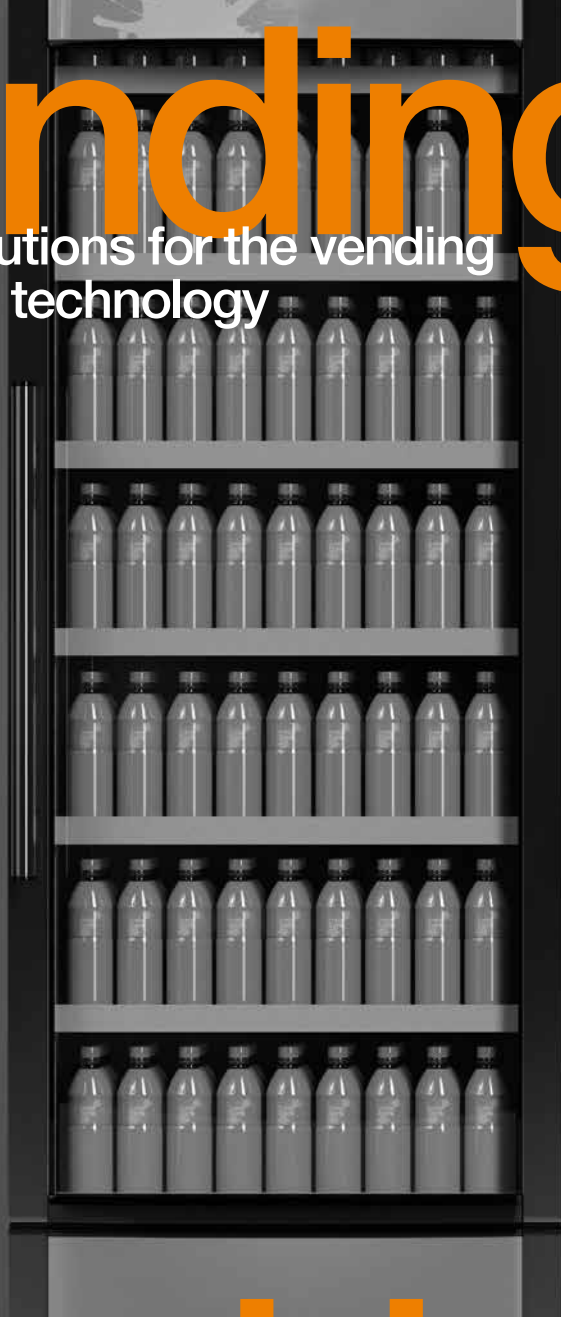


vending ...

igus® solutions for the vending
machine technology



plastics for longer life® ... igus

machines

... www.igus.eu/vending-machines ...

Reduce costs ...



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100% lubrication-free; thereby low noise, failsafe and long-lasting.

e-chains® and chainflex® cables for a reliable energy and data transmission - also as ready-to-install harnessed readychain® system

The vending machine technology is establishing itself day by day in very many industries. Users benefit from the convenience of having the desired product quickly in his hands and at the same time need little space for storage. In addition to the industrial use in e.g. pick & place systems or tool handling, however, more vending machines are used directly in salesrooms and in this way new standards are being set in speed and running smoothness.

All movements have one thing in common. Fully automated systems start and run in the background – quickly, quietly and failsafe. Specifically for this purpose, igus® offers a large modular kit of lubrication-free and maintenance-free product solutions. Lubrication-free, low noise drylin® drive modules for positioning, failsafe energy chains® and cables, maintenance-free plain bearings, efficient high helix threads, lightweight linear guides even for the smallest of spaces.

Whether they are individual components or systems such as harnessed energy chains® with cables and connectors or ready-to-install linear axes with a motor, igus® products provide the following benefits:

- Lubrication-free
- Silent operation and smooth gliding
- Resistance to dirt
- Long service life
- Corrosion resistance
- Compact products for the narrowest installation spaces
- High media resistance
- Ready-to-install harnessed system solutions
- Low-cost automation solutions
- A wide array of variants and material types
- Delivery from stock at quantities as low as 1 item in as little as 24 h

Our online tools also enable you to reduce process costs. igus® delivers from stock in 24-48 hours! Also, see our industry website.

 www.igus.eu/vending-machines

We look forward to talking to you.

... Improve technology ...



**... with motion plastics®
from igus®**

igus® solutions ...

Lubrication-free, maintenance-free and failsafe solutions ...



e-chain®

Small energy chains® with small bend radius for the perfect energy supply in the most confined spaces



chainflex® cables:

Tightest radii, failsafe, with UL and 36-month guarantee



dryspin® lead screw nuts/lead screws

Lead screw module with high efficiency through improved flange angle



igubal® pillow block and spherical bearings

Maintenance-free, compensation of tolerances



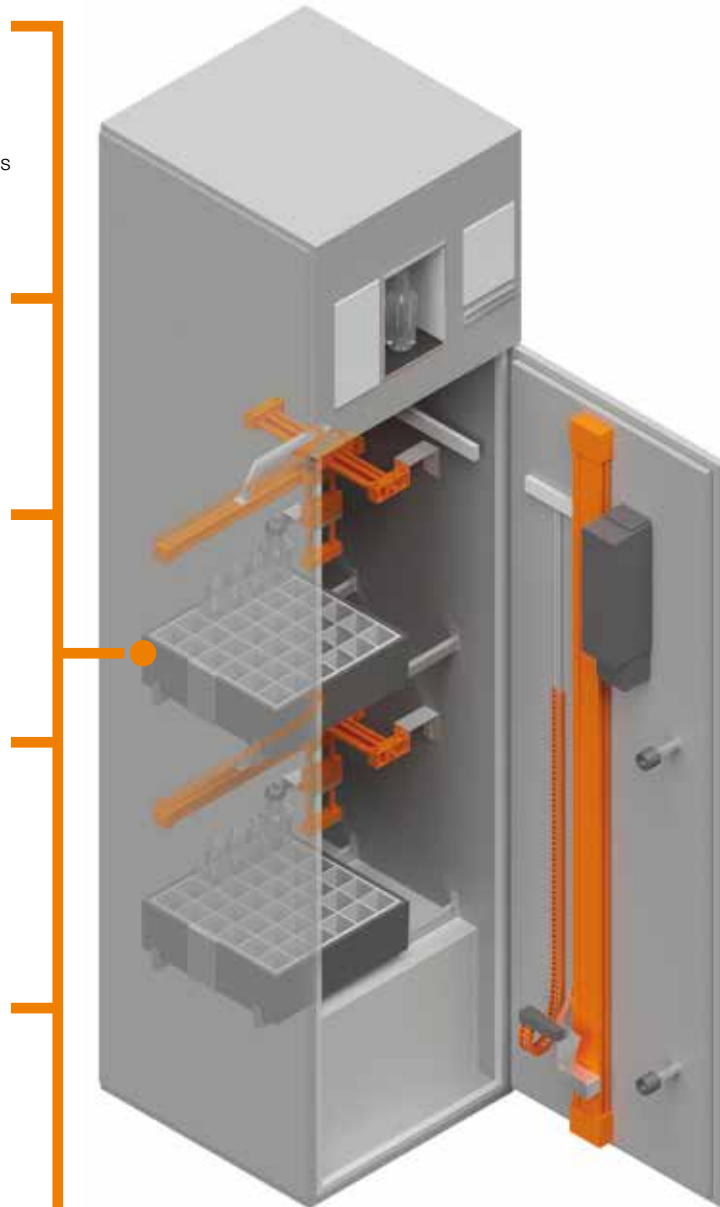
drylin® linear guides and linear axes

Low noise linear travel without lubrication



iglidur® plastic plain bearings

Fit and forget. Easy bearing without lubrication



... for vending machines

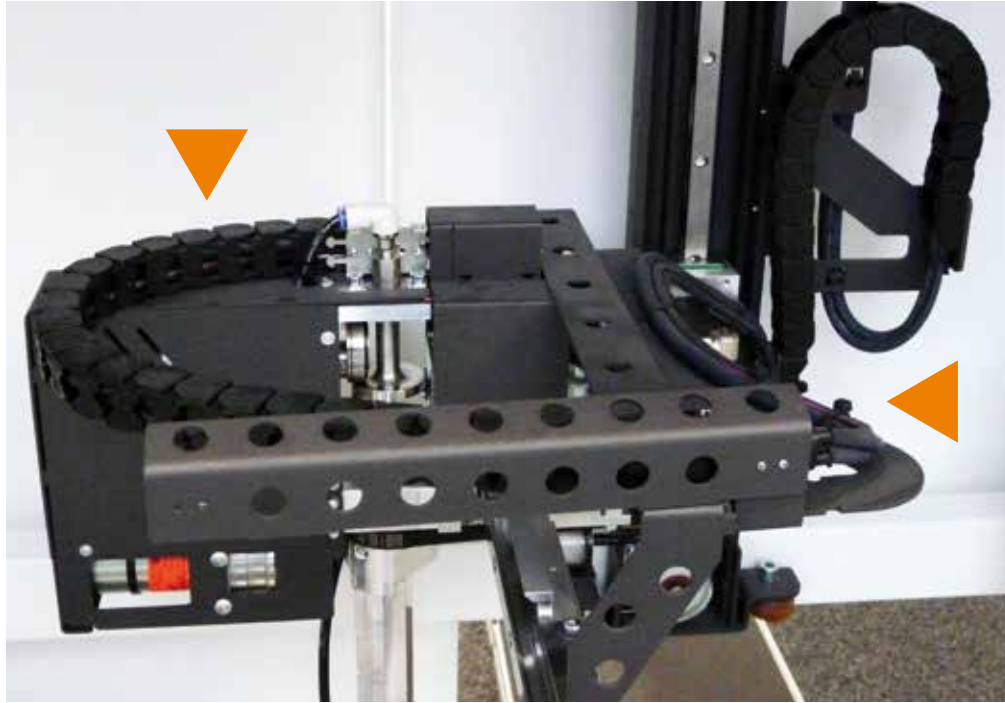
... guide energy in extremely small installation spaces ...



In this fully automatic warehouse, e-chains® and chainflex® cables accomplish maximum services. Medicines are order picked from the shelves quickly and efficiently with dryspin® high helix lead screws/nuts.

igus® applications ...

Tight radii ... chainflex® lasts ... 4xd bend radius



The igus e-chains® and chainflex® cables are also used in the fully automated storage systems, which automatically identify the medicines and specify a storage location



Coin changer



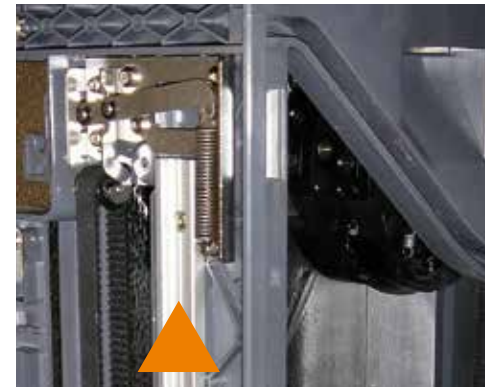
Order picking device

... for vending machines

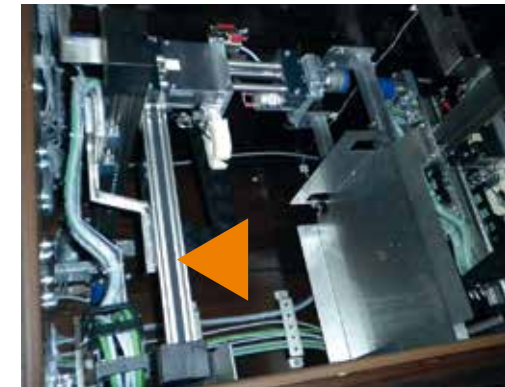
No lubrication ... with igus® dry-tech® bearings



In this inspection station, banknotes are checked fully with lubrication-free drylin® ZLW toothed belt axes



drylin® N low profile guides in ATMs are robust and compact and also lubrication-free and maintenance-free



By pressing a button on this vending machine with motorised drylin® linear axes, products are fully automatically transported to the output shaft

Arguments in favour of ...

energy chains®, cables and linear technology ...



High media resistance

igidur® materials – in particular of the "igidur® H family" – are distinguished by a high media resistance and a wide application range in the wet area. Thus the leakage of Cola (phosphoric acid) or juices does not affect the functional capability of iglidur® plain bearings or drylin® linear bearings. Due to the omission of lubricants, the lubricants need not also be rinsed or flushed out.

Compact, flat designed solutions

Wherever space is restricted, the e-chains® and chainflex® cables for the narrowest bend radii from 4xd are the ideal and failsafe solution (see picture). The very flat-designed drylin® N flat guides help in making your equipment very compact, space-saving and maintenance-free.

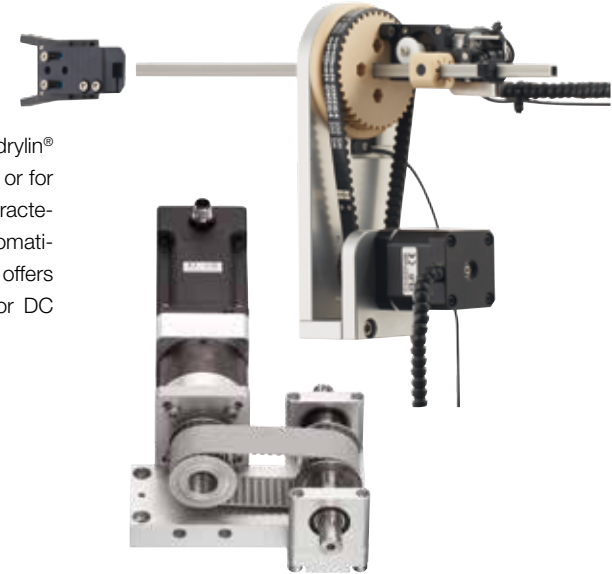


... igus® motion plastics®

... reduce costs and improve technology

Low-cost automation

Simple automation tasks at a low price with drylin® low-cost drive units. Whether entirely of plastic or for simple adjustments. These key messages characterise the drylin® linear axes of the "low-cost automation" type series. For many linear axes, igus® offers motor kit options for connection to stepper or DC motors.



Maintenance-free, dust-repellent

Use is also enabled in very dirty and dusty environments. Particles are repelled from the contact surface by the movement itself. Seals can be deliberately dispensed with due to the dry operation. Dust and dirt cannot stick to grease or oil.



Moving energy made easy

Solutions from the igus® e-chains® construction kit

e-chains® – designed to guide and protect.

e-chainsystems® are the "umbilical cord" of modern machines. They reduce downtime and increase the service lives of cables and hoses. Plastic energy chains® have been developed, produced and tested by igus® since 1971. e-chainsystems® carry sensitive bus, data and fiber optic cables, as well as energy forms such as electricity, gas, air and hydraulics.

- Maintenance-free – no grease or oil needed to lubricate the joints
- Modular design reduces the assembly time
- For small installation spaces
- For all applications
- The plastic material reduces noise development and has a vibration dampening effect
- Electrically insulating
- Easy to lengthen and shorten
- Resistant to dirt, sea water, chemicals, extreme temperature
- Diverse modular interior separations
- Lightweight AND high stability

One choice from 90,000 e-chains® products:



E1 system

- Cost-effective solution for large volumes
- Can be shortened or lengthened as required through injection-moulded, modular chain band

www.igus.eu/E1



E2 micro

- For the smallest installation spaces
- UL94-V2 (optional V0)
- Stable, light and quiet

www.igus.eu/E2micro



System E2.1

- Stable and low noise
- Large, assembly-friendly pins
- Snap open on both sides
- Extensive accessories

www.igus.eu/E21



easy chain®

- Easy insertion of cables
- Flexible, highly dynamic and quiet
- Easy access from inside or outside
- Affordable one-piece energy chains®

www.igus.eu/easychain

Explore more products at www.igus.eu/e-chains

chainflex® works – guaranteed

chainflex® cable types from stock, with guarantee

25 years of chainflex® – cables with the special structure for a very long service life in energy chains® and the unique 36-month guarantee*.

Flexible cables in energy chains® need special characteristics to last through many cycles, high speeds and accelerations, as well as demanding environmental conditions. Electromagnetic compatibility and compliance with standards and guidelines such as NFPA 79, UL, CSA, VDE, Inter- and Profibus are also taken for granted today. The igus® chainflex® product range extends from energy chain® compatible control cables, servo cables, motor cables, as well as robot cables to bus cables, data cables, encoder cables and fibre optic cables.

- Temperatures -40 °C to +90 °C
- For highly dynamic applications in energy chains®
- Special design prevents cable failure and "corkscrewing"
- 36 month guarantee for chainflex® cables®



One choice from 1,244 chainflex® types:



PVC control cables CF130.UL & CF140.UL

- For medium duty applications
- PVC outer jacket (CF140 shielded)
- Flame retardant

www.igus.eu/CF130



TPE control cables CF98 & CF99

- For heavy duty applications
- Very small radii of 4xd
- TPE outer jacket (CF99 shielded)

www.igus.eu/CF98



PVC Ethernet cable CAT5/GigE CFBUS.PVC

- For medium duty applications
- PVC outer jacket, shielded
- Oil resistant, flame retardant

www.igus.eu/CFBUS



PVC motor cables CF31

- For heavy duty applications
- PVC outer jacket, shielded
- Oil resistant, flame retardant

www.igus.eu/CF31

Explore more products at www.igus.eu/chainflex

* 36 months or up to 10 million double strokes (5 million for cables of the chainflex® M family); whichever is first

Lubrication-free mounting ...

Plain bearings made of high-performance polymers – iglidur®

No lubrication or maintenance required, while cutting costs and increasing service life, everything from stock and delivered promptly – that is the central idea of all igus® products. iglidur® plastics have been extensively tested with respect to wear and friction values including other relevant material properties. iglidur® polymer plain bearings from igus® signifies the step from the plastic bearing to the tested and therefore predictable machine component.

- Absolutely lubrication-free
- Vibration dampening
- Maintenance-free
- Very light weight
- High static loads
- No corrosion
- Metric and imperial dimensions
- Available from stock
- Special dimensions and designs on request

One choice out of over 50 iglidur® materials:



igidur® G polymer plain bearings

- High abrasion resistance
- Resistance to dust and dirt
- Suitable for e-coating

www.igus.eu/g



igidur® J polymer plain bearings

- Vibration dampening
- Low humidity absorption
- Good gliding partner even for "soft" shafts

www.igus.eu/j



igidur® H2 plastic plain bearing

- For underwater use
- Cost-effective
- Chemical resistant, for high temperatures
- Excellent properties with additional lubrication

www.igus.eu/H2



igidur® A181 plastic plain bearing

- FDA-compliant as well as 10/2011 EC conformity
- For use with temperatures up to +90 °C
- Universal use
- Good media resistance
- Wear resistant

www.igus.eu/a181

Explore more products at www.igus.eu/igidur

... self-aligning ...

Lubrication-free and maintenance-free spherical bearings – igubal®

igubal® is a system of self-aligning bearing elements completely made from plastic. The igubal® series provides developers with a complete system of self-adjusting bearing elements: rod end bearings, clevis joints, flange bearings, spherical bearings and pillow block bearings. Self-adjusting bearings are easy to install, adaptable to all angular variations and have already been used to replace special housings in many cases. igubal® utilises all the advantages of the high-performance plastics employed. They can be used in dry operation and have excellent vibration dampening properties. They are resistant to dirt, can operate in liquids and even in chemicals and are completely resistant to corrosion.

- igubal® maintenance-free spherical bearings with a diameter of 2 to 50 mm
- Resistant to chemicals and corrosion
- Excellent damping properties
- High frequency possible
- Predictable service life

One choice from virtually over 2,500 igubal® products:



Various types of pillow block bearings

- With split housing and/or spherical ball (optional).



Flange pillow block

- With 2 or 4 bore holes
- Also available as HT version for up to +200°C



Rod ends

- With male/female thread; right/left
- Also available as HT version for up to +200°C

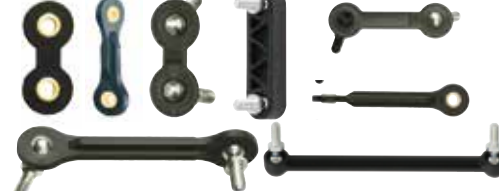


Clevis joints and spring-loaded fixing clip

- Individually or in combination (e.g. with clevis joints)



Spherical bearings and self-aligning clip bearings



Double joints and coupling bars

Explore more products at www.igus.eu/igubal

Quiet linear travel ...

Lubrication-free and maintenance-free drylin® linear technology ...

drylin® is a product range of lubrication-free linear plain bearings based on the principle of sliding instead of rolling. Tribologically optimised iglidur® high performance polymers are used as sliding surfaces. The drylin® linear systems run dry and are maintenance-free. Linear guide systems with rails or round shafts are available. The drylin® drive technology can supply ready-to-connect systems with lead screw drives or toothed belt drives, with or without motor. The focus is on the ruggedness and insensitivity to influences such as dirt, water, chemicals, heat or impacts, as well as the freedom from maintenance and lubrication

- Insensitive to dirt due to dry operation
- Quiet operation
- Vibration dampening
- Resistant to impacts and vibration
- Dirt channels for paper dust.
- High static load capacity
- Cleanroom compatible
- Lightweight
- Suited for short-stroke applications
- Available from stock
- Special designs according to your specifications
e.g. curved rail profiles

A choice from over 2,000 drylin® products:



drylin® N low profile guides

- Low installation height 6-12 mm
- Very lightweight
- Numerous carriage options – also with pretension

www.igus.eu/drylinN



drylin® W linear linear system

- Modular structure, low weight
- Square rail with floating bearing function for 90 degree installation

www.igus.eu/drylinW



drylin® T linear guides

- Automatic clearance adjustment
- High static load capacity
- High levels of dirt resistance
- Low vibration and quiet

www.igus.eu/drylinT



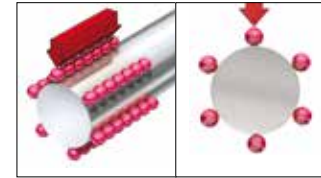
drylin® R shaft guides

- Dimension is identical to standard commercial bushings
- Shafts, shaft support blocks and accessories available from stock, replaceable liners

www.igus.eu/drylinR

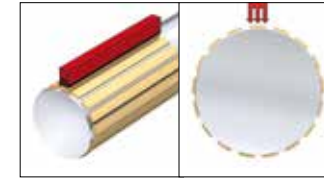
... quiet ... maintenance-free

... sliding instead of rolling ... resistant to dirt



"Conventional" rolling bearings – point contact

Force is transmitted via balls at certain points. The system requires lubrication to ensure proper functionality.



drylin® plain bearings – surface contact

The force is transmitted two-dimensionally over liners or sliding elements. The system is lubrication- and maintenance-free over the entire service life.



Resistant to dirt, dust and moisture –

due to lubrication-free use and dirt channels, for example, paper dust cannot stick.

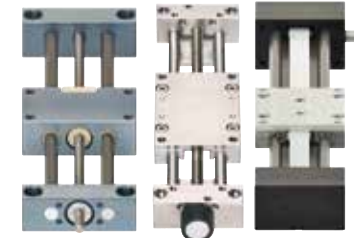
Further solutions from the drylin® modular kit:



drylin® lead screw drives

- Efficient and durable dryspin® technology
- Self-locking trapezoidal and metric threads
- Lead screw nuts made from 5 iglidur® materials

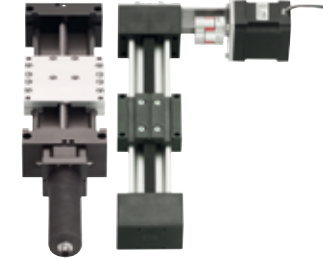
www.igus.eu/drylin-leadscrewdrives



drylin® drive technology

- Linear modules with lead screw drive or toothed belt
- For manual or electrical adjustments
- Configuration with customised stroke lengths

www.igus.eu/drylin-drive



drylin® E drive technology

- Linear axes with stepper motors/ DC motors
- Fail-safe due to the use of encoders and initiators
- Can be combined for gantry configurations

www.igus.eu/drylinE

Explore more products at www.igus.eu/drylin

From batch size 1 from ...

... customised igus® special parts



Special parts made from tribo-plastics according to customer requirement

speedimold is primarily simple! Constructive special solutions just as you need it, virtually everything is possible. iglidur® offers you self-lubricating and maintenance-free plain bearing solutions, all according to your wishes, "off the shelf" or "custom made", especially for your applications: Choose from 8 iglidur® tribo-plastic materials iglidur® G, iglidur® J, iglidur® W300, iglidur® X, iglidur® M250, iglidur® P, iglidur® A180, iglidur® H2 and igumid G. You will get, depending on the complexity of parts, injection-moulded parts in 1 to 10 days with no minimum order value.

www.igus.eu/speedimold



Special parts made from iglidur® materials

speedicut uses the entire range of iglidur® bar stock materials and produces parts according to customer requirements very quickly. Like the proven speedigus® rapid tooling system, speedicut easily and quickly creates a cost estimate based on a 3D model. The parts are then delivered within a few days.

www.igus.eu/speedicut



Additional customised components available, such as machined drylin® rails, shafts etc.

Just ask and together we will develop the "one" component that is optimally suited for your application.

www.igus.eu/drylin

... the dry-tech® construction kit

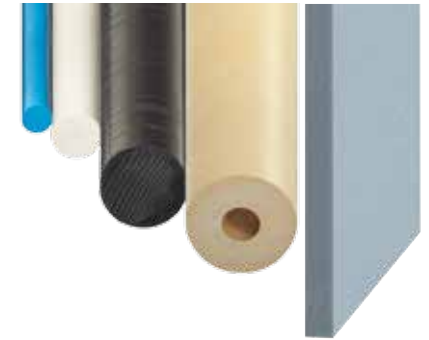
... Filaments and liners



Simply cut and stick Tribo-Tape

- Suitable for a variety of lining for tribologically stressed surfaces and shapes
- Easy to cut and glue
- Less space required
- Optional self-adhesive back

www.igus.eu/tribotape



For free design – iglidur® bar stock

- iglidur® materials as round bars, tubes and plates
- Currently 25 iglidur® materials to choose from
- Cut to required size without offcut removal
- Mechanical processing from a batch size of 1
- Maintenance-free and calculable

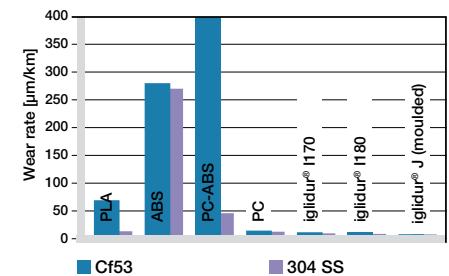
www.igus.eu/barstock

igidur® Tribo-Filament for 3D printers

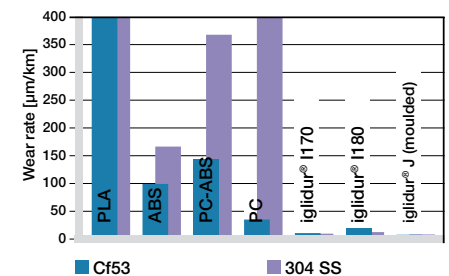
Tribo-material has up to 50 times more abrasion resistance than common 3D printing materials

- Design custom parts or manufacture prototypes while also relying on the tested service life of igus® materials
- Select from three highly wear-resistant igus® materials: iglidur® I170, iglidur® I180 and iglidur® J260
- Give it a try with our starter kits with 25 g each of iglidur® I170 (in 1.75 mm), iglidur® I180 (in 1.75 mm and 3 mm) and iglidur® J260 (in 1.75 mm and 3 mm)

www.igus.eu/tribo-printing



Wear, pivoting: $v = 0.01$ m/s; $p = 1$ MPa; $\beta = 60^\circ$



Wear, linear: $v = 0.1$ m/s; $p = 1$ MPa; $l = 5$ mm

As assembled system ...

readychain®: chain - cable - guarantee ... delivered in 3-10 days



Assembled igus® readychain® systems: individual or serial production

readychain® – fully harnessed systems in 3-10 days

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

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

 www.readychain.eu

readycable®: harnessed drive cables ... in 24-48h



readycable®

igus® provides more than 4,000 harnessed cables for drives according to 24 different manufacturer standards. Professionally produced, 100% tested.

 www.readycable.eu

Tested service life!

Tested at the 2,750 m² Cologne lab. 4,100 tests, 7,512 findings added to the electronic database, 10 billion e-chains® cycles per year for chains and cables



A section of the igus® e-chain® test laboratory, Cologne



A section of the igus® dry-tech® test laboratory



Many types with fire class UL94-V2 or V0



Wear tests under the influence of different media



Control cable CF98.05.04 tested in e-chain®. More than 138 million strokes with a bending factor of 3.2 x d

igus® services ...



Visit our industry web pages for more information, products, application examples and useful online-tools.

www.igus.eu/vending-machines



Quickly find and configure products and calculate service life – all online.

Using our online product finders, you can find the right igus® product and get a service life prediction.

www.igus.eu/online

For any task – in any batch size

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 in many industries.

www.igus.eu/industry

... quick and reliable



The igus® delivery service
Over 97% availability of all catalogue parts – no need for you to stock

- Over 100,000 products from stock
- No minimum order
- No surcharges for small quantities
- No costs for cutting cables
- No packaging costs

www.igus.eu/24



Modern injection moulding technology

The igus® GmbH quality policy is based on the objective of identifying and meeting customer needs, and of always being a professional partner and reliable supplier. igus® has always been committed to producing products of the best possible quality and consistently developing innovative solutions.



The igus® lab

The industry's largest test lab (2,750m²) conducts more than two billion test cycles per year on a total of 107 test rigs.

- Extensive test databases
- Customised tests on request

www.igus.eu/test



igus® motion plastics®

One vision has been driving us for 1964 years – motion plastics®: Moving parts made of plastic that cost less and last longer. Our core technology consists of tribo-polymers – high-performance plastics, which we have optimised for friction and wear. The technology has made us into a world-wide leader for developing and manufacturing energy supply systems and plain bearings.



/9001:2008 /16949:2009

igus® is certified in accordance with ISO 9001:2008 and ISO/TS 16949:2009 in the field of energy supply systems, cables and harnessing, as well as plastic bearings.

/newsletter

Free of charge! Discover more about the latest trends and innovations from the world of igus® motion plastics®. Many exciting applications and videos for your industry.

Register here: www.igus.eu/newsletter

/contact

Your contact person for your industry and your country: www.igus.eu/contact

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