

# maritime

igus® solutions for the shipbuilding  
and offshore industry



# industry

plastics for longer life® ...igus

[www.igus.com/maritime](http://www.igus.com/maritime)

# igus® solutions ...



## **Tough, light, igus® plastic solutions for the maritime industry are self-lubricating and maintenance-free.**

Tried and tested in numerous applications on the high seas: e-chain systems® and plain bearings from igus® withstand the toughest environments. They provide reliable energy supply and allow highly dynamic movements with a long service life in wind turbines, oil rigs and the ship building industry. We test all products in the largest test laboratory in the industry under real world conditions.

This testing allows us to guarantee the reliability of our products and implement tailored solutions for e-chain systems® and plain bearings in a wide variety of customer applications. Travels for e-chains® of up to 2,625 ft., cable fill weights of 403 lbs/ft or high edge loads of up to 36,260 psi with plain bearings. More than 200,000 customers per year rely on motion plastics solutions from igus®.

I look forward to speaking with you.

### **Sean McCaskill**

Engined Systems Manager  
smccaskill@igus.com

From the port to the high seas, we offer igus® products for the offshore industry:

#### **e-chains®:**

- Maintenance-free, resistant to seawater and oil
- Fill weights of up to 403 lbs/ft
- Strong, yet lighter than steel
- Corrosion-resistant
- Conductive ESD options

#### **chainflex® cables:**

- DNV-GL certified cables, for example according to DNV-GL
- Flexible down to -40°F, UV-resistant
- Resistant to oils according to MUD NEK606
- Specifically designed for highly dynamic movements in e-chains®

#### **iglide® bearings:**

- Dry-running and self-lubricating
- High edge loads and surface pressure up to 36,260 psi
- Resistant to dirt

With our 30 online tools you can also save design costs. igus® delivers in 24 to 48 hours from stock! Visit our industry website

 [www.igus.com/maritime](http://www.igus.com/maritime)

A close-up, low-angle shot of an offshore oil rig's upper structure. The image features a complex network of white and red tubular steel beams. A prominent horizontal beam in the foreground is white with a red section. Below it, a circular platform with railings and various mechanical components is visible. The background shows the blue sky and the dark blue ocean. The overall scene is brightly lit, suggesting a clear day.

for maritime applications

Cost down,  
service life up!



# Prevent downtime in shipyards ...



## Meyer Werft Papenburg

Eight gantry cranes connected in series travel a total length of 590.6 ft. Both the longitudinal and transverse travels are reliably supplied by igus® e-chains® from the E4/4 range. The compact design of the e-chain® and guide trough allows the system to integrate seamlessly into the beam, leaving no cable loops hanging in the crane beam area or field of view.

with igus® e-chain systems®





# Reliable in offshore applications



## Jack up rig, China

### Transverse travel

Travel: 21 ft.  
Fill weight: 25.3 lbs/ft  
Speed max.: .98 ft/s  
e-chain®: 800-40-600-0

### Longitudinal travel

Travel: 63 ft.  
Fill weight: 50.1 lbs/ft  
Speed max.: .98 ft/s  
e-chain®: 600-25/178/178/25-600-0

# Rig skidding



## Working since 1993

e-chain®: 50-20/20/20/20-400-0  
Fill weight: 26.2 lbs/ft  
Travel: 137.8 ft.



## Claymore drilling rig, North Sea

e-chain®: 5050-18/18/18/18-450-0  
Fill weight: 24.5 lbs/ft  
Travel: 97 ft.



# For long travels ...



Rig skidding concept with e-chain® E4-350 for large diameter hoses and cables. Smaller cables, can guided with e-chains® Series E4-168 and E4-112.



## AMORAS - long travel reference in the Port of Antwerp

Travel: 449 ft.  
Speed max.: 4.92 ft/s  
Acceleration: 3.28 ft/s<sup>2</sup>  
e-chain®: E4-350R-500-1000-0  
chainflex®: CF300  
Total fill weight: 67 lbs/ft



# and high loads



## Jack-up rig, Caspian Sea

Year Built: 2000  
Nested e-chains®: 600-45/45-350-0  
600-45/45-500-0  
Fill weight: 179 lbs/ft  
Travel: 70.5 ft.



# Largest plastic e-chain® ...



## Flexlay vessel: Seven Waves

The vertical tiltable lay tower works with the biggest plastic e-chain® in the world.

e-chain®: E4-350-800-1000-0

Fill weight: 80.6 lbs/ft

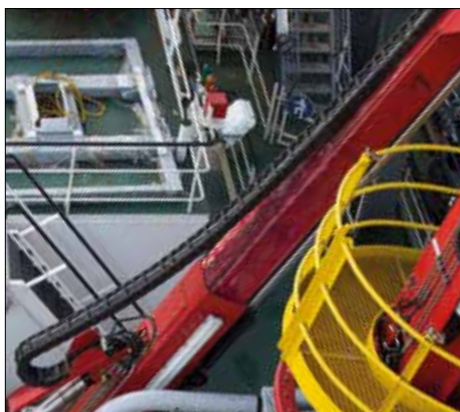


Seven Waves Pipelayer equipped with igus® e-chain systems®.

# pipelay vessel



Long travel skidding application with E4.56.



E4-42 working on a Remote Operate Vehicle (ROV).



e-chain system® 4040 on a vertical tensioner.

E4-350 at the hinge point of the lay tower.





# Robust and seawater-resistant ...



Gantry crane with e-chain® 5050C-26-250-0



Vertical pipe handling systems with opposing e-chains® E4-80-23-300-0

# pipe handling



Catwalk machine with e-chain® 5050C-25-200-0



NOV Starracker with Series 600



Starracker with e-chain® 600-20/25/25-500-0



Long travel with  
e-chain® 5050C-55-400-0

# Anchor handling tugs



## Anchor handling tug supply vessel.

The A-Frame structure of this vessel makes it possible to use the 5050C-47-400/400-0 e-chain®.

The special design with a “reversed bend radius” allows safe operation in any position on the vessel.

The system was commissioned and installed in 2008.





# Deepwater construction vessel (DCV)



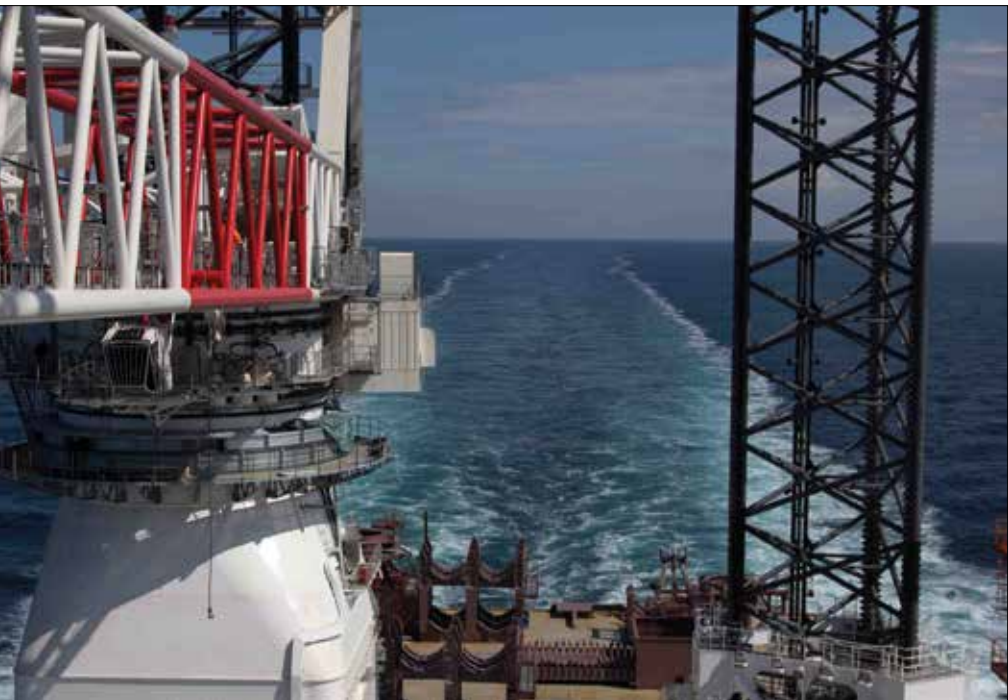
## Vessel: Aegir

The heavy-duty crane has a maximum rotation angle of 560°. igus® e-chains® guide the cable package for the main hoist and the slewing system.

The lay tower is equipped with two parallel E4-350 e-chains®.

Series E4-1 is used for the tensioners.

# Wind farm construction vessel ...



The Innovation is a heavy-duty jack-up vessel for installing and maintaining offshore wind farms. The igus® multi-rotation module is the main power supply for the crane which operates around the leg. The 2 layer design allows a rotation angle of 90°.

## INNOVATION: Wind farm installation vessel

Operation area: North Sea  
Rotation angle: 90°  
e-chains®: E4-56.60-200/6000-0  
E4-56-60-300/6000-0  
chainflex® cables: CF300, CF34, CF10 CFPE,  
CFLG, CFBUS

igus® has designed a customized rotary trough system for the Innovation and Vidar. Both systems were developed by the igus project team in Cologne, Germany before they were assembled Crist shipyard in Gdynia, Poland.



with 900° multi-rotation modules





# Heavy lifting ...



## Sherleg Crane 1, Singapore

e-chain®:	5050-15/17/15-300-0
Fill weight:	23.3 lbs/ft
Travel:	177 ft.
Speed:	3.28 ft/s
Acceleration max.:	3.28 ft/s <sup>2</sup>
Installation/commissioning:	2001



## Sherleg Crane 2, Singapore

e-chain®:	5050RHD-18/18/18/18-300-0
S10-0-E	
Fill weight:	30.2 lbs/ft
Travel:	244 ft.
Speed:	3.94 ft/s
Acceleration max:	3.28 ft/s <sup>2</sup>
Installation/commissioning:	2014

# with heavy duty rol e-chains®



# Heavy duty ...

Due to the igus® rotational module in this heavy-duty crane, it can rotate by 540°. Other areas equipped with igus® products on such vessels are:





# heavy lift vessel



... on welding equipment.



... on pipe handling equipment.



... on handling systems.



... on the tensioner.

# Reliable energy supply ...



## Power supply for rotary crane

Rotation angle: 470°  
Speed: 5.97 ft/s<sup>2</sup>  
e-chain®: 4040C-40/40-300/3792-0  
chainflex® cable: CF27, CF11, CF14,  
CF Coax, CFLG

Split guide trough system  
Total weight of the e-chain® and cables: 3.5 tons



# for heavy-duty cranes



Opposing series 5050 e-chains® with igus® guide trough system and support structure – outer diameter: 39.4 ft., rotation angle: 340°.



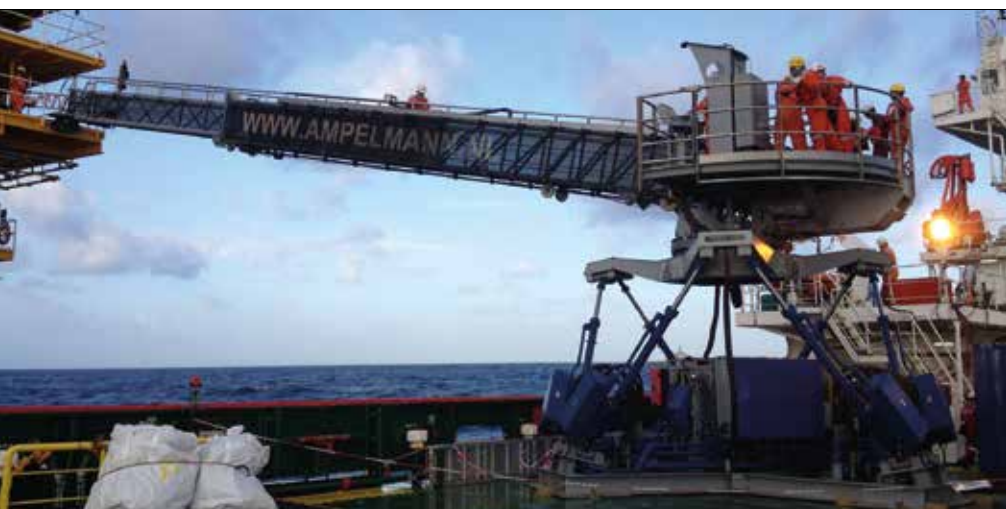
Rotary system with “floating islands” for safe operation on rough seas – rotation angle 540°



e-chain® 4040C



# Motion compensation platform

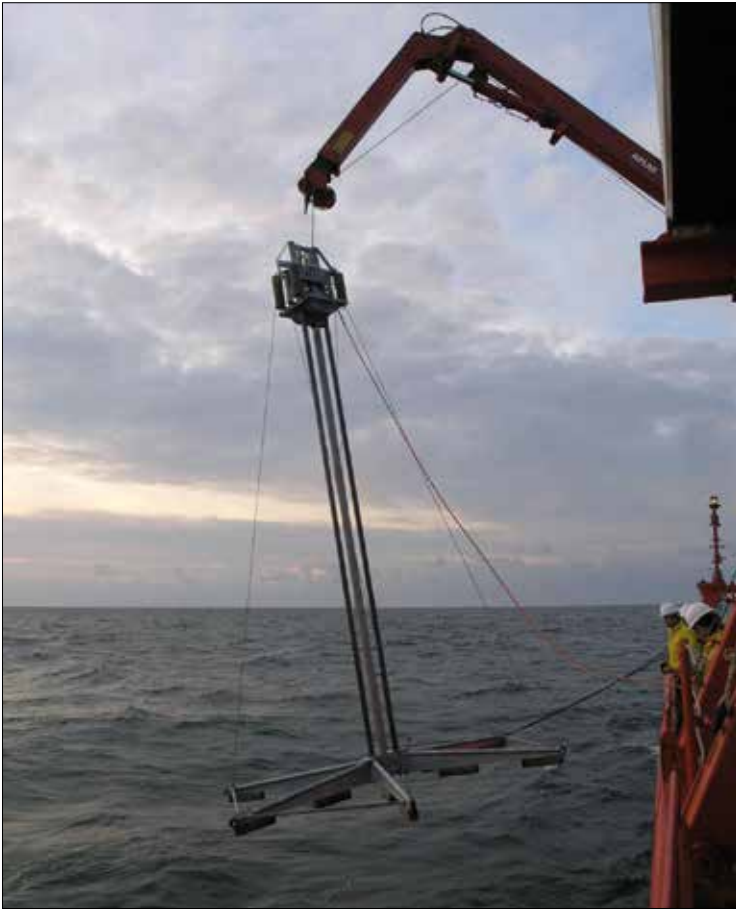


## Self-stabilizing “Ampelmann” platform

The “Ampelmann” platform automatically compensates all wave movements, so that oil platforms can be worked on safely using a ship as a base. In order to do this the platform is supported by several hydraulic cylinders. The energy supply is guaranteed by igus® triflex® R e-chains®.

e-chains®: E4-56-17-200-0  
chainflex® cables: CF78-UL-15-25, CF78-UL-15-25,  
CFBUS-045, CFPE-100-01

# Deep sea drilling rig



## Deep sea drilling rig

The Vibrocoiler VKG-6 drill, is used in water depths of up to 656 feet, controlled offshore from a ship. igus® chainflex® servo cables from the CF27-D series with two shielded control pairs are used for the energy supply and to control the drilling head, as well as for data transmission to display the drilling depth.

# Explosion protection on FPSO ...




## igus® rol e-chain® on a maintenance crane.

e-chain®:	2828R-10-200-0-E
Travel:	662.8 ft.
Speed max.:	4.92 ft/s
Acceleration max.:	3.28 ft/s <sup>2</sup>

ATEX version of the igus® e-chain system®, series E4, harnessed with hydraulic hoses and igus® chainflex® cables. Here shown on a test stand, now in operation on the Dalia FPSO (linear motion of mooring).

### ATEX material

The conductive material igumid ESD has offered explosion protection and protection against electrostatic buildup since 2002. This material is in turn based on a material which was developed as early as 1992, modified in 2002 and certified by the PTB as far back as eleven years ago.

- igumid ESD with PTB certificate.
- all standard e-chains® are available in igumid ESD.
- tested and successfully used in explosion-protection areas for many years.
- identification:  II 2 GD – special ESD e-chain® color: grey (RAL 7015)



# thanks to ATEX/ESD solutions



E4-350 to be installed on a skidding application on an FPSO. Stainless steel guide trough with hook attachment.

e-chain®: E4.350.450.1100.0.ESD.E44

Fill weight: 72.6 lbs/ft

Travel: 48.2 ft.

# High loads, corrosion-free ...

## Save cost and increase productivity!

### Self-lubricating and maintenance-free products for the shipbuilding and offshore industry.

The construction of increasingly bigger ships and complex offshore facilities creates high demands on the production processes in any shipyard. igus® products can demonstrate a proven track record of many applications in the world of shipbuilding.

For example, igus® products ensure a reliable energy supply to overhead cranes, welding systems and cutting equipment in shipyards as well as to handling applications on offshore platforms or the rotary movements of heavy-duty cranes. Use igus® products made from high-performance plastics to optimize the service life of your systems while also reducing costs and weight. igus® products are suitable for applications subject to almost any environmental condition: whether hot, cold, humidity or dirt – we can always offer the right solution.

#### Key benefits:

- Individual custom solutions through the igus® engineering team
- Maintenance-free and self-lubricating, predictable service life
- Resistant to heat/cold, corrosion, seawater, chemicals and UV radiation
- Rotation and linear motion are possible
- Easy installation, flexible, reliable and modular



# long service life

## Strong, corrosion free, UV and seawater resistant energy supply systems

Plastic e-chains® with inner heights of up to 13.78" and fill weights (additional loads) of up to 403 lbs/ft.

- Corrosion free and UV resistant
- Strong and maintenance-free
- Easy to install and long service life

 [www.igus.com/e-chain](http://www.igus.com/e-chain)



e-chain systems®

## Cables according to DNV-GL and mud resistant according to NEK 606

The certification of 348 chainflex® cable types with the DNV-GL seal of approval provides further evidence of their high quality for the offshore and cargo ship sectors. With 3,942 certified cable types, we offer more approvals and certificates for e-chain® cables than any other provider. Our chainflex® cables are now also CTP and EAC-certified for the Russian, Belarusian and Kazakh markets. These certificates replace the former GOST certificates.

- Resistant against dirt, mud, oil, seawater and UV
- Highly flexible even at low temperatures (-40°F)
- For the highest demands inside energy chains

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



chainflex® cables:

## Dirt resistant and corrosion-free plastic bearings

Dry running plastic bearings and linear bearings for high loads of up to 21,760 psi and use in dirty environments.

- Self-lubricating and dirt resistant
- Low wear even with high loads
- Maintenance free and cost effective
- Also available as a stainless-steel version (drylin® linear bearings)

 [www.igus.com/iglide](http://www.igus.com/iglide)



iglide®  
plastic  
bearings

drylin®  
linear  
technology



# chainflex® cables ...



## A world first: chainflex® cables with DNV-GL certification.

### A new test standard for dynamic cables in moving applications guarantees the reliability of maritime equipment.

In order to employ cables for moving applications on ships and offshore applications without expensive custom certifications, igus® GmbH and the classification company DNV-GL have jointly developed a new test standard. Against this they have now certified a total of 348 chainflex® cables from igus® with a type rating for e-chain® cables in continuous motion. These cables are therefore the world's first to receive this certificate specifically for applications in e-chains®.

### New test procedures needed to be developed.

Classification companies such as DNV-GL typically issue certificates based on international standards. In many cases, these refer to special characteristics with regard to flammability properties and other characteristics of the materials.

A lengthy, three-year certification period with a wide range of tested aspects, combined with the specialized expertise of both companies has now resulted in the first certification of cables for use in dynamic applications on ships and offshore platforms.



### GERMANISCHER LLOYD

Certified according to GL-type examination.



### NEK 606 – MUD resistance

NEK 606 is a Norwegian standard for all cables used in offshore applications. Our PUR outer jackets of 14 selected cables comply with the requirements of the NEK 606 mud and oil test.

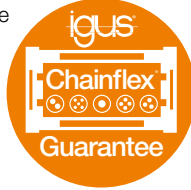
# with DNV-GL approval

## chainflex® cables

The igus chainflex® range has been and continues to be specially developed, manufactured and tested for e-chains® with a guaranteed service life. More than 1,000 types are available from stock.

- DNV-GL seal of approval
- Mud resistant acc. to NEK 606
- For outdoor applications
- Special design to combat cable breakage
- Perfect for use with e-chains®

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



## Tested!

In the largest lab of its kind, igus® Cologne

**29,600 ft² lab ... more than 700 cable tests ...  
2 billion test cycles ... reliability through  
practical experience ...**

By conducting over 2 billion test cycles per year in the igus® test lab, we have gained a unique level of knowledge of cables in the area of e-chains®.

## For example: cold test

**Objective:** To determine the maximum service life of igus® chainflex® TPE cables at temperatures of -40°F.

**Test setup:** An igus® CF35 TPE cable was moved in an e-chain® in the igus® climate container at a travel of 23 ft. and a speed of 4.92 ft/s at -40°F.

**Results:** The test was ended after 3.7 million cycles. The cable exhibits little/or no wear and is fully functional.



## In the field



# 348 chainflex® cables ...

The certification of 348 chainflex® cable types with the DNV-GL seal of approval provides further evidence of their high quality – including in the offshore and ship sectors.



**chainflex® CF77-UL-D** – PUR control cable for heavy duty use, oil and coolant-resistant, flame-retardant, notch-resistant, PVC/halogen-free, min. bending radius 6.8-7.5 x cable-Ø [www.igus.com/CF77ULD](http://www.igus.com/CF77ULD)



**chainflex® CF78-UL** – PUR control cable for heavy duty use, shielded, oil and coolant-resistant, flame-retardant, notch-resistant, PVC/halogen-free, min. bending radius 6.8-7.5 x cable-Ø [www.igus.com/CF78UL](http://www.igus.com/CF78UL)



**chainflex® CF9-UL** – TPE control cable for extremely heavy duty use, oil and bio-oil-resistant, PVC/halogen-free, low temperature flexible, min. bending radius 5 x cable-Ø [www.igus.com/CF9UL](http://www.igus.com/CF9UL)



**chainflex® CF10-UL** – TPE control cable for extremely heavy duty use, shielded, oil and bio-oil-resistant, PVC/halogen-free, low temperature flexible, min. bending radius 5 x cable-Ø [www.igus.com/CF10UL](http://www.igus.com/CF10UL)



**chainflex® CF240-PUR** – PUR data cable for heavy duty use, overall shielded, oil and coolant-resistant, flame-retardant, PVC/halogen-free, min. bending radius 10-12 x cable-Ø [www.igus.com/CF240PUR](http://www.igus.com/CF240PUR)



**chainflex® CFBUS-PUR** – PUR Profibus cable heavy duty use, overall shielded, oil and bio-oil-resistant, flame-retardant, min. bending radius 10-12.5 x cable-Ø [www.igus.com/CFBUSPUR](http://www.igus.com/CFBUSPUR)



**chainflex® CFBUS** – TPE bus cable for extremely heavy-duty use, overall shielded, oil and bio-oil-resistant, flame-retardant, min. bending radius 10-12.5 x cable-Ø [www.igus.com/CFBUS](http://www.igus.com/CFBUS)



# with DNV-GL approval



**chainflex® CF111-D** – PUR system cable for medium heavy duty use, shielded, oil and coolant-resistant, cut-resistant, flame-retardant, min. bending radius 10 x cable-Ø

[www.igus.com/CF111D](http://www.igus.com/CF111D)



**chainflex® CF113-D** – PUR measuring system cable for heavy duty use, shielded, oil and coolant-resistant, flame retardant, PVC/halogen-free, min. bending radius 10 x cable-Ø

[www.igus.com/CF113D](http://www.igus.com/CF113D)



**chainflex® CF27-D** – PUR servo cable for heavy duty use, shielded, oil and coolant-resistant, flame-retardant, PVC/halogen-free, min. bending radius 7.5 x cable-Ø

[www.igus.com/CF27D](http://www.igus.com/CF27D)



**chainflex® CF34-UL-D** – TPE motor cable for extremely heavy duty use, oil and bio-oil-resistant, flame-retardant, UV-resistant, min. bending radius 7.5 x cable-Ø

[www.igus.com/CF34ULD](http://www.igus.com/CF34ULD)



**chainflex® CF35-UL** – TPE motor cable for extremely heavy duty use, shielded, oil and bio-oil-resistant, flame-retardant, UV-resistant, min. bending radius 7.5 x cable-Ø

[www.igus.com/CF35UL](http://www.igus.com/CF35UL)



**chainflex® CF300-UL-D** – TPE motor cable for extremely heavy duty use, oil and bio-oil-resistant, flame-retardant, UV-resistant, min. bending radius 7.5 x cable-Ø

[www.igus.com/CF300ULD](http://www.igus.com/CF300ULD)



**chainflex® CFPE** – TPE motor cable for extremely heavy duty use, oil and bio-oil-resistant, flame-retardant, UV-resistant, min. bending radius 7.5 x cable-Ø

[www.igus.com/CFPE](http://www.igus.com/CFPE)

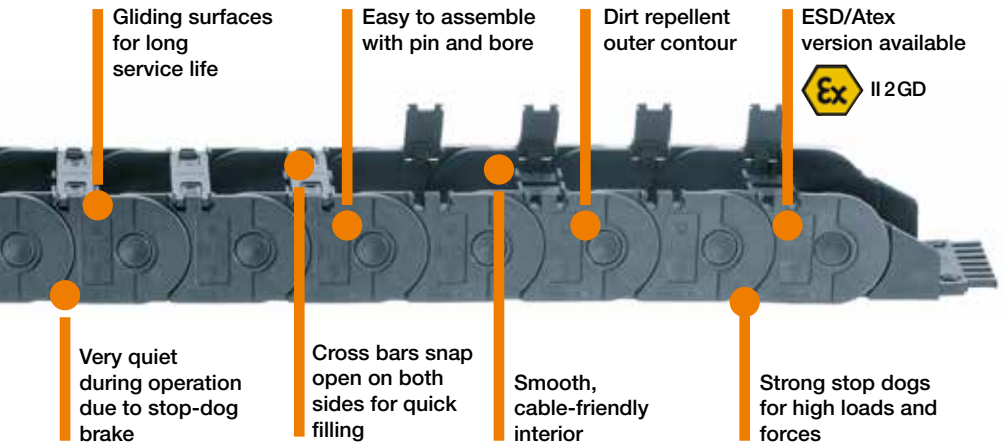


**chainflex® CF310-UL** – TPE motor cable for extremely heavy duty use, oil and bio-oil-resistant, flame-retardant, UV-resistant, min. bending radius 7.5 x cable-Ø

[www.igus.com/CF310UL](http://www.igus.com/CF310UL)



# e-chains® for any application ...



igus® e-chains® are versatile, available from stock and simple to use.



## The versatile one – System E2/000

The E2/000 system symbolizes easy and versatile installation combined with ruggedness - high stability combined 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.com/E2000](http://www.igus.com/E2000)



## The cost-effective and easy-to-fill - E-Z chain

E-Z Chains® are available in two versions. In the "E" version the cable is simply routed from the outside, and in the "Z" version from inside. The shortened installation time is one of the main features of the E-Z Chain® e-chains®. Their elastic and rugged 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 the E-Z Chain® very cost effective.

 [www.igus.com/e-zchain](http://www.igus.com/e-zchain)



## The small, stable all-around chain – System E2-1

Small e-chain® with rugged stop dog system and large bolts for up to 25% longer unsupported length and 100% higher additional loads (compared to identical igus® types). A built-in "brake" minimizes impact noise and very smooth contours ensure optimum cable protection. A chain opener (included) saves significant time when opening e-chains®.

 [www.igus.com/E2-1](http://www.igus.com/E2-1)

# and installation methods

## igus® e-chains® and e-chain systems® are suitable for universal applications:

- Various types of motion
- To carry sensitive bus, data cables and fiber optics cables as well as energy sources such as electricity, gas, air and liquids
- For high dynamic loads and tough service life requirements
- For all environments
- Compact installation
- High acceleration and speeds can be achieved
- Simple modular assembly on site, as well as quick retrofitting of cables

 [www.igus.com/e-chain](http://www.igus.com/e-chain)

## Save time and money by using e-chains® and e-chain systems®!

- Innovative products that can be assembled quickly
- Delivered straight from stock – reducing your storage costs
- Large range of products – find the right solution immediately
- Supply of entire systems, including assembly and turn-key installation
- Swift project planning and consulting with an ever-growing network of local sales engineers worldwide

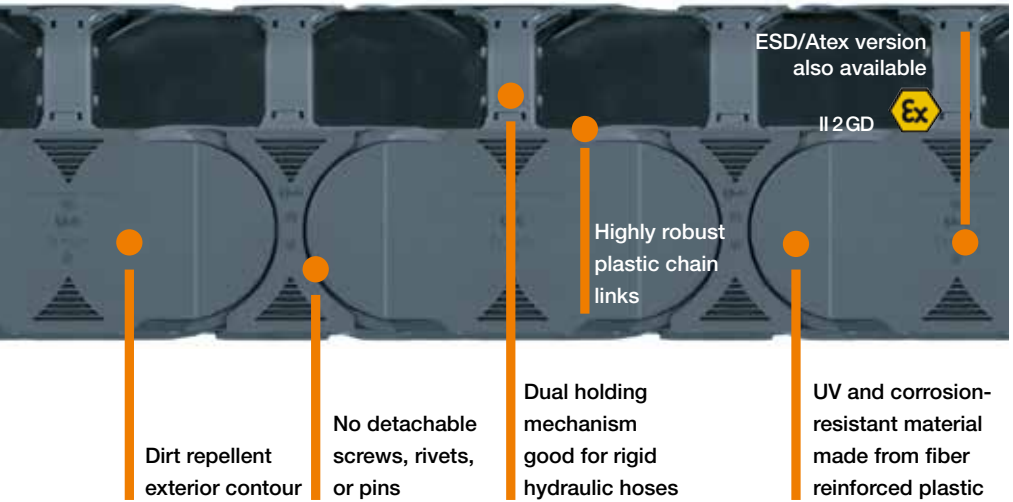


## In the field





# Robust, low maintenance ...



**igus® e-chains®: robust, modular, corrosion free and easy to install.**



## The All-around – System E4-1

The E4-1 system is the toughest igus® e-chain® range. With the igus® E4-1 system, the service life of your application can be extended and costs lowered.

 [www.igus.com/E41](http://www.igus.com/E41)



## Heavy duty – System E4/4

igus® “heavy duty” e-chains® are especially developed for the highest demands and harshest environments.

 [www.igus.com/5050HD](http://www.igus.com/5050HD)



## High speed and long travel – System P4

igus® P4 RoI e-chains® for long travels of up to 1,969 ft and speeds of up to 32.8 ft/s. By “rolling” instead of “gliding” the drive output can be reduced by up to 57%.

 [www.igus.com/P4](http://www.igus.com/P4)

# assembly-friendly

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

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

- Up to 13.78" inner height / 7.87" - 39.4" inner width
- Fill weights up to 403 lbs/ft
- Travel speeds up to 1,969 ft/min.
- Maintenance free – no grease or oil needed to lubricate the joints
- Modular design reduces the assembly time
- Highly resistant to wear, corrosion and seawater
- Easy to lengthen and shorten
- Plastic material reduces noise
- Electrically insulating

 [www.igus.com/e-chain](http://www.igus.com/e-chain)

## Tested!

In the largest lab of its kind, igus® Cologne



## Vibration test

**Objective:** To test the service life of an e-chain® subject to strong vibrations, as the existing became unstable due to screws coming loose

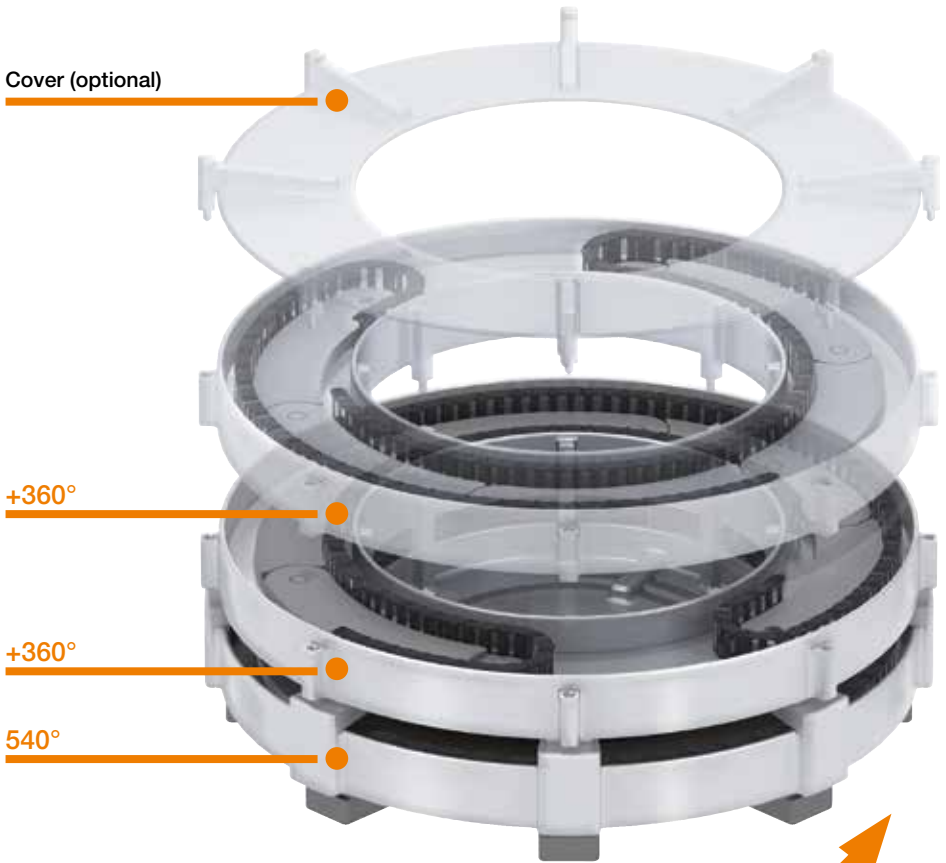
**Test setup:** An upright igus® E4 e-chain® was exposed to direct vibration (comparable to a rock drilling machine).

**Result:** No damage to the connections on the e-chain® links. No individual parts were lost.

## In the field



# High stacking ...



## Rotation modules:

- When the rotation angle of the lower layer is reached, the next upper module is carried along automatically due to an integrated anchorage system.
- The construction minimizes potential interference. Multi Rotation Module system is ideal for rotary applications, heavy loads and for tough environments.
- The e-chain® can also guide hoses for air, gas or fluids, as well as bus and fiber optic cables.
- Even for harsh environmental conditions.



# large rotation

## Realize circular motions up to 900° and more, even for high loads, using igus® rotation modules

With the rotation module you can implement larger angles of rotation of 900° and more. Thanks to add-on modules, the angles of rotation can be extended virtually indefinitely. The rotation and add-on modules are ideally suited for rotary motions with high fill weights and limited space

- Several individual systems are stacked on each other, and thus are combined to a complete system.
- The maximum rotation of the individual levels can be easily added, thereby enabling rotary motions up to 900 degrees and more
- Compact design enables the application even in limited space
- Extendable as required
- High fill weights possible
- Chains can be freely assembled
- Peripheral speeds up to 3.28 ft/s

 [www.igus.com/RBR](http://www.igus.com/RBR)

## Tested!

In the largest lab of its kind, igus® Cologne

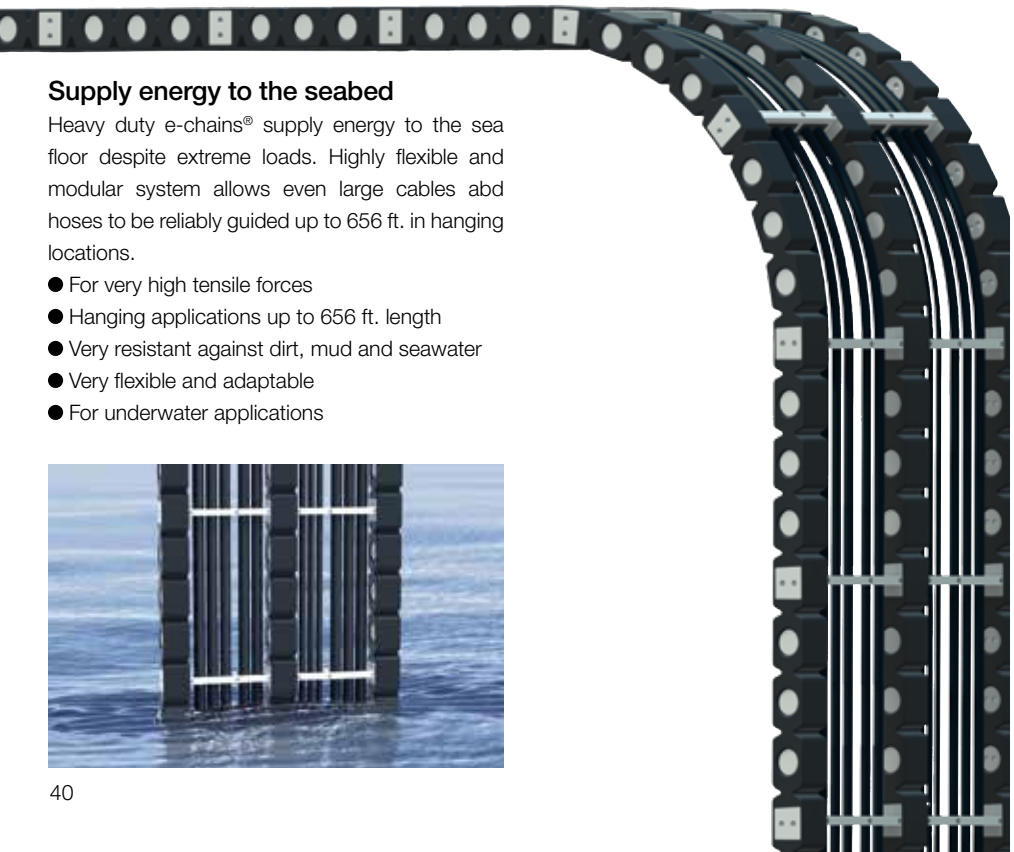
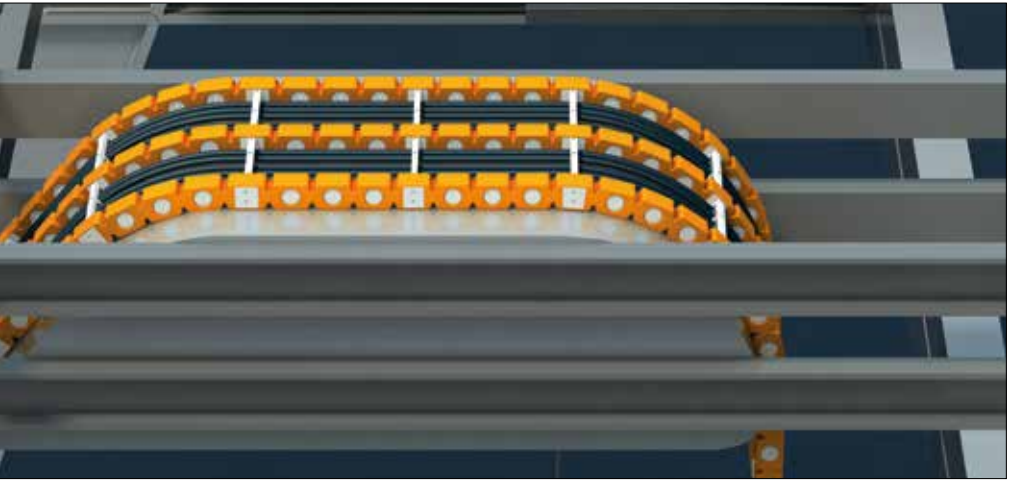


igus® RBR rotation modules tested in the igus® lab.

## In the field



# Supply energy ...



## Supply energy to the seabed

Heavy duty e-chains<sup>®</sup> supply energy to the sea floor despite extreme loads. Highly flexible and modular system allows even large cables and hoses to be reliably guided up to 656 ft. in hanging locations.

- For very high tensile forces
- Hanging applications up to 656 ft. length
- Very resistant against dirt, mud and seawater
- Very flexible and adaptable
- For underwater applications



# to seabed



## Tested!

In the large igus® lab in Cologne

## Study: Underwater energy supply

Offshore wind farms pose particular challenges with regard to cable management. Drilling work has to be carried out under water for the pylons on wind turbines. Heavy duty energy supply systems are necessary to withstand the difficult environmental conditions and the huge tensile forces when freely suspended over long lengths. The specially developed, environmentally-resistant and flexible



offshore e-chain® from igus® guides even cables with large diameters safely. The heavy duty wire holds the weight of the system. Intensive tests in the igus® laboratory have proven the extraordinary load capacity of the offshore chain.

 [www.igus.com/offshore-chain](http://www.igus.com/offshore-chain)



# Corrosion-free ... high loads ...

From a wide range of self-lubricating **dry-tech** solutions a selection for the offshore industry.

iglide® bearings are corrosion, maintenance-free and self-lubricating.

- More than 45 materials available from stock
- Online lifetime calculator and product finder to find the right solution for every application
- Types: bearing with flange or thrust washers
- Available in metric sizes from 3 - 195 mm, or inch sizes from 1/8" - 4".

 [www.igus.com/iglide](http://www.igus.com/iglide)

igus® has developed a combination of stainless steel and self-lubricating triboplastics especially for the offshore industry.

- All steel components are entirely corrosion-free
- Use of 1.4571 and 1.4301 stainless steel
- Resistant to seawater and chemicals
- Ready-to-fit solutions from stock
- iglide® J bearings for under water use

 [www.igus.com/drylin](http://www.igus.com/drylin)



iglide® H370 –  
for underwater  
use.



iglide® J –  
low wear.



drylin® R  
round linear  
guidance  
systems.



drylin® W  
linear guidance  
systems.

drylin® HTS  
linear tables



iglide® H –  
highly environmentally  
resistant.



iglide® T500 –  
for high  
temperatures.



iglide® TX1 –  
high loads,  
seawater resistant.

# maintenance free

## dry-tech: Improve technology without lubrication

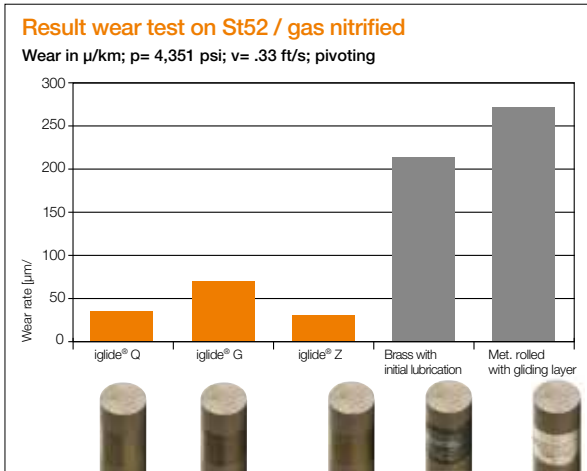
igus® dry-tech bearings are an alternative to plain and roller bearings with lubrication. igus® develops triboplastics for dry-running bearings. By avoiding external lubrication, dry-tech plastic technology attains superior service life: from -148°F up to +482°F at continuous exposure – from cleanroom environments to extreme dirt exposure, from vacuums to extreme humidity. dry-tech bearing technology for:

- Self-lubricating applications for a long service life
- Extreme environmental conditions
- Lowest possible friction and wear values in continuous and intermittent operation.

 [www.igus.com/drytech](http://www.igus.com/drytech)

## Tested!

In the largest lab of its kind, igus® Cologne



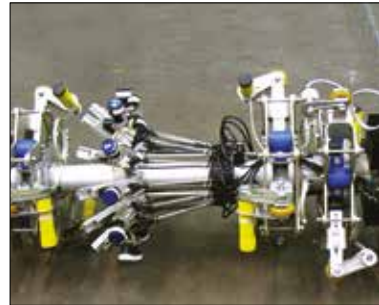
## Test: "swivel test"

**Objective:** To test the wear of iglide® plastic plain bearings compared to metallic plain bearings

**Test setup:** Swivel test on a shaft with a weight of 2,646 lbs. The figure to the right illustrates the concept

**Result:** All tested iglide® materials exhibit significantly lower wear than the metal plain bearings. The shafts of the metal plain bearings exhibit significant wear and are therefore unsuitable for further use.

## In the field



**Kosten einsparen und Prozesse verbessern!**  
Mit modernen igus®-Produkten wartungsfrei!

Schwer- und wartungsfähige Produkte für die Schiffbauindustrie

Die Bes. immer größerer Schiffe stellt hohe Anforderungen an die Produkt- und Bearbeitung von Schiffen und auch in vielen anderen Anwendungsbereichen. Die Sorgen für die sichere Energiezufuhr an Masten, Schiffs-Robotern und Transport u.ä. v.

Optimieren Sie mit igus®-Produkten Ihre Wartungs- und Instandhaltungskosten! Die geringsten die Prozesskosten. igus®-Produkte zeigen sich für Antriebe, Frachtkäbe, Schweiß-... wir haben immer eine Lösung.

**System components in 24-hr hours**

**Polymer D-Chain® systems**

igus® is a specialist in the area of polymer research, with more than 40 years of experience. Special high performance polymers allow the use of igus® D-Chain® and bearings in almost all environments. Steel, coal, concrete, humidity, dirt - we have a solution. In wire and most heavy duty applications, steel systems are successfully replaced with igus® plastic D-Chain®. Because of their extraordinary capacities:

- Corrosion free (no salt water resistant)
- Light weight AND high stability
- Low maintenance and long service life

**Programmbereich D-Chain® Systeme**

- für alle Antriebsarten möglich
- breiten sich von 20 bis 80 mm
- beliebig zu öffnen
- schnelle Montage
- nachträgliche Design

**Systeme für die Industriemaschinen**

- für alle Antriebsarten möglich
- breiten sich von 20 bis 80 mm
- beliebig zu öffnen
- schnelle Montage
- nachträgliche Design

**Systeme für die Industriemaschinen**

- für alle Antriebsarten möglich
- breiten sich von 20 bis 80 mm
- beliebig zu öffnen
- schnelle Montage
- nachträgliche Design

**High-Tech-Produkte**

- sehr gute Chemikalienbeständigkeit
- sehr geringe Reibkräfte
- hohe Lebensdauer
- VDE 0219 DA 120/13 in Öltemperatur

**Plastiklager**

- für alle Antriebsarten möglich
- breiten sich von 20 bis 80 mm
- beliebig zu öffnen
- schnelle Montage
- nachträgliche Design

**igus® quality gears - 3 new approvals: Österreichischer Lloyd, SAC, CTR**

**igus® quality gears - 3 new approvals: Österreichischer Lloyd, SAC, CTR**

The new certified gears in various materials, moduli and sizes are available with a customer service 24/7. The gears are available in a wide range of sizes and materials. They are available in a wide range of sizes and materials. They are available in a wide range of sizes and materials.

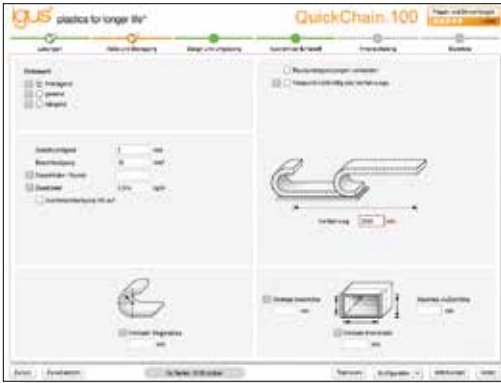
The production of 100 certified gears with the Österreichischer Lloyd seal of approval provides a secure basis of high performance - including in the offshore oil and gas sector. The gears are available in a wide range of sizes and materials. They are available in a wide range of sizes and materials. They are available in a wide range of sizes and materials.

**igus® quality gears - 3 new approvals: Österreichischer Lloyd, SAC, CTR**

The new certified gears in various materials, moduli and sizes are available with a customer service 24/7. The gears are available in a wide range of sizes and materials. They are available in a wide range of sizes and materials. They are available in a wide range of sizes and materials.

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





**i For all tasks – and all batch sizes**


Different industries need different solutions. Whether in mechanical engineering, automotive manufacturing or the robot industry – igus® offers customized support for specialized applications. igus® already has many years of experience and specialized resources for many industries.

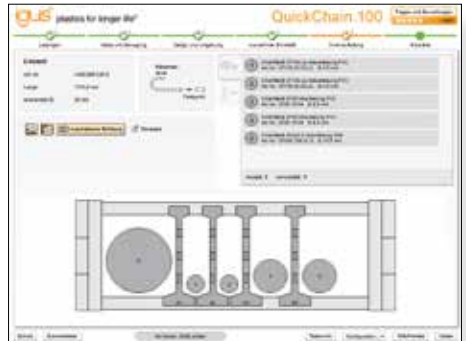
 [www.igus.com/industries](http://www.igus.com/industries)

 [www.igus.com/quickchain100](http://www.igus.com/quickchain100)

**Expert for designing and calculating systems for travels of up to 328 ft.**

Simply enter your application's parameters into the e-chain® expert and this will propose a suitable solution.

A wide range of other online tools, such as configurators, service life calculators, and product finders, can be found at  [www.igus.com/online](http://www.igus.com/online)



# Research & Development ...



Better products for less - a key element is the industry's largest test lab. 29,600 ft<sup>2</sup> lab, tens of thousands of tests and billions of cycles each 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 massive igus® lab (29,600 ft<sup>2</sup>) conducts more than two billion test cycles per year on more than 100 test rigs.

- Extensive test databases
- Customized tests on request

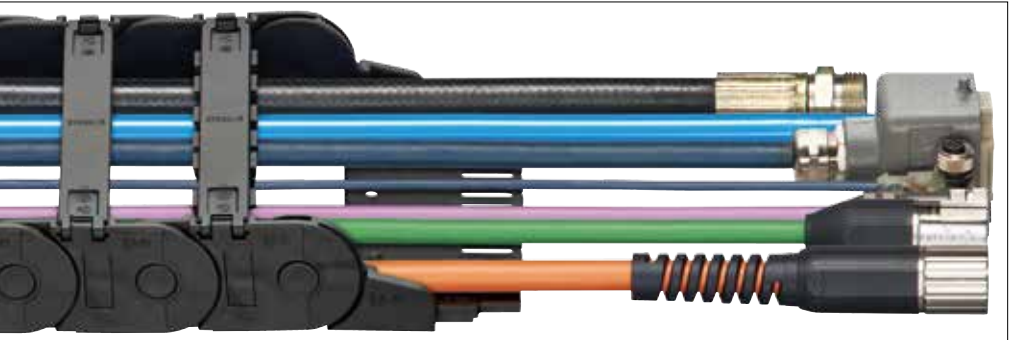


Tribology testing in the plain bearing lab, igus® Cologne, Germany






## Assembled energy supply systems and cables with connectors



### readychain®

Fully assembled systems in 3-10 days, 700 systems per week in 11 readychain® factories worldwide – optimized assembly time and better 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%
- Minimize machine downtime
- System guarantee – depending on the application

 [www.readychain.com](http://www.readychain.com)

### readycable

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

- Servo, motor and signal/encoder cables
- No cutting charges, no surcharges for small quantities and packaging
- Cable length accurate to the centimeter per customer specifications
- Smallest bending radii from 7.5 x d
- Reduce storage costs and increase cash flow
- Allen Bradley, Fanuc and Siemens standards available from stock in 24-48 hrs. For other manufacturers standards please call for lead time.

 [www.igus.com/readycable](http://www.igus.com/readycable)

## The igus® assembly service

Ensure error-free installation and avoid downtime and additional costs – with the igus® e-chain systems® assembly service

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

 [www.igus.com/montageservice](http://www.igus.com/montageservice)



# from 24 hours

## igus® delivery service - quick & reliable



### Shipped from stock in 24 hrs

#### All catalog parts and individual components

*for example:* one e-chain® link, 19.7 ft. e-chain®, 3 strain reliefs, one iglide® Q2 plain bearing, one drylin® linear plain bearing

### 24 - 48 hrs\*

#### Customized systems

*for example:* 37.6 ft. e-chain® with interior separation, guide rails, mounting brackets; 8 ft. drylin® profile rail with 2 carriages

### 3-5 business days

#### Simple prefabricated systems

*for example:* simple, harnessed e-chain systems® with filled cables without connectors, lead screw unit based on specific needs

### 10 business days

#### Complex systems and machined components

*for example:* harnessed e-chain systems® with cables of all types and connectors, interfaces, protrusions, machined shafts according to drawing, or mechanically shortened plain bearings, or tool-based injection-molded parts

\* Products leave our facility within the indicated time. The indicated delivery time specifies the time until the product ships.



### motion plastics

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

Our core technology is triboplastics – high-performance plastics, that we optimize for friction and wear. This technology has made us into the world-wide leader for developing and manufacturing energy supply systems and plain bearings.





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