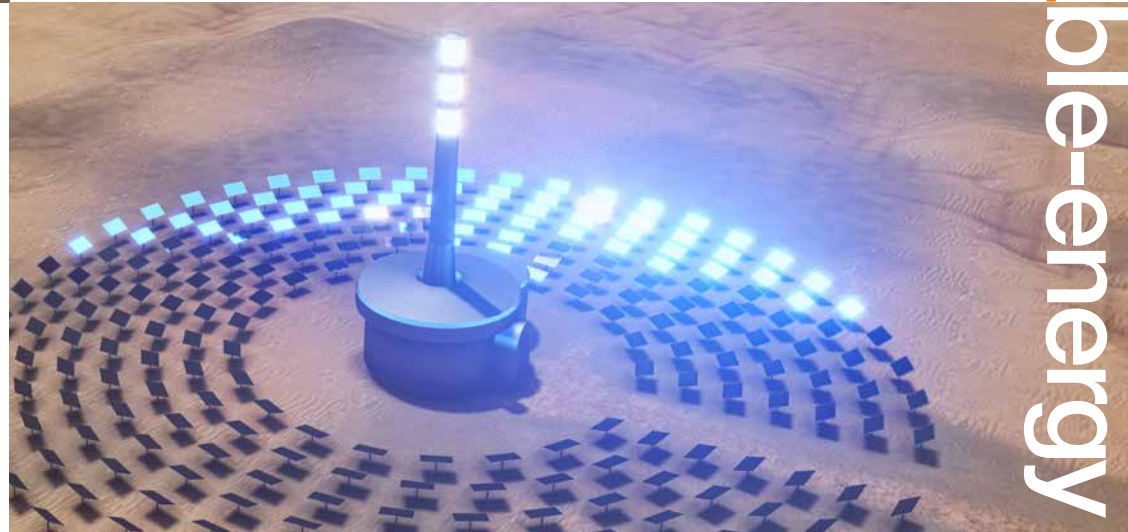
Longer service life, no maintenance, available immediately.



Optimal energy yield from a solar thermal system requires high direct solar irradiation and consistently low cloud cover. Desert regions are the primary candidates. igus® offers a wide variety of solutions for tracking systems that can withstand the harsh outdoor conditions and thus avoid maintenance and downtimes. The application areas of dirt-insensitive, lubricant-free plain and spherical bearings include parabolic trough and Fresnel collector power plants, solar power towers, and cleaning systems.

Advantages of igus® solutions

- UV-resistant and requires no lubrication or maintenance
- Quiet operation without torque fluctuations
- Extremely low coefficients of friction thanks to tribo-optimised plastics
- For tight installation spaces
- Insensitive to dirt and dust
- Long predictable service life
- Low cost
- More than 17 years of experience in the solar industry



Maintenance-free products

Solar thermal energy



Fixed flange bearings with two mounting holes

igubal® EFOM fixed flange bearing

- For cleaning robot with revolving brushes
- Compensation of misalignment
- Corrosion-free and light
- Easy to assemble

 www.igus.eu/EFOM

Fixed flange bearings with four mounting holes

igubal® EFSM fixed flange bearing

- For cleaning robot with revolving brushes
- Compensation of misalignment
- Corrosion-free and very light
- For temperatures from -30 to +80°C

 www.igus.eu/EFSM



Flanged bearings

Made of iglidur® materials

- Resistant to dirt and dust
- Lubrication and maintenance-free
- Excellent friction coefficients
- Low moisture absorption
- High media resistance
- Resistant to edge pressure
- Resistant to shocks and impacts

 www.igus.eu/iglidur/plain-bearing



Pillow block bearing

Housing material: RN33,
Spherical ball material: iglidur® J

- On-site assembly
- Maintenance-free, dry operation
- For high static loads
- Lightweight
- High rigidity and durability

 www.igus.eu/kstm-gt



Heavy-duty bearings for loads of up to 200MPa

iglidur® TX1

- Up to 200MPa static and 140MPa dynamic
- Wear-resistant and dimensionally stable
- Good media resistance
- Lubrication and maintenance-free

 www.igus.eu/tx1

www.igus.eu/renewable-energy

Areas of use Solar thermal energy

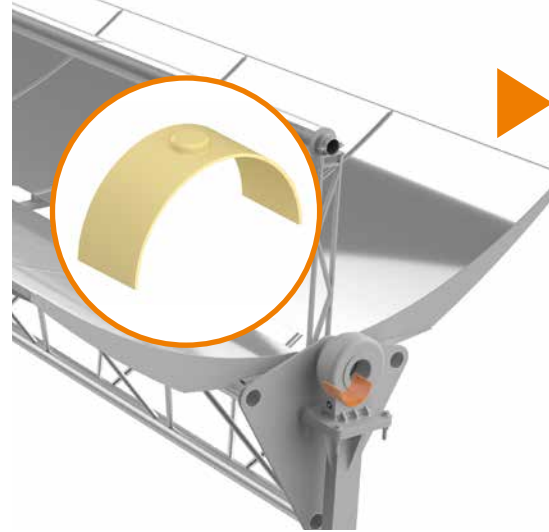


Solar tower technology

iglidur® J plain bearings

- Excellent wear resistance
- Excellent friction coefficients
- Low moisture absorption
- Resistant to edge pressure, shocks, impacts, dirt, and dust

 www.igus.eu/j



Parabolic trough

iglidur® J

- Lubrication and maintenance-free
- Insensitive to dirt, dust, and wet conditions
- Temperature-resistant
- Various shapes

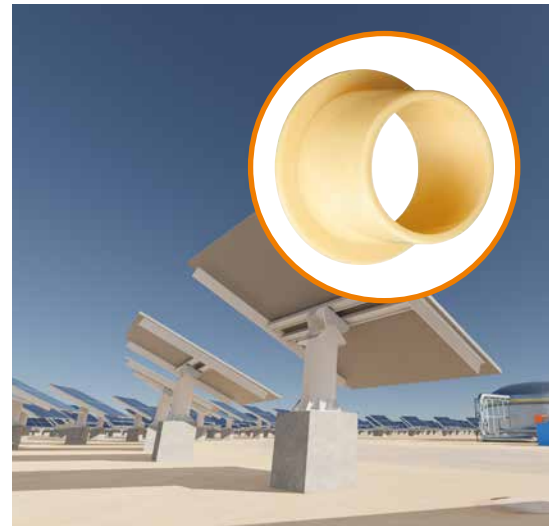
 www.igus.eu/J

Quick assembly saves time

igubal® pillow block bearing

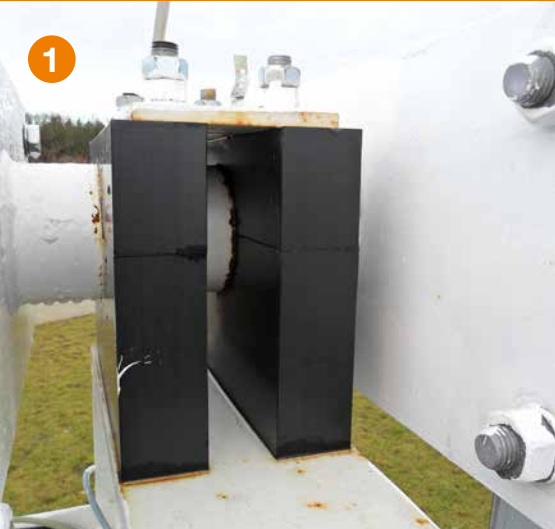
- Misalignment compensation
- Durable and reliable
- Low moisture absorption
- Wear resistance

 <https://www.igus.eu/kstm-gt>



Successfully in use Solar thermal energy

- 1 Parabolic trough power plant
- 2 Fresnel collectors
- 3 Solar tower power plants



Maintenance-free replacement for rolling bearings in the parabolic trough system

Problem: Given that solar thermal power plants are expected to operate for more than 20 years, no suitable bearing solutions that were virtually maintenance-free were available on the market at the time.

Solution: Specifically developed iglidur® plain bearings make manufacturing and operating costs much less than those of rolling bearings. The new bearings have a much longer service life and require no maintenance thanks to the lubrication integrated into the material.



20 years of service life is no problem iglidur® plain bearings in a solar steam system

Problem: Plain bearings were needed for a precision bearing system that would function and always be reliable even under adverse weather conditions and constant UV radiation and in hot and cold conditions.

Solution: iglidur® J UV plain bearings proved to be the ideal solution for the approximately 1,000 bearing points in each plant. The material was specifically developed for use in UV radiation and is durable, reliable, and maintenance-free, even in sunlight.



Wind power



New fabric-wound bearings made of high-strength filament fabric

iglidur® TX2

- Particularly low wear in heavy-duty areas
- Up to three and a half times as wear-resistant as iglidur® TX1
- Cost-effective even for large dimensions and low volumes



www.igus.eu/tx2

Wind turbines must function reliably in harsh weather conditions. igus® offers a wide range of solutions for wind turbines and their production facilities, transport, and assembly that help you improve your technology, reduce downtime, and cut costs. They include robust energy chains and flexible cables for torsional movements used in such applications as towers, azimuth systems, and blade adjustments.

Wear-resistant bar stock and heavy-duty plain bearings that require no lubrication or maintenance are ideal for blade adjustment and braking systems.

Advantages of igus® solutions

- Safe rotational movements
- Cable protection against vibration
- Suitable for small installation spaces, tight radii
- Maintenance-free and lubrication-free bearings
- Fail-safe cables with a guarantee for up to 36 months
- High static and dynamic load capacity
- Wear-resistant and dimensionally stable
- Quiet operation
- Constant coefficients of friction thanks to tribo-optimised plastics

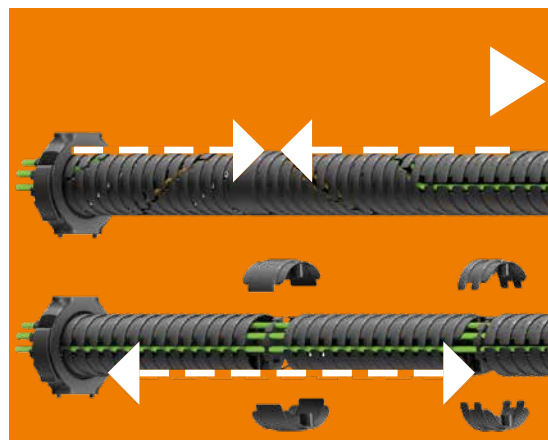
Modular e-chain®

e-loop®

- Modular system, easy to open
- Maximum cable/hose outer diameter up to 76mm or 500mm bend radius
- Robust PU outer body protects against impacts
- Offers operational reliability due to secondary locking tension of all bolted connections
- Weather-resistant



www.igus.eu/e-loop



Telescopic, twistable e-chain®

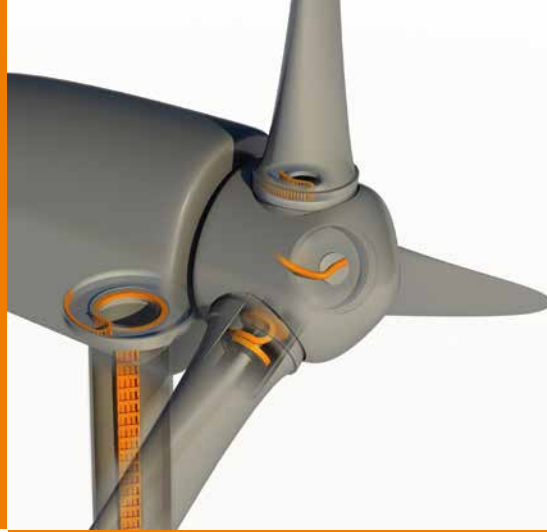
triflex® TRX

- Length compensation of up to 40%
- Minimises loop formation
- Space-saving design
- Compatible with the TRE range's triflex® R portfolio
- Easy to retrofit



www.igus.eu/trx

Maintenance-free products Wind power



Twistable cables

Specifically designed for safe 3D movement in space

- For torsion applications with +/- 360° with a cable length of 1m
- guaranteed for up to 36 months

 www.igus.eu/chainflex



Rotary movements in a very small space – 20 times around its own axis

twisterband

- Rotary movements of up to 7,000°
- Rotary speeds up to 180°/s
- Modular and easy to fill

 www.igus.eu/twisterband



Heavy-duty plain bearing

iglidur® Q2E

- For loads well above 130MPa
- Optimised for even better edge load absorption

 www.igus.eu/Q2E



3D energy chain for safe multi-axis movement

triflex® R

- Defined bend radius
- +/- 10° twist per chain link
- High tensile strength

 www.igus.eu/triflexr

Areas of use

Wind power

Rotor lock systems

iglidur® TX2 plain bearings

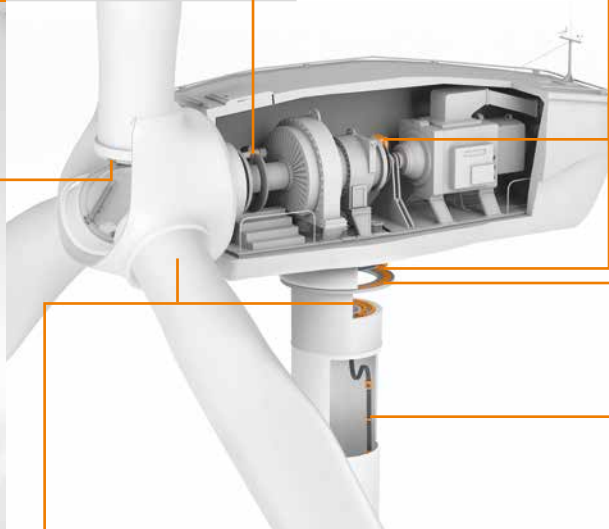
- Especially low wear in heavy-duty areas
- Up to three and a half times as wear-resistant as iglidur® TX1



Azimuth and rotor brakes

Individual elements made of iglidur® X oder F

- Bar stock or injection-moulded parts
- High wear resistance and compressive strength



Azimuth adjustment

iglidur® W300bar stock sliding plates

- Extremely wear-resistant
- Low coefficient of friction
- Resistant to dirt



Pitch actuators

iglidur® TX1 plain bearings

- Up to 200MPa static and 140MPa dynamic
- Wear-resistant and dimensionally stable



Blade and azimuth adjustment

RBR rotating energy supply

- For high fill weights and confined spaces
- Rotation angle up to 90°

Energy supply for nacelle

Modular e-loop energy chain system

- Modular system, easy to open
- Protects against impact due to robust PU outer body

Wind power – Successfully in use



Maintenance platform

Cables, energy chains, and plain bearings in a WKA rotor maintenance platform

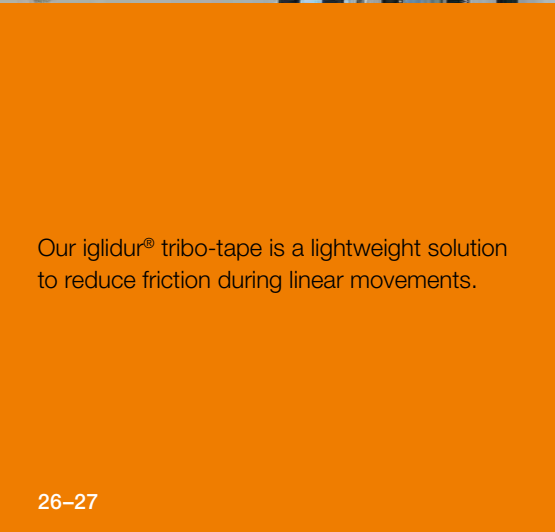
A startup based in Brandenburg has developed a mobile maintenance platform for wind turbine rotors. It allows repair work in almost any weather and at any time of day. igus® flexible cables, energy chains, and plain bearings are on board.



Our energy chains guide the chainflex® cables to the "terra" platform's numerous moving components.



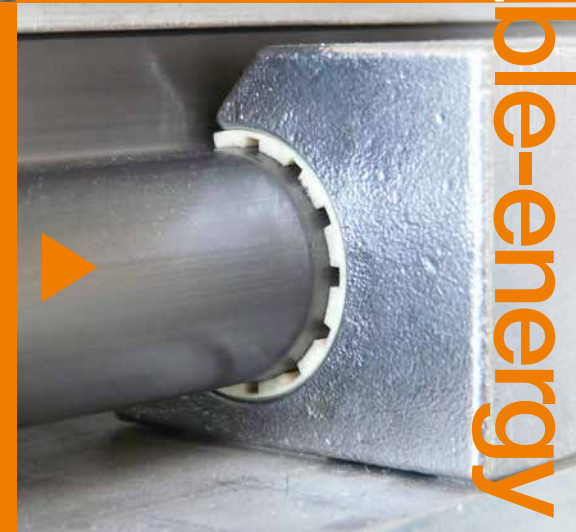
The tarpaulins for weather protection are opened and closed with drylin® linear guides.



Our iglidur® tribo-tape is a lightweight solution to reduce friction during linear movements.



Our plain bearings are installed on various axes. Lightweight, maintenance-free and lubrication-free operation and insensitivity to corrosion are major advantages here.



www.igus.eu/renewable-energy

Hydro energy industry



Because frequent maintenance and failures due to material wear can have a negative impact on energy output, machine components used in hydroelectric power generation must withstand high loads, be resistant to salt water and UV radiation, and function continuously. igus® offers a wide range of customised solutions that help improve your plant's technology. Wave power plants, hydroelectric turbines, and screening plants – the areas of application for plain and spherical bearings, lead screws, and energy supply systems in the hydroelectric industry are diverse.

Advantages of igus® solutions

- Suitable for underwater applications
- Resistant to dirt, dust, and UV radiation
- Lubrication-free and maintenance-free for 24/7 use
- Extremely low coefficients of friction thanks to tribo-optimised plastics
- For tight installation spaces
- Quiet, smooth operation
- Long predictable service life
- Customised customer solution, from prototype to high-volume production



Metallic rod end with stainless steel female threads

KCRM, iglidur® J bearing ring

- Spherical ball for high lateral loads
- Maintenance-free inner ring made of iglidur® J, right-hand threads

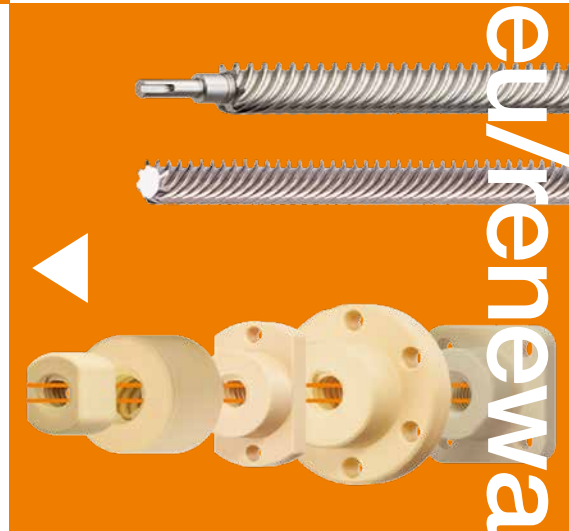
 www.igus.eu/20465

Lead screw and lead screw nut dimensions

dryspin® lead screw technology

- Quiet, no vibration operation due to rounded tooth geometry, and up to 30% longer service life than conventional lead screws
- Maintenance-free thanks to self-lubricating lead screw nuts and cost-effective manufacture (injection moulding)

 www.igus.eu/dryspin



Lowest coefficient of friction

igidur® H370 plain bearings

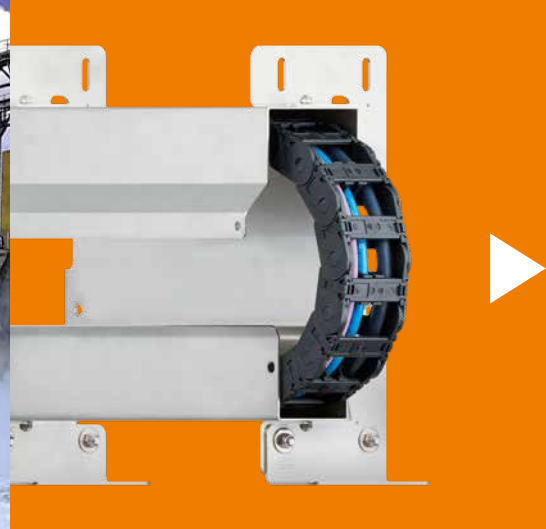
- Good wear resistance at high temperatures
- Suitable for very high speeds
- Very low moisture absorption
- Excellent wear resistance under water

 www.igus.eu/H370



Maintenance-free products

Hydro energy industry



Complete moving energy supply system for screening plants

basic flizz® system

- Low-maintenance, for travels up to 100m
- Protection against weather and dirt exposure
- Cost-effective, enclosed complete system

 www.igus.eu/basicflizz

For adjusting blades in hydropower turbines

igubal® rod ends

- Suitable for wet environments
- Extremely low coefficient of friction in dry operation and very low stick-slip tendency

 www.igus.eu/igubal

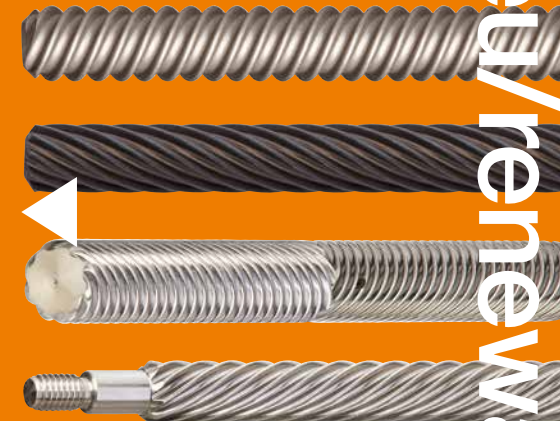


Higher efficiency for the energy generator, especially in point absorbers

dryspin® high helix lead screws

- Quiet and vibration-dampening operation thanks to rounded teeth
- Longer service life thanks to asymmetry

 www.igus.eu/dryspin

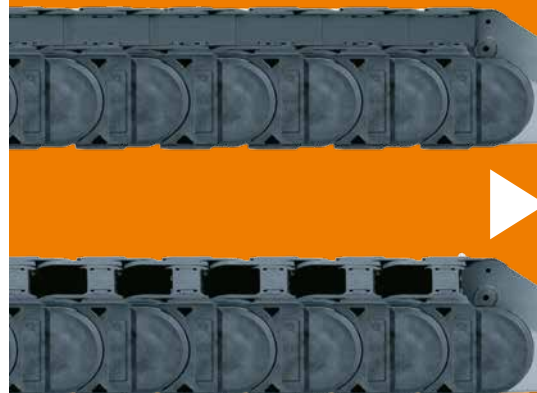


For use in point absorbers

igidur® UW plain bearings

- Extremely wear-resistant under water, tested and maintenance-free
- For fast and constant rotation
- Long service life

 www.igus.eu/igidurUW



Energy chain for wave energy converter

e-chain® E4.1

- Robust, quiet, modular
- Hinged lids for quick cable insertion from both sides
- Cable-friendly interior separation

 www.igus.eu/E4-1

www.igus.eu/renewable-energy

Areas of application

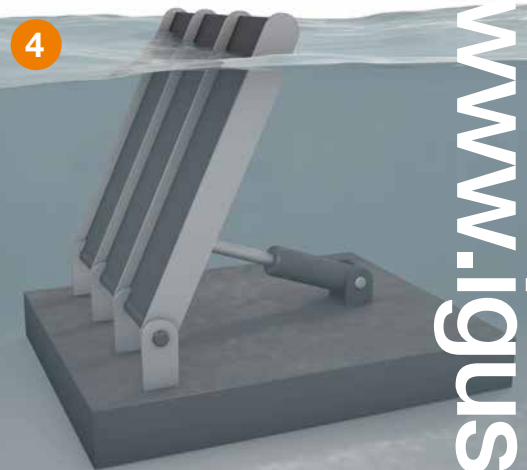
Hydro energy industry

- 1 Point absorbers
- 2 Attenuators
- 3 Screening plants
- 4 Oscillating water columns
- 5 Turbines

Oscillating water columns
such as iglidur® H370 plain bearings



 www.igus.eu/H370



4

www.igus.eu/renewable-energy

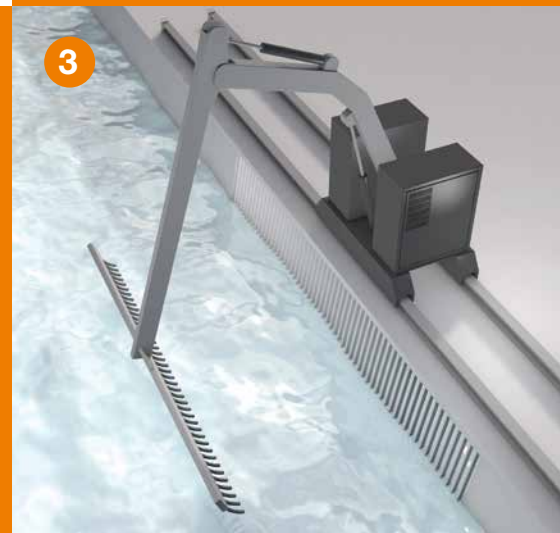


1

Point absorbers
energy chain systems




 www.igus.eu/e-chains



3

Screening plant
basic flizz® enclosed guide system

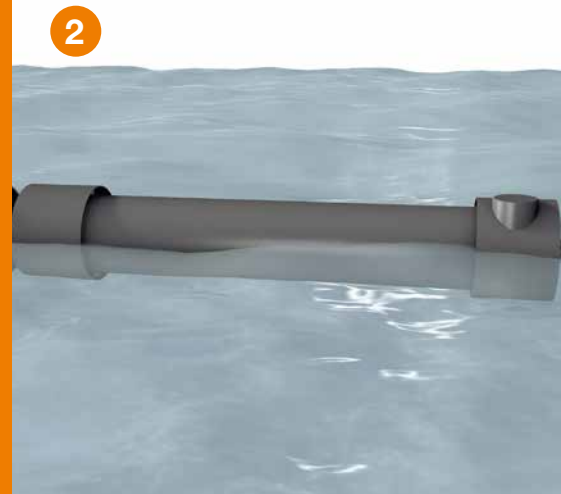


 www.igus.eu/basicflizz

Attenuators
igidur® TX1 plain bearings, for example



 www.igus.eu/tx1

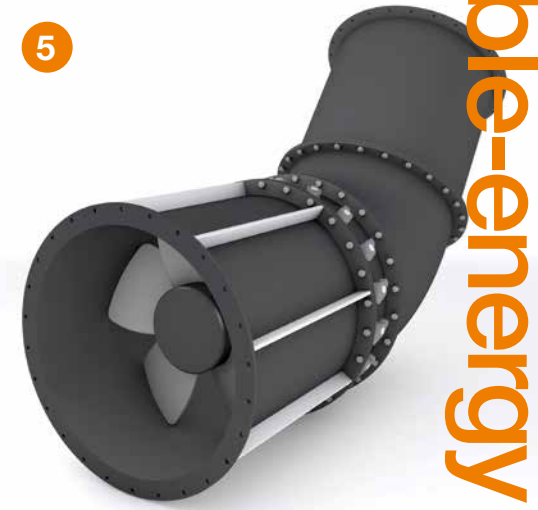


2

Turbines
igubal® rod ends, for example



 www.igus.eu/igubal



5

Hydro energy industry – Successfully in use



Uninterruptible power transmission on the tidal turbine

Tocado's developers were looking for a way to route cables safely from the turbine to the converter in the control cabinet and thus achieve the longest possible service life for the system. igus® provided the perfect solution with series E/4 e-chains®, which are corrosion-free, completely resistant to persistently damp environments, easy to install, and quick to open if a cable needs to be replaced.



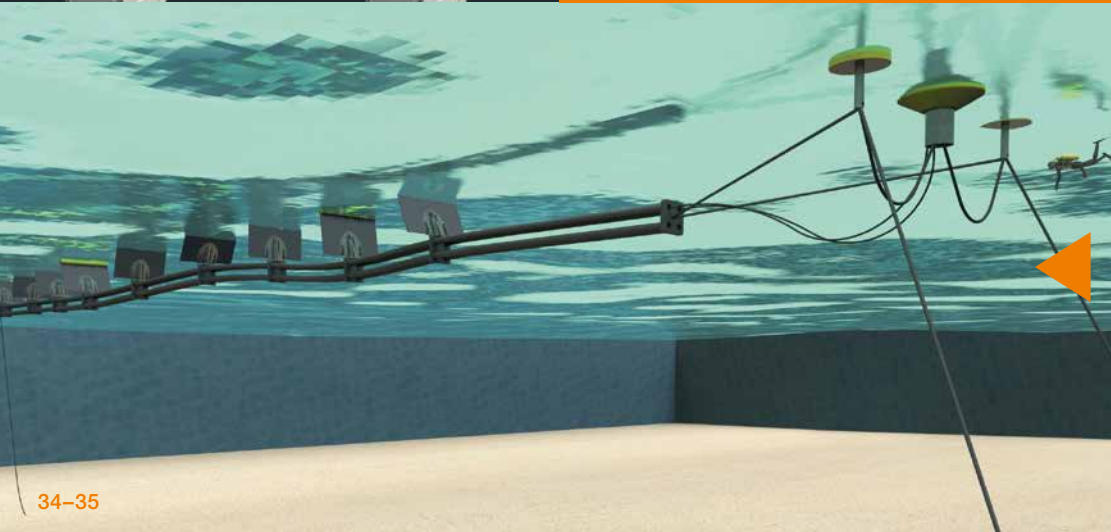
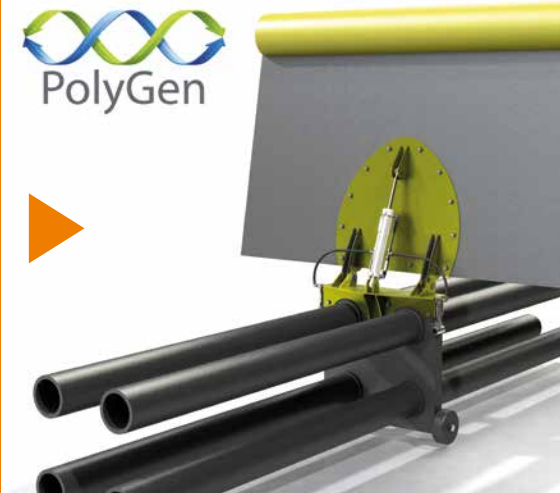
Reliable energy supply, even in high swells

CorPower Ocean, a Swedish company, makes point absorbers that are light and compact and cope well with storms thanks to the innovative Wavespring Phase Control Technology. A cascade gearbox converts the buoy's up-and-down movement into rotational movement to drive a power generator. Energy is supplied within the buoy by two vertical E4.1 series e-chains® and chainflex® servo, power, and control cables.



First plastic WEC reliably moved with iglidur®

The Volta wave energy converter made by PolyGen Ltd in Chesterfield is the world's first device for generating renewable energy from ocean waves and is made predominantly of plastic. For the flap axes, the developers were looking for bearings that could withstand the high mechanical loads and corrosive saltwater for as long as possible. They found the perfect solution at igus®: iglidur® flange bearings made of H370, a material developed specifically for wet environments.



readychain® – e-chain system® delivered pre- assembled and ready to install



readychain® saves three to eight hours of assembly time

1,600 systems are produced each week in 12 readychain® factories around the world, – assembly time-optimised to increase cash flow. The largest factory for harnessed readychain® systems (4,700m²) is in Cologne and has 160 employees.

- Eliminate storage costs for cables, e-chains®, and connectors
- Cut installation times by half
- Flexible response to order fluctuations
- Reduce the number of suppliers and orders by 75%
- Minimise your machine downtime
- System guarantee – depending on the application

 www.igus.eu/readychain



The largest test laboratory in the industry – experience, test data, tools



The igus® laboratory and field experience

Reducing costs while guaranteeing the highest possible process reliability is something only those who invest considerable resources in testing and research can accomplish. The industry's largest test laboratory performs more than two billion test cycles per year at a total of 107 testing stations. Our mechanical engineering components work reliably in real-world manufacturing because they have already passed an endurance test before they ever leave the igus® warehouse.

- 3,800m² chain and cable laboratory in Cologne
- More than 15,000 tests per year, 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 etc.)
- 450 test rigs for bearings
- 10 billion e-chain® cycles
- 3,500 tested cables
- 400 customer-specific examinations

 www.igus.eu/test

Test data and tools

The data obtained from the test laboratory with various test methods continues to be used even after development. Our customers enjoy being able to access our experience, the test results, and the materials technology that has grown out of them – in a processed form. Online, we offer numerous tools free of charge to help you choose and buy the right products:

- Service life calculator
- Configurators for product comparison
- Product finder
- Product configurators
- CAD configurators

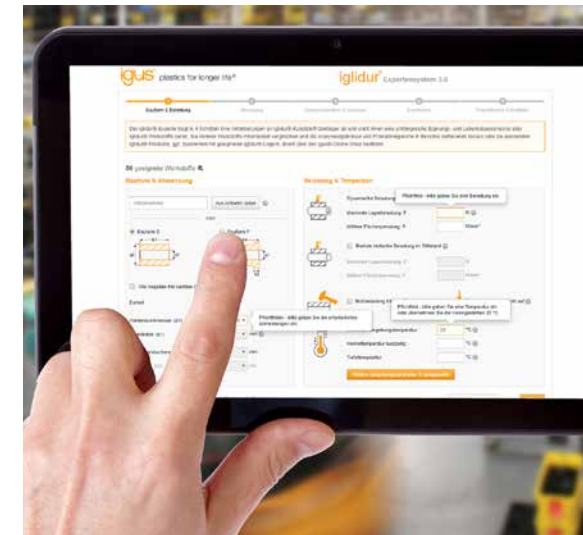
 www.igus.eu/online

One of more than 50 online tools

Compare materials and calculate service life

With the iglidur® expert individually calculated for your application. For injection-moulded, 3D-printed or sintered plain bearings. Based on real test data. Determine the ideal counter part.

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igus® service

- Data registration and engineering service
- Modernisation of your energy supply equipment
- Pre-assembled readychain® systems
- Minimal downtime
- Installation and supervisor service
- Inspection/maintenance service and guarantee extension

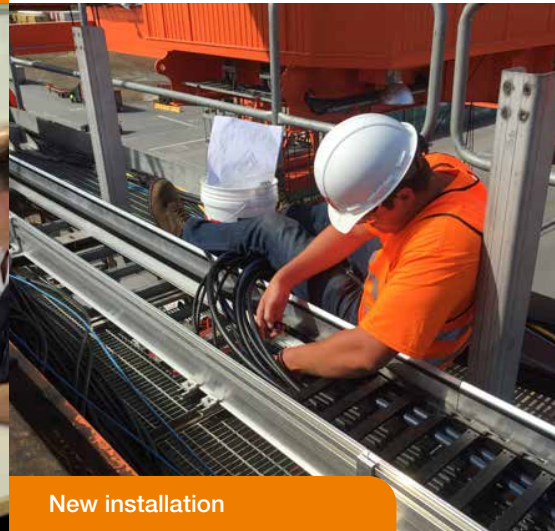
 www.igus.eu/installation

www.igus.eu/renewable-energy

Short reaction times

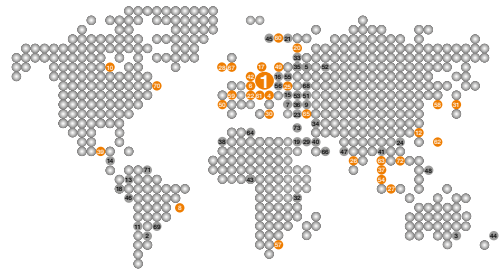


Project planning



New installation

Modernisation, conversion, retrofitting



Harnessing



Installation service



Inspection and maintenance

Sustainability at igus®

Since 1964, we have been developing high-performance plastics for movement to advance our clients' manufacturing efforts. The aim is to improve technology and reduce costs.

From the very beginning, recycling was an important issue, and now we reuse 99% of our plastic waste from production by processing it to make granulate material, which we feed back into the production process.

Products that last longer and require no lubrication contribute to preserving our environment. No lubricants means less environmental pollution. Less abrasion means less pollution with microplastics. Less weight means less energy required for movement.



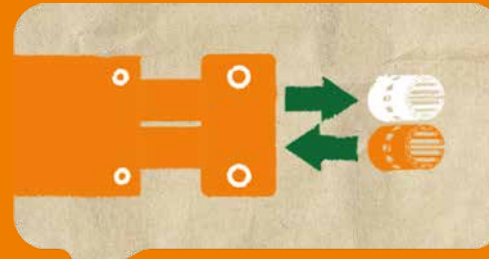
Rare replacement ...
Durable material



New life for old chains ...
Recycling old energy chains



Extremely low friction, saving energy ...
Optimised tribology



Conserves resources and is cost-effective ...
Exchange bearings for drylin® linear guides



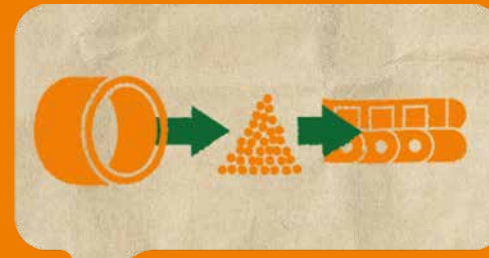
No lubricating oil pollution ...
Clean, lubrication-free bearing technology



Replace only damaged parts ...
Predictive maintenance with smart plastics



Lightweight, saving energy ...
Lightweight plastic material



99% of the waste can be reused ...
Internal recycling since the company's founding

change Recycling Programme for energy chains

You can send us your old energy chains instead of simply disposing of them with other products as part of your industrial waste.

The key here is that we accept all energy chains, including those from other manufacturers. The material is separated by type and shredded on site. We pass on the sorted granulate from competitor chains to circular economy exchanges. We use the recycled material from igus® e-chains® for injection moulding new products. We reward your commitment with an igus® voucher whose value is calculated according to the weight of the chains sent in.

It's simple:

 www.igus.eu/change

Other projects

Plastic2oil: in order to support the plastics circular economy, igus® has now invested 4.7 million euros in a company that plans to start up the first commercial Cat-HTR plant. The catalytic hydrothermal reactor technology can create mineral oil from plastic waste in just 20 minutes.

The **"clean igus®"** programme: plastics in production do not end up as waste, but are all collected and recycled.

Local reforestation projects with our subsidiaries worldwide

Our **environmental management** is certified according to ISO 14001.

An internal project group continuously introduces **sustainable everyday improvements**.

 www.igus.eu/sustainability

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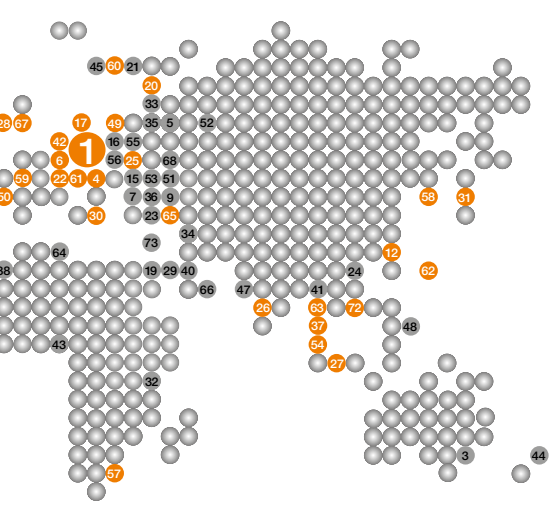
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igus® is certified in accordance with ISO 9001:2015 and ISO/TS 16949:2016 in energy supply systems, cables, harnessing, and plastic plain bearings.

/14001:2015

igus® is certified according to ISO 14001:2015. This environmental management systems supports us on our way to becoming a CO₂-neutral factory.

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