

rail

igus® solutions for the rail industry



plastics for longer life® ... igus®
technology
... www.igus.eu/railway ...

Costs down, service life up

Reduce costs with reliable, high quality products.

e-chains®:

- Maintenance- and corrosion-free
- Low noise
- Vibration dampening
- Small radii for small spaces
- Long service life
- Lightweight
- Low cost
- Meets EN45545

 www.igus.eu/e-chain



igus® plastic products have proven themselves in many applications the rail industry.

* CFSPECIAL.414

chainflex® cables:

- Developed for particularly highly dynamic applications
- Flame retardant IEC 60332-1-2, CEI 20-35, FT1, VW-1*
- Halogen-free in accordance with EN 50267-2-1*
- Toxicity according to EN 50305-9.2*
- Low smoke density according to EN 61034-2*
- Tested & guaranteed
- For the smallest installation spaces
- Cost-effective, especially as preassembled cable

 www.igus.eu/chainflex

dry-tech® bearing technology

- Lubrication-free
- Dirt-resistant
- Maintenance-free
- UL94-V0 classification
- High abrasion resistance
- Corrosion-free
- Lightweight
- Predictable service life

 www.igus.eu/dry-tech

Challenges ...

... the rail industry.

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iglidur® polymer plain bearings

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dryspin® high helix thread

High reliability and efficiency

Higher efficiency due to optimised thread angle and free from lubrication and maintenance. igus® dryspin® lead screws specifically for lead screw units.

- Maintenance-free dry running operation
- Low noise
- Resistant to dirt and dust
- Corrosion-free
- Trapezoidal thread and high helix thread
- High efficiency
- Anti-backlash function available

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chainflex® cables

Meet fire safety requirements and avoid cable failures

Highly flexible chainflex® cables for outdoor applications and high fire safety requirements.

- Flame retardant according to IEC 60332-1-2, CEI 20-35, FT1, VW-1*
- Halogen free in accordance with EN 50267-2-1*
- Toxicity according to EN 50305-9.2*

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e-chain® E2 micro

Guide cables safely in the smallest spaces

For the smallest installation spaces or maximum loads - igus® plastic energy chains® are reliable and maintenance-free.

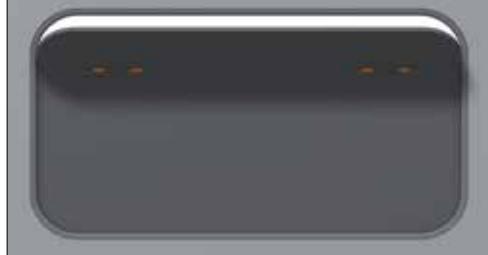
- For the smallest bending radii and installation spaces
- Strong and maintenance-free

* CFSPECIAL.414

igus® in the rail industry

dry-tech® bearing technology, energy chains® and chainflex® cables.

... drylin® linear technology in windows



... iglidur® plain bearings in seats



... dryspin® lead screws in foot boards



... igubal® spherical plain bearings in pantographs



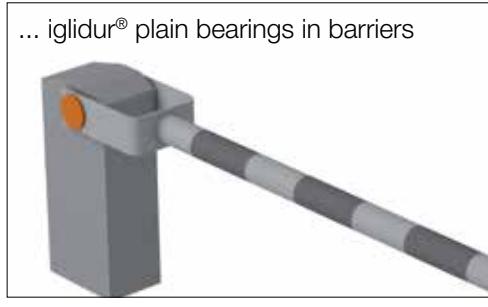
... iglidur® plain bearings in ramps



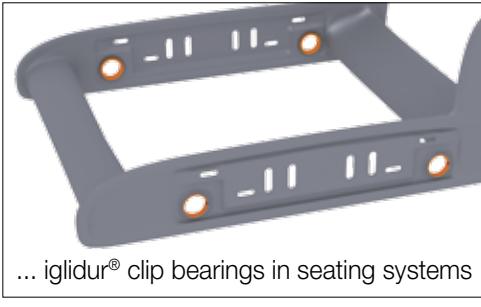
... dryspin® lead screws in train doors



... iglidur® plain bearings in barriers



... iglidur® clip bearings in seating systems



motion plastics® solutions for dynamic applications in rail vehicles – lightweight, reliable, lubrication- and maintenance-free.

In the rail industry, long-lasting, rugged and reliable machine components are needed. When used with high duty cycles under fluctuating environmental conditions, a continuous maintenance-free operation is critical. By using wear-resistant igus® high performance polymers, you save by removing the need for external lubrication, but also by the higher efficiencies of the systems.

 www.igus.eu/railway



Thorben Hendricks

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Rail Technology
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Email: thendricks@igus.de



... iglidur® plain bearings in wipers



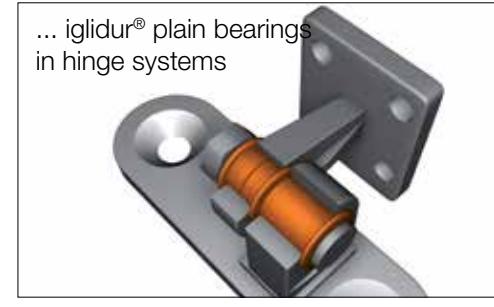
e-chains® and chainflex® cables in crane rail vehicles



... iglidur® plain bearings in braking systems



... e-chains® and chainflex® cables in road graders



... iglidur® plain bearings in hinge systems



... e-chains® and chainflex® cables in automatic doors

Reliably in use ...

igus® plastics products in the rail and transport sectors.



igus® moves railways

The rail sliding stage moves freight locomotives between 8 railway lines at the new North Rail Terminal of the port of Felixstowes.

Installed igus® products: igus® flizz® trough system, E4.1 e-chain® and chainflex® cables.

"The energy chain turned out to be a more rugged and compact solution compared to festoon systems or cable reels and the igus® product adapted itself perfectly around the surrounding area of the rail sliding stage."



... increase service life



Passenger compartment doors

chainflex® control cables for extremely small bending radii are used in this application in passenger doors for public transport vehicles.



Machine tool for railway track plates

This specialised machine tool requires a large number of different cables and hoses.



Portal milling machine

The energy supply fitted previously was worn out after nine months. The cables were destroyed by hot chips, resulting in production downtimes.

Reliable in service ...



High temperature debris

This special material repels chips with temperatures up to 850°C.



Roll stands for rails

The polymer energy supply from igus® replaced a steel chain system on this rolling mill.

... increase service life

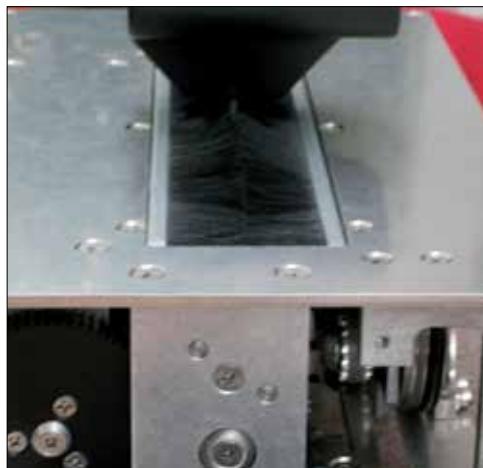


Door systems

High helix lead screw nuts in door systems.

Low-floor tram

chainflex® control cable for extremely small bending radii ensures operational safety in low-floor trams.



Switching device ("linear switch")

For railway control panel using drylin® SD lead screw unit.



Bridge inspection unit

Vertically hanging E4 e-chain® in this bridge inspection unit.



Pantographs

igubal® spherical bearings used as insulating components in pantographs of the subway.

Avoid ... maintenance and lubrication ... Reduce costs



iglidur® – plain bearings made of high performance polymers



iglidur® GV0 –
V0 classification accord-
ing to UL94.

This new material attains the V0 classification in accordance with UL94, making it ideally suited for applications with high fire protection requirements.



iglidur® J –
Fast-and-slow-motion.

Versatile in continuous opera-
tion, even for soft shafts.
The perfect combination of
wear-resistant plain bearings
at low to medium loads and
optimum coefficients of
friction.



iglidur® Q –
Suited for high loads.

Plain bearing solution for long
service lifes at high to extreme
loads.

www.igus.eu/GV0

www.igus.eu/J

www.igus.eu/Q

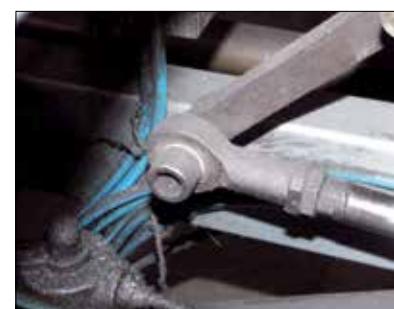
iglidur® plain bearings

iglidur® plastic bearings from igus® are lubricant-free, maintenance-free, cost effective and versatile. They always offer a solution – either from the catalogue range or as custom-made plain bearing. Special solutions – from batch size 1!

- 45 different materials – delivered from stock
- Corrosion-resistant
- Dirt resistant
- High compressive strengths
- Low coefficients of friction
- High wear resistance

www.igus.eu/iglidur

In the field

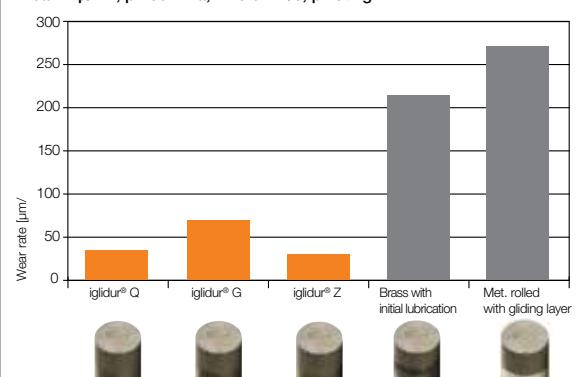


Tested!

In the largest lab of its kind, igus® Cologne

Result wear test on St52 / gas nitrified

Wear in $\mu\text{m}/\text{km}$; $p = 30 \text{ MPa}$; $v = 0.01 \text{ m/s}$; pivoting



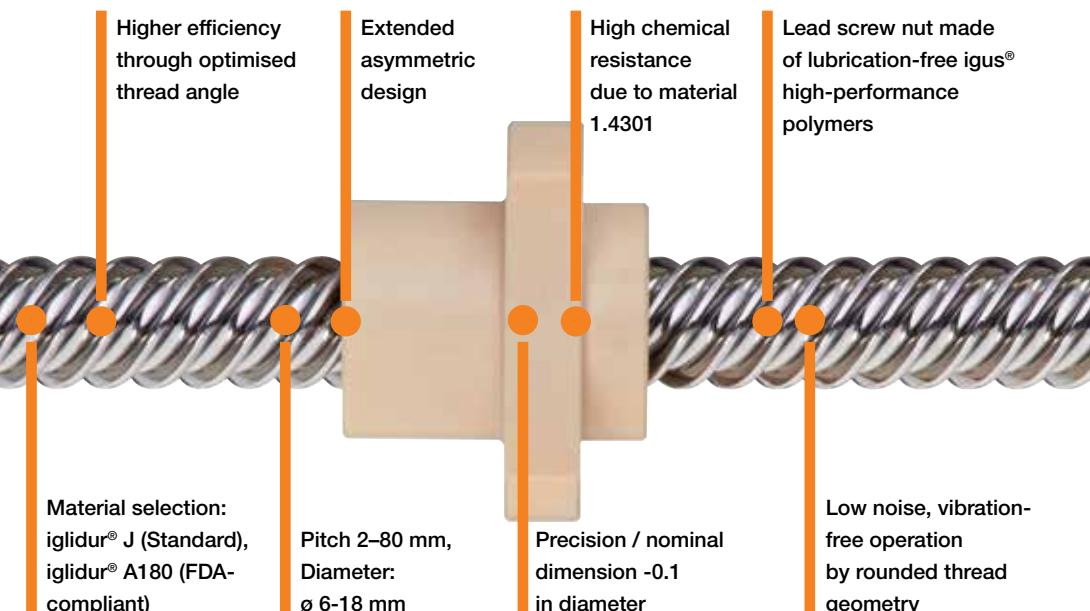
"Swivel test"

Objective: wear test of iglidur® plastic plain bearings against metallic plain bearings

Test setup: swivel test on a shaft with a weight of 1,200 kg.

Result: All tested iglidur® materials show considerably less wear than the metallic plain bearings. The shafts of the metallic plain bearings were reduced in size very significantly.

Increase efficiency and service life ... avoid lubrication



dryspin® – linear leadscrews lubrication- and maintenance-free.



dryspin® high helix lead screws

- Corrosion free due to material 1.4301
- Diameter Ø 6 - 18 mm
- Precision /nominal dimension -0.1 in Ø



dryspin® cylindrical lead screw nuts

- Lubrication-free due to igus® high-performance polymers
- Efficient with low noise
- Maintenance-free dry running operation



dryspin® lead screw nuts with flange

- Dirt resistant and corrosion-free
- Round flange
- Space-saving

dryspin® technology for high helix threads

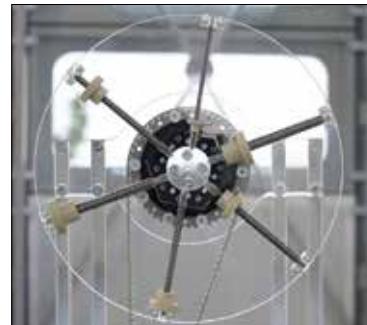
The dryspin® technology is based on wear-resistant igus® high performance polymers specially developed for lead screw units. With features and shapes matching the plastic nut and lead screw, dryspin® provides an even longer service life and higher efficiency for high helix threads. Due to its lubrication-free design dryspin® lead screw units are suitable for many applications including clean and hygienic environments.

Typical application areas

- Laboratory automation
- Sealing systems
- Medicine
- Handling
- Automotive

dryspin® benefits on video:

www.igus.eu/dryspin



dryspin® zero backlash lead screw nut

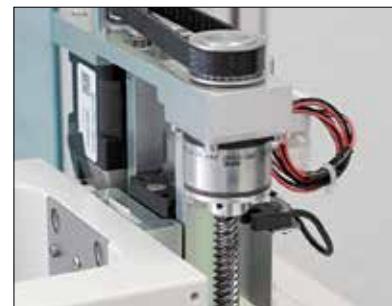
- Integrated zero-backlash system with spring pretension
- Minimum backlash
- For precise positioning



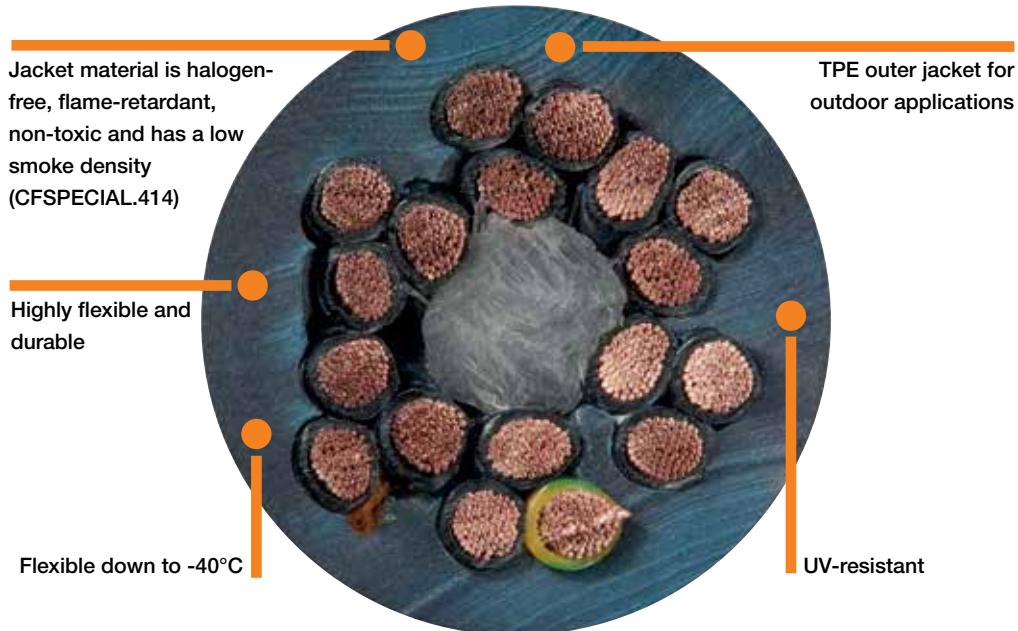
dryspin® accessories

- Bearing blocks for dryspin® high helix lead screws
- Nut holder for dryspin® lead screw nut
- drylin® E lead screw motor with dryspin® technology

In the field



Prevent cable failures ... Meet fire protection standards



The special design of igus® chainflex® cables is the key to a long service life in energy chains.



E.g. chainflex® CFSPECIAL.414 – particularly for use in rail vehicles. The jacket material is flame-retardant, non-toxic and has a low smoke density.

www.igus.eu/CF414



E.g. chainflex® CF10 – shielded TPE control cables for extreme requirements in outdoor applications.

www.igus.eu/CF10



E.g. chainflex® CF38 – shielded TPE motor cable for extreme requirements in outdoor applications, UV-resistant.

www.igus.eu/CF38



E.g. chainflex® CF98 / CF99 – for heavy duty use and especially for small radii. TPE- outer jacket, PVC- and halogen-free, cold-flexible, resistant to hydrolysis and microbes.

www.igus.eu/CF99

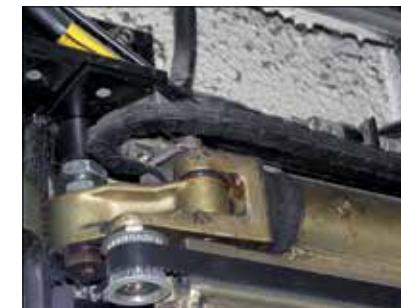
chainflex® cables

More than 1,040 types from stock – smallest bending radii, highly wear-resistant jacket materials (PVC, TPE, PUR), halogen-free and/or flame-retardant, various certifications and standards (e.g. UL, CE, CSA, Desina, cleanroom). Including guarantee!

- Certifiable according to EN45545
- For highly dynamic applications
- Special design prevents cable failure
- Ideally matched to e-chains®

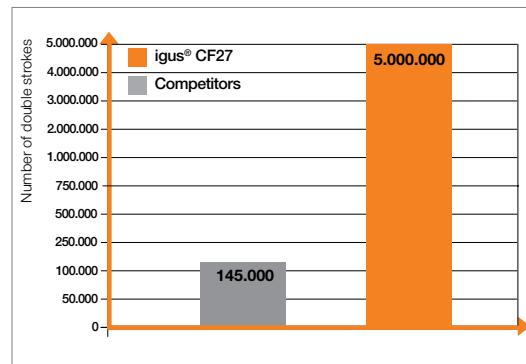
www.chainflex.eu

In the field



Tested!

In the largest lab of its kind, igus® Cologne



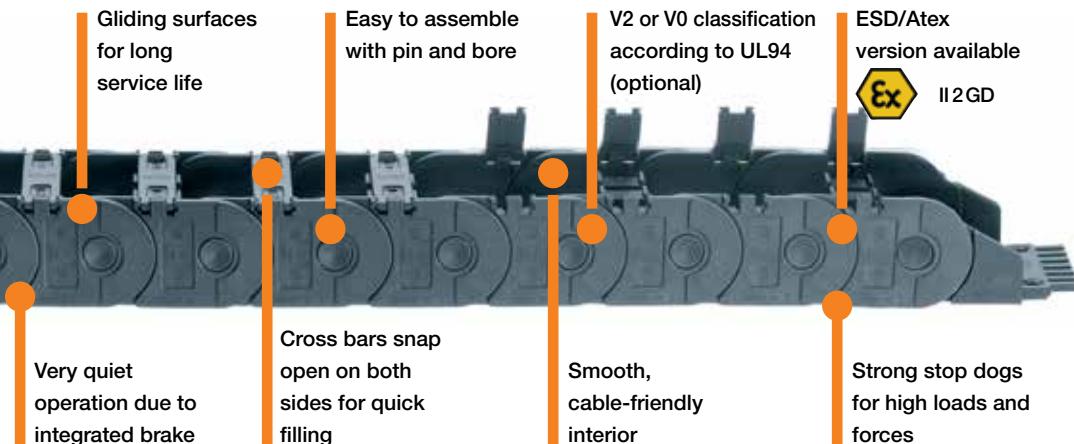
Due to the wide range of cable types solutions can be found to meet the customer's exact dynamic requirements.

Tested: 41 million strokes at 25% under-bending

Control cable CF5.10.25 withstood more than 41 million double strokes at 25% under-bending. chainflex® lasts - proven in test No. 2233 of more than 600 parallel tests conducted by the 1,750 m² test lab, the largest of its kind for flexible cables.

www.igus.eu/test2233

e-chains® for all applications ...



igus® e-chains® guide reliably, for the smallest installation spaces: cost efficient and lightweight.



The small, strong all-round-er chain - E2 micro system
Small e-chain® with strong stop dog system and large pin/bore connection for up to 25% longer unsupported length and 100% higher additional loads (compared to similar igus® types). A built-in "brake" to minimise impact noise and very smooth contours to ensure optimum cable protection. A chain opener (included) saves time when opening e-chains®.

The cost-efficient and quickly fillable – easychain®
Fast installation time is one of the key features of the easychain® e-chains®. Their elastic and tough material igumid NB offers yet more reasons for application: optimum elasticity, UL94-V2 classification and excellent suitability for clean rooms. Their one-piece design makes easychain® very cost effective.
easychain® e-chains® are, due to their compact dimensions, ideal for limited installation spaces.

The versatile – E2/000 system
The E2/000 system combines high strength with low-noise operation, long service life for cables and many mounting options. Mechanical engineers all over the world rely on this range.

www.igus.eu/E2.1

www.igus.eu/easychain

www.igus.eu/E2000

... and movements

igus® e-chains® and e-chainsystems® are suitable for universal applications:

- Various types of motions
- Carrying sensitive bus, data and fibre optic cables, as well as energy forms such as electricity, gas, air and liquids.
- Very high dynamic stresses
- Handles extreme environments and climates
- Compact installation
- Simple assembly of the system on site, as well as quick retrofit of cables

www.igus.eu/e-chain

In the field

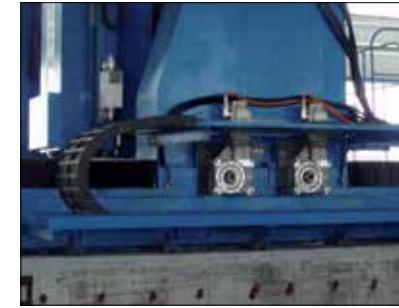


Tested!

Fire safety standard EN45545

Test report	Dates of test	Test method		Parameter	Test result	Requirements fulfilled for hazard level:
14/0121-1	2014-01-22	T01	EN ISO 4589-2 Combustibility	Oxygen index	37.8 Vol.-%	HL1-HL2-HL3
14/1384	2014-08-12	T10.03 25 kW/m²	EN ISO 5659-2 Smoke density	D ₃ max (10 min)	150	HL1-HL2-HL3
14/1385	2014-08-19	T12 600 °C	NFX70-100-1/-2 Toxicity	CIT _{NLP}	0.42	HL1-HL2-HL3

igus® has certified the material igumid V0.GF for the fire safety standard EN45545. The material is optionally available for many igus® e-chains® and is approved for many applications with fire prevention regulations. With these test results igus® covers the requirement areas R22, R23 and R24.





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Home > Solutions for Public transport engineering



* manus China Gold 2006 - Safety and freedom from maintenance in the compensation mechanism in Chinese rail tracks.

igus® products in the Public transport engineering - Tribopolymers with experience

e-chainsystems® and Chainflex® cables

- Free of maintenance and corrosion
- Low noise
- vibration damping
- With
- Long
- Light
- Low



DryLin® - Geradführungen/spindeln dryspindl

WTF Stangenführungen für Schienenfahrzeuge und U-Bahn
Die Führungssysteme für Schienenfahrzeuge und U-Bahn sind
Hochleistungsfähige, sehr auf Wartungsfreiheit und
Lebensdauer ausgelegte Führungssysteme. Sie sind
speziell für den Einsatz in Bahnen und U-Bahnen
entwickelt. Die Führungssysteme sind auch für
Lebensdauer und Effizienz. Durch die
Anwendung der tribopolymeren LSF für Rollenführungen, R-
reifen und Polymeren Umhüllung ist es möglich, die
Lebensdauer und die Wartungsfreiheit zu erhöhen.



www.igus.eu/railway

Visit our industry website for more information, products and application examples as well as online tools.

Technical Application Notes:
 • Für Anwendungen in Eisenbahnanlagen
 • Für Anwendungen in Eisenbahnanlagen
 • automatische Anpassung an Anforderungen

Productfinder screw drives

Input

• Without flange
 • With flange

Result

• Right-hand thread
 • Left-hand thread
 Threaded nut
 Step thread
 Metric thread
 Constant thread size
 Constant specific material

Demands

Low moisture absorption
 Self-locking required
 -90°C ambient temperature
 FDA compliant

Configuration

Achse Achse (mm) up to 0.21 N Spur length up to 1.000 mm
 Fest last up to 0.0001 N/mm Duty cycle 10 %

 www.igus.eu/drylinSD

Product finder and service life prediction for lead screw units.

Using our product finder for lead screw units, you can quickly find the right part and be provided with a service life projection. You have the option to configure and request your desired dimension for lead screw nuts and lead screws.

 www.igus.eu/online

Productfinder screw drives

Input

Threaded Nut
 Part No.: PT2000-000-43077101sd
 1 Piece(s)

Result

Spindle/nut assembly

Nut weight: 1 mm
 Load moment: 0.0001 N/mm
 Overall length: 10 mm (Screw length + Nut length + Connection length)

Configuration

P-Plan
 Gravity (G), All-wheel
 Gravity (G), 2-wheel
 Gravity (G), 4-wheel
 Gravity (G), 6-wheel
 Gravity (G), 8-wheel

Productfinder screw drives

Input

To select please click on the column heading

Spindle diameter	Nut size (mm)	Nut weight	Overall length	Step size (mm)	Step height (mm)	Step width (mm)	Step angle (deg)
200	10-10-10	10	27	✓	0.00	177000012000	0.00
210	10-10-10	10	27	✓	0.00	177000012000	0.00
220	10-10-10	10	27	✓	0.00	177000012000	0.00
230	10-10-10	10	27	✓	0.00	177000012000	0.00
240	10-10-10	10	27	✓	0.00	177000012000	0.00
250	10-10-10	10	27	✓	0.00	177000012000	0.00
260	10-10-10	10	27	✓	0.00	177000012000	0.00
270	10-10-10	10	27	✓	0.00	177000012000	0.00
280	10-10-10	10	27	✓	0.00	177000012000	0.00
290	10-10-10	10	27	✓	0.00	177000012000	0.00
300	10-10-10	10	27	✓	0.00	177000012000	0.00

Configuration

P-Plan
 Gravity (G), All-wheel
 Gravity (G), 2-wheel
 Gravity (G), 4-wheel
 Gravity (G), 6-wheel
 Gravity (G), 8-wheel

 For all tasks - for all batch sizes

Different industries need different solutions. Whether in mechanical engineering, automotive manufacturing or in the robot industry – igus® offers customised support for specialised applications.

igus® already has many years of experience and specialised resources for many industries.

 www.igus.eu/industry

Available from stock ...



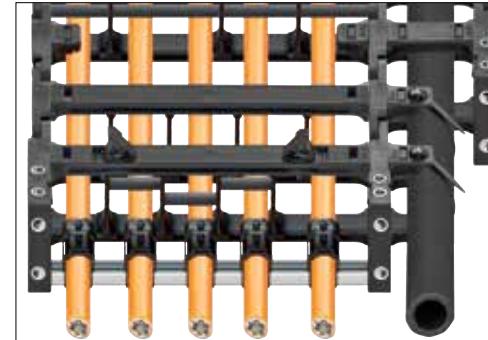
iglidur® and igubal® bearing technology

Highly wear-resistant polymers, tested and proven: iglidur® plain bearings and igubal® spherical bearings from igus® are lubrication-free, maintenance-free, cost-effective, predictable, and versatile.

- Predictable service life
- Customer-specific solutions possible

www.iglidur.eu

www.igubal.eu



e-chainsystems® and accessories

100,000 types from stock. Energy chains and systems reduce downtime and increase the service life of cables and hoses.

- A wide range of versions and sizes
- 5 - 350 mm inner height
- For all types of applications and installation

www.igus.eu/e-chain



Available from stock

More than 97% of catalogue parts are available from stock – You can find detailed information about our delivery times online

www.igus.eu/24



drylin® linear technology

The lubrication- and maintenance-free product range for drylin® linear technology includes 5 independent type series.

- drylin® T guides as alternative to recirculating ball bearings
- drylin® N low-profile guides for confined installation spaces
- drylin® W universal linear construction kit with many profiles and carriage options
- drylin® R guides as construction kit – compatible with standard spherical bushing
- drylin® Q – anti-torque square guides
- drylin® SD lead screw units, lubrication-free, quiet at all speeds

www.igus.eu/drylin-linear



chainflex® cables

More than 1,040 types from stock – smallest bending radii, highly wear-resistant jacket materials (PVC, TPE, PUR), halogen-free and/or flame-retardant, various certifications and standards (e.g. UL, CE, CSA, Desina, cleanroom). With guarantee!

www.chainflex.eu



drylin® drive technology

- Complete linear axis with lead screw unit (trapezoidal- or high helix thread) or toothed belts
- Any stroke length
- For manual or electric motor adjustments (NEMA/DC)

www.igus.eu/drylinE

... tested for millions of cycles

Research & Development



Better products for less - a key element is the industry's largest test lab. 1,750 m² lab, more than 15,000 tests and 2 billion test strokes per year.

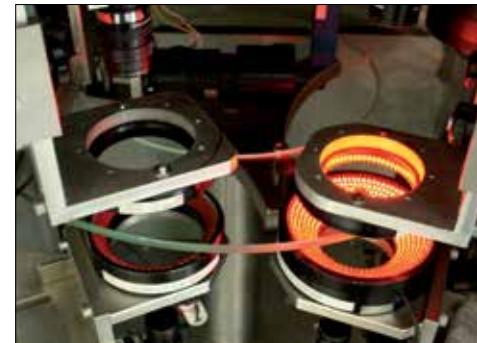
The igus® lab and field experience

Cutting costs while also guaranteeing maximum process reliability – only those who conduct intensive research and testing will successfully bridge this gap. The industry's largest test lab conducts more than two billion test cycles per year on a total of 107 test rigs.

This means they can be relied upon completely in the field.



Tribology testing in the plain bearing lab, igus® Cologne.



The igus® quality assurance

The quality policy of igus® is to identify and meet customer needs, and to always be a competent and reliable supplier. igus® has always been committed to produce products at the best available quality level, and to consistently develop innovative solutions.



Better for the environment

Because iglidur® is free of lubricants, no contaminants are discharged to the environment. The low weight of iglidur polymer plain bearings also help make them environmentally attractive.



Your requirements		Max. static surface																																																					
<input type="checkbox"/> Maximum service life	<input type="checkbox"/> Low coefficient of friction	<input type="checkbox"/>	2																																																				
<input type="checkbox"/> Del resistant	<input type="checkbox"/> High resistance to chemicals	<input type="checkbox"/>																																																					
<input type="checkbox"/> Vibration damping	<input type="checkbox"/> Good in moulding	<input type="checkbox"/>																																																					
<input type="checkbox"/> Low moisture absorption	<input type="checkbox"/> Underwater application	<input type="checkbox"/>																																																					
<input type="checkbox"/> FDA compatible Foodstuff	<input type="checkbox"/> Cost effective	<input type="checkbox"/>																																																					
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The right ETC bearing suited for you!																																																							
<input checked="" type="checkbox"/> Standard <input type="checkbox"/> Specialist meeting your needs		<input type="checkbox"/> Other related specialists																																																					
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<p><input type="checkbox"/> The basic selection is the Specialist bearing model as shown above (not good availability) for your requirement.</p> <p><input type="checkbox"/> Number components <= 20-40 hrs</p> <p><input type="checkbox"/> Components are standardised</p> <p><input type="checkbox"/> Delivery time of delivery: normally 2 - 8 weeks</p>																																																							

Extensive test database

What is probably the world's largest database was created from more than 15,000 test. This database gives us the ability to select the right product for your specific application.

igus® Services

Harnessed energy supply systems and cables with connectors.



readychain®

Fully harnessed systems in 3-10 days, 700 systems per week in 11 readychain® factories worldwide – optimised assembly time and better cash flow.

- Eliminate storage costs for cables, e-chains® and connectors
- Cut turnaround times by half
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- Reduce the number of suppliers and orders by 75%
- Minimise your machine downtime
- System guarantee - according to application

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igus® provides more than 2,830 harnessed cables for drive technology according to 20 different manufacturer standards. Professionally produced, 100% tested.

- Servo, power and signal-/encoder cables
- No cutting charges, no surcharges for small quantities and packaging
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The igus® installation service

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- Products and services from a single source – with low logistics costs for you
- igus® system guarantee, customised for each application

 www.igus.eu/assemblyservice



igus® delivery service - fast & reliable.



From 24 hrs or same day*

All catalogue parts and individual components for instance: one e-chain® link, 6 metre e-chain®, 3 strain reliefs, one iglidur® Q2 plain bearing, one drylin® linear plain bearing

24 - 48 hrs*

Customised systems

for instance: 11.46 m e-chain® with interior separation, guide rails, mounting brackets; 2.46 m drylin® profile rail with 2 carriages

3-5 business days

Harnessed systems

for instance: simple, harnessed e-chainsystems® with cables without connectors; lead screw unit based on specific requirements

10 business days

Complex systems and machined components

for instance: harnessed e-chainsystem® with cables of all types and connectors, interfaces, fittings, machined shafts to drawing, or mechanically shortened plain bearings, or tool-based injection-moulded parts

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For 50 years, we have been driven by a single vision – motion plastics®: Innovations from plastics that move machinery.

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* Products leave our facility within the indicated time.

The indicated delivery time means time until shipping of goods.

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igus® is certified for energy chains®, cables, and harnessing, as well as plastic plain bearings in accordance to ISO 9001:2008 and ISO/TS 16949:2009.

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