



# construction machinery

igus® solutions for construction machinery

plastics for longer life® ... igus

# ...industry...

... [www.igus.eu/constructionmachinery](http://www.igus.eu/constructionmachinery) ...

# Reduce costs ...



**Harry Suckau**

Industry manager

Construction machinery

Tel.: +49-172 2306764

Email: hsuckau@igus.de

## Extremely tough against vibration, cold and dirt – igus® plastic solutions for the construction equipment industry.

At present in this industry, components of machines and installations are exposed to high loads. In order for the machines to run reliably without downtime, all components must be designed for maximum availability.

igus® offers plastic solutions for cable protection and guiding, cables for highly dynamic continuous motion and bearing systems for your industry. We test all the products under practical conditions in the largest test lab of its kind in Cologne. More than 200,000 customers rely on plastics solutions from igus® worldwide.

### Some advantages of the igus® products for the construction equipment industry

#### e-chains®:

- Resistant to shocks and vibrations
- Resistant to many construction materials and so on, for example, bentonite
- Highest loads up to 600 kg/m
- Corrosion and UV resistant
- No easily lost parts such as screws, bolts or rivets
- Know-how from igus® specialists, e.g. for sloping travel paths

#### chainflex® cables:

- Flexible down to -40 °C, UV-resistant, oil resistant
- Specifically designed for highly dynamic movements in energy chains®
- Numerous approvals, e.g. in accordance with UL, EAC, CTP, DNV-GL
- 36 months guarantee for chainflex® cables (according to igus® specifications)

#### iglidur® plain bearings:

- Dry-running, lubrication-free and dirt resistant
- High edge loads and surface pressures up to 250 MPa

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/constructionmachinery](http://www.igus.eu/constructionmachinery)

I look forward to speaking to you.

# ... improve technology ...



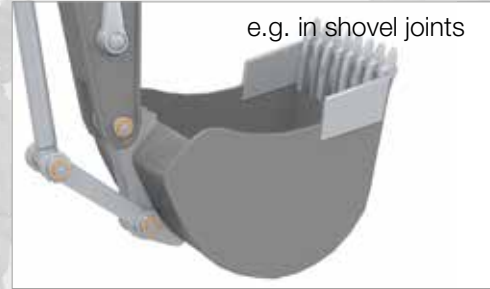
... with motion plastics® from igus®

# igus® in construction machinery

## ... in drilling equipment



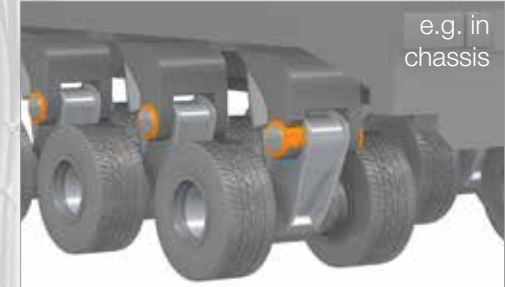
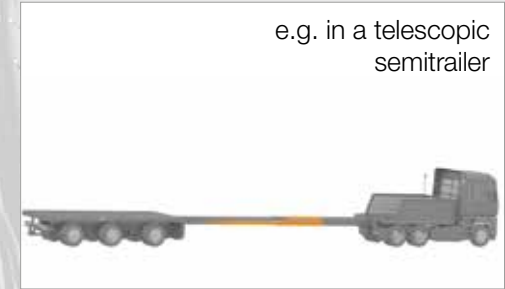
## ... in the excavator



## ... in telescopic extensions



## ... in utility vehicles



# ESD/Atex ... vibration resistant

Deep drilling rig



Exploration project in southern Argentina, under extremely challenging conditions, the company has now equipped two drilling systems with custom modified igus® Atex e-chains®.

# Dirt ... high temperatures

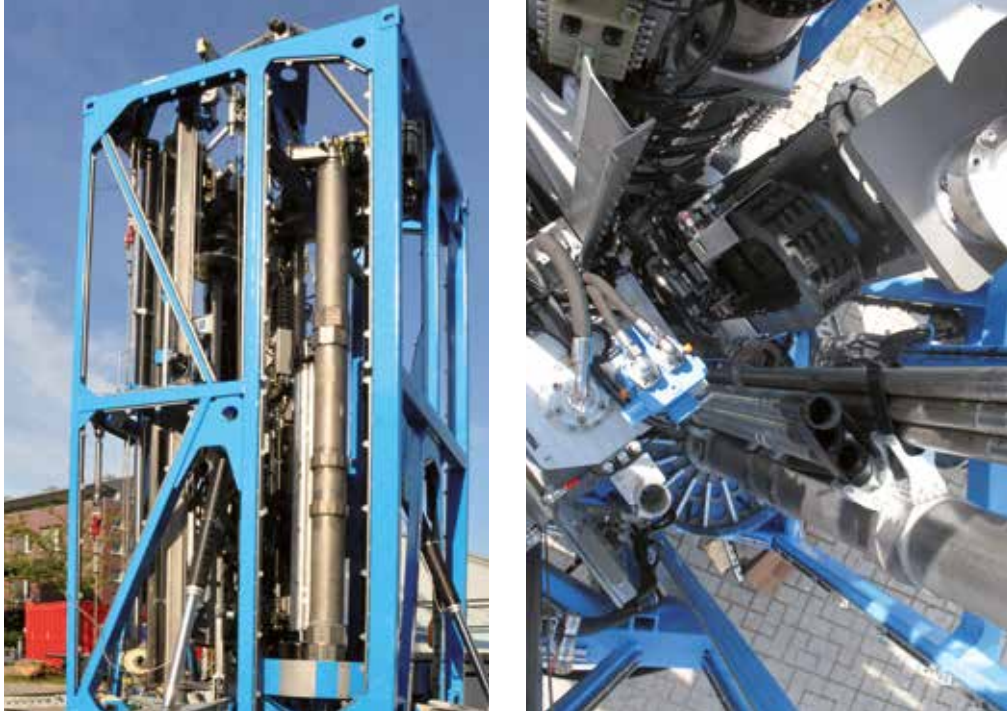
Tunnel drilling rig



The erector is supplied with energy by two counter-running e-chains®.

# Corrosion resistant ...

Sea bed drilling rig



Three E4 series e-chains® supply energy to this drilling equipment working 4,000 m under the sea. Special igus® plain bearings for underwater applications ensure a lubrication-free operation in seawater

# ...100 kg/m ... UV resistant ...

Sludge treatment plant



World's largest polymer energy chain® - enormously lighter than comparable steel chains, it effortlessly moves more than 100 kg filling weight per metre

# ... No easily lost parts ...

Earth boring device



igus® H4 series guides hydraulic hoses reliably in an anchoring drill



igus® E4 series guides pulsating hydraulic hoses to this pile driver



Anchoring drill in operation with igus® E4 e-chain® with dirt and vibration

# ... Cost effective ... unsupported

Telescopic forklift



igus® series 2400 in a telescopic forklift



Telescopic forklift



igus® E4 in moveable cabin on an industrial excavator

# igus® products in cabins

Bearings and linear bearings –  
lubrication- and maintenance-free ...



**1** Mirror adjustment  
igidur® J plastic plain bearings

- Low coefficients of friction, low wear

[www.igus.eu/J](http://www.igus.eu/J)



**2** Monitor adjustment  
drylin® W profile guide carriages

- Flexible and easy to position

[www.igus.eu/drylinW](http://www.igus.eu/drylinW)



**3** Head rest back adjustment  
drylin® W profile guide

- Lubrication-free and modular
- Low assembly cost

[www.igus.eu/drylinW](http://www.igus.eu/drylinW)



**4** Steering column bearing  
drylin® polymer linear bearing

- Quick clip-on mounting
- No axial securing required

[www.igus.eu/jucm](http://www.igus.eu/jucm)



**4** Steering column bearing  
drylin® polymer linear bearing

- Quick clip-on mounting
- No axial securing required

[www.igus.eu/jucm](http://www.igus.eu/jucm)



**5** Steering column bearing  
igidur® G plastic plain bearings

- High wear resistance
- Resistant to dirt

[www.igus.eu/G](http://www.igus.eu/G)



**6** Operating element  
triflex® 3D e-chain®

- Moving along all axes

[www.igus.eu/triflexR](http://www.igus.eu/triflexR)

[www.igus.eu/triflexR](http://www.igus.eu/triflexR)



**7** Connection hydraulic valve  
igubal® double joint bearing

- Compensation of misalignments
- Modular construction kit

[www.igus.eu/igubal](http://www.igus.eu/igubal)



**8** Armrest adjustment  
drylin® N low profile guide

- Light, low profile dry running

[www.igus.eu/drylinN](http://www.igus.eu/drylinN)

[www.igus.eu/drylinN](http://www.igus.eu/drylinN)



**9** Seat back adjustment  
drylin® W profile guide

- Lubrication-free and modular

[www.igus.eu/drylinW](http://www.igus.eu/drylinW)



**10** Seat bearing adjustment  
e-chain® E2 micro, chainflex® cables

- Stable, quiet and quick to assemble

[www.igus.eu/E2micro](http://www.igus.eu/E2micro)

[www.igus.eu/chainflex](http://www.igus.eu/chainflex)

# the-chain – moving energy ...

## Solutions from the igus® e-chains® construction kit

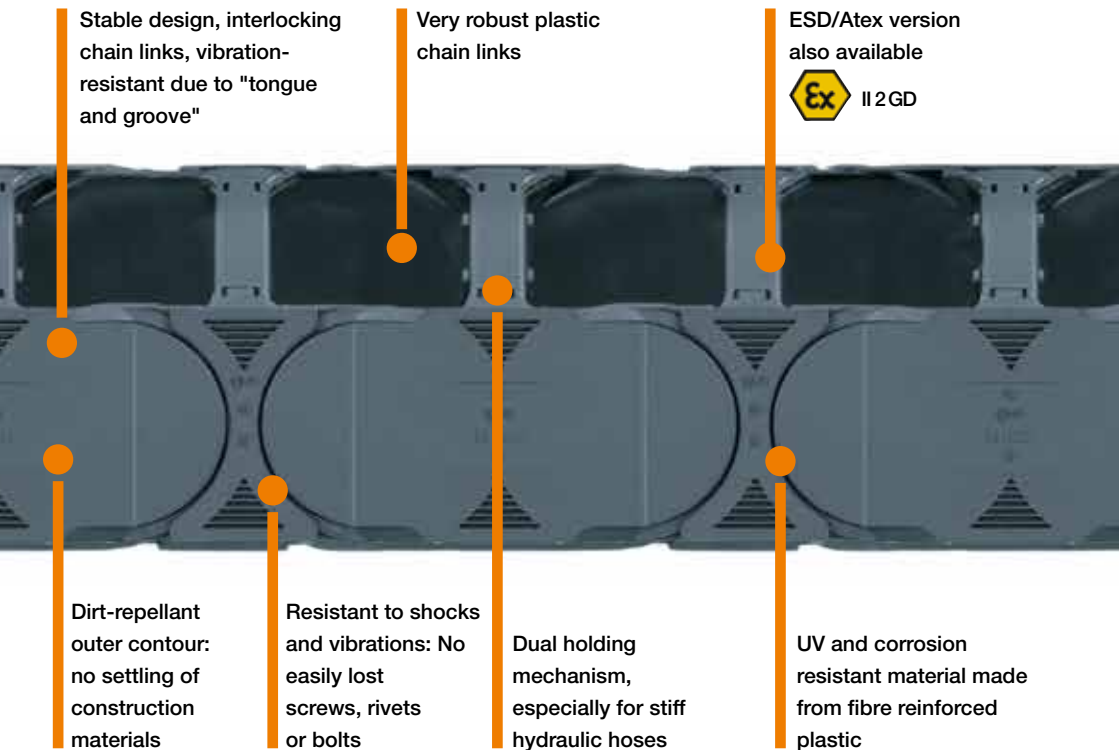
### e-chains® – designed to guide and protect.

e-chainsystems® - 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.

- Up to 350 mm inner height / 200-1,000 mm inner width
- Fill weights up to 600 kg/m
- Travel speeds up to 600 m/min.
- Maintenance-free – no grease or oil needed to lubricate the joints
- Modular design reduces the assembly time
- Highly resistant to wear, corrosion and sea water
- Easy to lengthen and shorten

- The plastic material reduces noise development and has a vibration dampening effect
- Electrically insulating
- Resistant to dirt, sea water, chemicals, extreme temperature
- Diverse modular interior separations
- Lightweight AND high stability

 [www.igus.eu/e-chains](http://www.igus.eu/e-chains)



# ... made easy

## Tested for your industry, for example:



### igus® bentonite test

**Goal:** resistance of e-chains® material against bentonite and measurement of the force to move the e-chain®

**Test set-up:** four e-chains® are immersed in different bentonite mixtures for 100,000 cycles and allowed to dry out

**Result:** the igus® e-chain® has no recognizable wear. It is still easy to move despite bentonite



### igus® vibration test

**Goal:** service life test under high vibration to simulate the use in construction and drilling equipment

**Test set-up:** standing E4 e-chains® are exposed to a vibration of 30 - 60 Hz on a specially developed test stand

**Result:** after 2,000 hours no wear of the plastic e-chain® could be measured. The steel chain already shows massive wear in the region of the bolts.

## Special solutions for your industry, for example:



### Locking separator

Holds securely even with hydraulic hoses under high pressures.



### Roller separator

Protects hydraulic hoses against wear in strong movement.



### Attenuated e-chain®

Tribo-optimised polyamide bolts to absorb and compensate for any vibration.

Explore examples and products at  [www.igus.eu/constructionmachinery](http://www.igus.eu/constructionmachinery)



# chainflex® work ... guaranteed!

More than 1,040 chainflex® cable types from stock

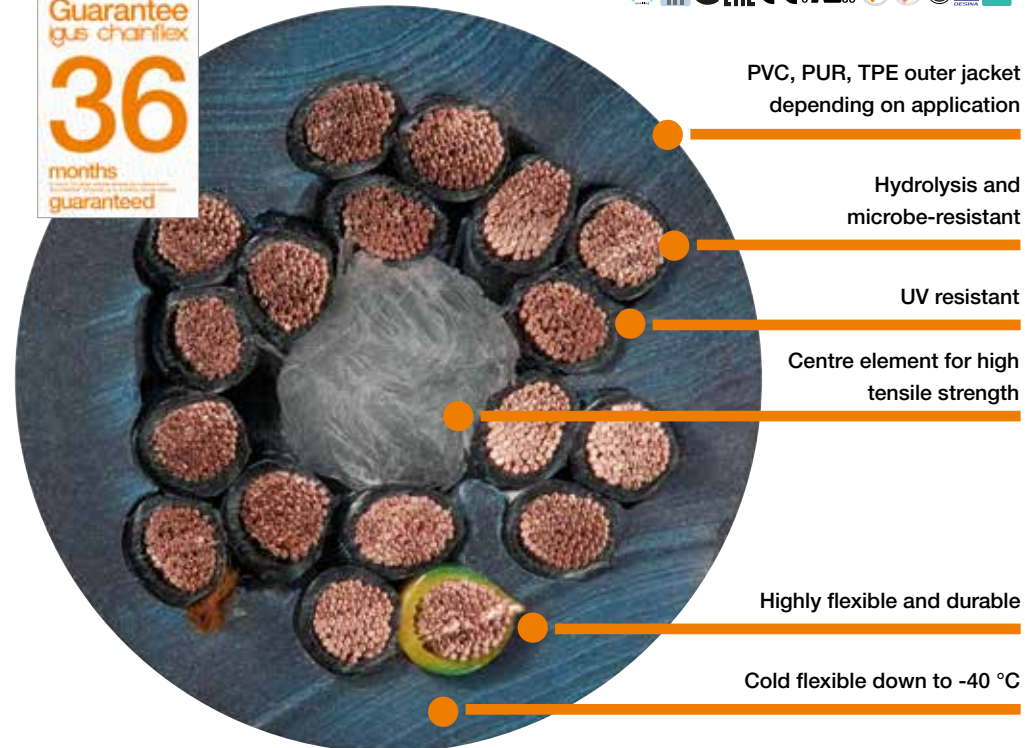
25 years of chainflex® – cables with the special structure for a very long service life in energy chains® and the unique 36-month guarantee\*.

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"
- Highly abrasion-resistant jacket materials (PVC, PUR, TPE)
- 36 months guarantee for chainflex® cables

- Germanischer Lloyd seal of approval (DNV-GL)
- Mud resistant acc. to NEK 606
- For outdoor applications

 [www.chainflex.eu](http://www.chainflex.eu)



# ... or your money back!

Tested for your industry, for example:



## igus® resistance test

**Objective:** Service life and durability tests on various igus® chainflex® cables

**Test setup:** igus® chainflex® cables moving in e-chains®, in a selection of oils.

**Result:** no impairment of the tested chainflex® cables in a variety of oils and lubricants



## igus® cold chamber test

**Objective:** to determine the maximum service life at temperatures of -40 °C.

**Test set-up:** 7 m travel, speed of 1.5 m/s at -40°C, igus® CF35 TPE cables in an e-chain®

**Result:** the test was ended after 3.7 million double strokes. The cable exhibits little wear and is fully functional.

Special solutions for your industry, for example:



### Single core motor cable

Shielded and unshielded single core motor cables for demanding requirements



### Data cables

For all throughput data systems in e-chains® applications. Even with large cross sections.



### Control cables

PVC, PUR, TPE – for all application areas Shielded and unshielded cables.

Explore examples and products at  [www.igus.eu/constructionmachinery](http://www.igus.eu/constructionmachinery)

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

# dry-tech® ... don't lubricate

## A choice of 50 iglidur® plastic plain bearing materials

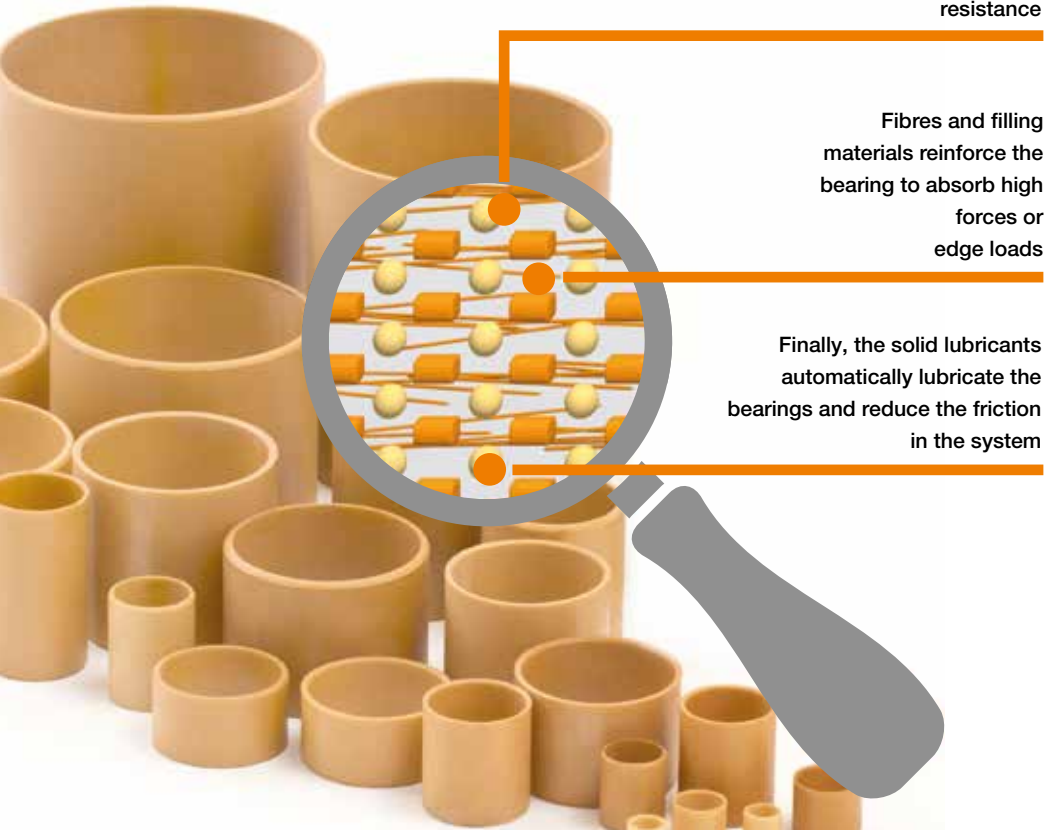
### Lubricant and maintenance free plain bearings made from high-performance plastics – iglidur®.

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 iglus® products. iglidur® plastics have been extensively tested with respect to wear and friction values including other relevant material properties. iglidur® polymer plain bearings from iglus® signifies the step from the plastic bearing to the tested and therefore predictable machine component.

- Absolutely lubrication-free
- Very light weight
- Maintenance-free
- High static loads
- No corrosion
- Vibration dampening
- Metric and imperial dimensions
- Special dimension and designs

[www.igus.eu/igidur](http://www.igus.eu/igidur)

### Structure of iglidur® plain bearings:



The base polymer is crucial for the wear resistance

Fibres and filling materials reinforce the bearing to absorb high forces or edge loads

Finally, the solid lubricants automatically lubricate the bearings and reduce the friction in the system

# tested for specific applications

## Tested for your industry, for example:

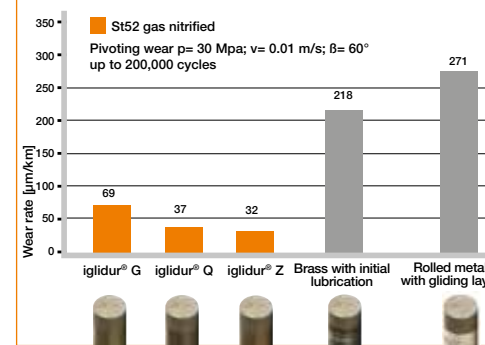


### igus® Heavy Duty test

**Goal:** comparison of typical, lubricated metallic bearing systems with lubricant-free iglidur® plain bearings

**Test set-up:** original front loader, driven by a stationary hydraulic unit (11kW, 70 litre flow rate/minute)

**Result:** due to the control the most diverse collective motion can be programmed, with similarly variable forces



### igus® "swivel test"

**Objective:** to test the wear of iglidur® plastic plain bearings compared to 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 bearings are very strongly shrunk and thus not fit for further use.

## Other solutions for your industry, for example:



### igidur® Q290 plain bearings

- Long life even on soft shafts
  - Insensitive to edge loads
- igidur® TX1 plain bearings**
- Lubrication- & maintenance-free
  - Up to 200 MPa static and 140 MPa dynamic

[www.igus.eu/igidur](http://www.igus.eu/igidur)

### igidur® PRT slewing ring bearing

- Lightweight due to the use of plastics and aluminium
- Very quiet rotary motion
- For high loads, robust
- Extensive accessories

[www.igus.eu/PRT](http://www.igus.eu/PRT)

### drylin® W profile guide

- Simple installation, maintenance-free
- Curved rails
- Low weight and quiet operation
- Special profile solutions

[www.igus.eu/drylinW](http://www.igus.eu/drylinW)

[www.igus.eu/curved-rails](http://www.igus.eu/curved-rails)

Explore examples and products at [www.igus.eu/constructionmachinery](http://www.igus.eu/constructionmachinery)

# Ready to fit from a single source

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



## readychain® – fully harnessed systems in 3-10 days

1,000 systems produced per week in 12 readychain® factories around the world – assembly time optimised to increase your cash-flow

- 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](http://www.readychain.eu)

## readychain® assembly rack

Save 80 % at prototyping. Assembly transport rack for ready-to-install energy supply systems.

Assembled igus® readychain® systems: individual or serial production



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



## readycable®

igus® provides more than 3,200 harnessed cables for drive technology to 22 different manufacturer standards. Professionally produced, 100% tested.

[www.readycable.eu](http://www.readycable.eu)

# Installation and maintenance

## Save time and money on maintenance and installation of your energy chain systems®

### Design, harnessing, delivery up to complete assembly of energy chains® with all components.

Machines must work reliably and without problems. This requires reliable energy chain systems® and cables, which guarantee a long service life and a quick service, by which machine downtimes can be avoided or reduced in case of emergency.

[www.igus.eu/assemblyservice](http://www.igus.eu/assemblyservice)

### Our service:

- Predictable fixed cost for the installation, maintenance or inspection of energy supply systems on your system
- Fast and accurate installation and maintenance of all components by qualified specialists
- Minimal down time
- Products and services (energy chains®, cables, strain relief, guide troughs, etc) from a single source – less logistics costs for you
- igus® system guarantee\*



New installation



Upgrades / Replacement



Chain monitoring



Repairs

# Tested! Service life ...

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



Better products for less – a key element is the industry's largest test lab. 2,750 m<sup>2</sup> lab, more than 15,000 tests and 2 billion test strokes per year.

## The igus<sup>®</sup> 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.

Our mechanical engineering components pass the test presented by production reality because they have already passed this test before leaving the igus<sup>®</sup> warehouse.



Polymer bearings technology: tested a thousand times ... under real conditions.

 [www.igus.eu/test](http://www.igus.eu/test)

# ... predicted accurately.

Tested, tested, tested ... For example:



Heavy duty test: typical, lubricated metallic bearing systems compared with lubricant-free iglidur<sup>®</sup> plain bearings



Service life test under high vibration to simulate the use in construction and drilling equipment



Pivot wear test rig for testing the pivoting wear rate for medium loads.



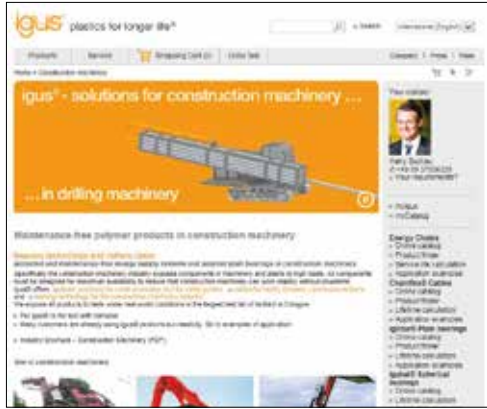
Determining the maximum e-chain<sup>®</sup> sag, as a "chain-in-chain" solution in this example



Outdoor test facility with up to 240 m travel for the 24 hours outdoor test

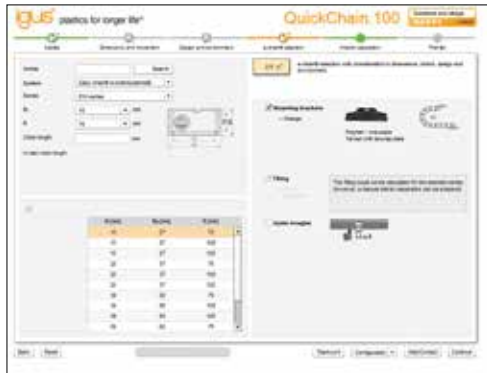


Determination of the maximum service life, tested in e-chain<sup>®</sup>. More than 65 million strokes



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

[www.igus.eu/constructionmachinery](http://www.igus.eu/constructionmachinery)



**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](http://www.igus.eu/online)



## The igus® delivery service

Over 97% availability of all catalogue parts – no need for you to hold stock

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

[www.igus.eu/24](http://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](http://www.igus.eu/test)

## **i** 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](http://www.igus.eu/industry)

## **i** igus® motion plastics®

One vision has been driving us for more than 50 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](http://www.igus.eu/newsletter)

# /contact

Your contact person for your industry and your country: [www.igus.eu/contact](http://www.igus.eu/contact)

# igus®

igus® GmbH  
Spicher Str. 1a  
51147 Cologne  
Tel. +49 2203 9649-800  
Fax +49 2203 9649-222  
[info@igus.de](mailto:info@igus.de)  
[www.igus.eu](http://www.igus.eu)

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