

igus® motion plastic solutions for ...

# automotive



plastics for longer life® ... igus

# technology

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

# Automotive...

## It could not be easier!



The public debate on the greenhouse effect and the resulting emission limits have put pressure on car manufacturers to save as much weight as possible in each component.

### Every gram counts. iglide®

plastic bearings can reduce the weight of every bearing point by a factor of seven when compared to metal solutions.

Millions of iglide® plain bearings are already used in automobile manufacturing each year. On the following pages, find a wide variety of applications with some extreme requirements, and how our high-performance plastics stand up to the challenging demands of not only weight constraints but also:

- wear resistance
- low vibration and noise
- corrosion resistance
- cost

In your search for information, check out our variety of free online tools at [www.igus-automotive.com](http://www.igus-automotive.com), or contact us directly for personal support in your selection for the best bearing solution.

Enjoy reading and getting ideas.

Yours  
Kenneth Block  
Automotive Product Manager



### igus® catalogs

Excerpt of catalog on next pages, order igus® catalogs online [www.igus.com/catalog](http://www.igus.com/catalog).



### Ordering times

Monday to Friday 7:00 am - 8:00 pm



### Contact

Phone 800.521.2747  
Fax 401.438.7270



### Online

Visit [www.igus-automotive.com](http://www.igus-automotive.com) for more information.



### Questions?

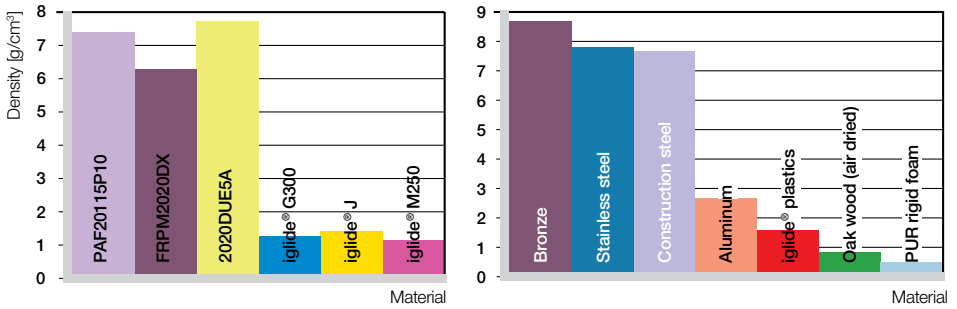
For answers, feel free to call us, or try our free online tools at: [www.igus.com](http://www.igus.com).

# Light...

## Lightweight construction with iglide®

Besides the advantages of dynamic driving, strict environmental and emissions standards compel car manufacturers to keep the weight of every component to the minimum. By replacing metallic plain bearings with iglide® plain bearings, enormous weight advantages can be immediately achieved. Every gram counts. Major weight reductions can be achieved by replacing metal bearings with iglide® bearings.

### Metallic rolled DU bearings compared to iglide®



The weight of a single DU bearing is equal to that of seven iglide® bearings

# Where is igus in the car?

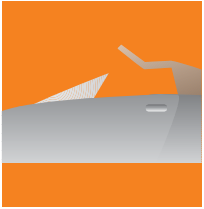
## Self-lubricating and maintenance-free iglide® plastic bearings



### WINDSHIELD WIPER:

#### Arm and blade, kinematics

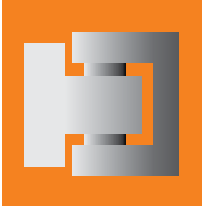
- Corrosion resistant
- Highly flexible, yet strong
- Resistant against dirt
- Economically priced



### CONVERTIBLE TOP:

#### linkages, kinematics, locks

- Self-lubricating
- Quiet operation
- Can be used with standard bar shock shafting
- Suitable for E-coating
- No special requirement for rivet/shaft



### HINGES:

#### Door hinges, Multi-articulation hinges

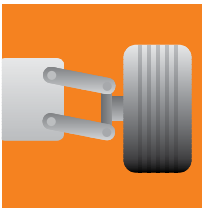
- High compressive strength
- High wear resistance
- Suitable for E-coating
- Corrosion resistant
- Economically priced



### SEATS:

#### Seat height adjustments, crash active headrests

- Quiet operation
- High static load
- Can be used with bar shock shafting
- Suitable for E-coating
- Low precision shafting possible



### CHASSIS:

#### Shock absorber, brakes, control arms

- High compressive strength
- Damping
- Resistant to dirt
- Economically priced



are used in a variety of automobile applications



**STEERING SYSTEM:**

**Column adjustment, steering shaft**

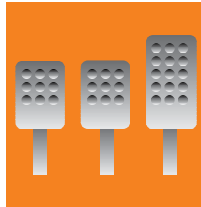
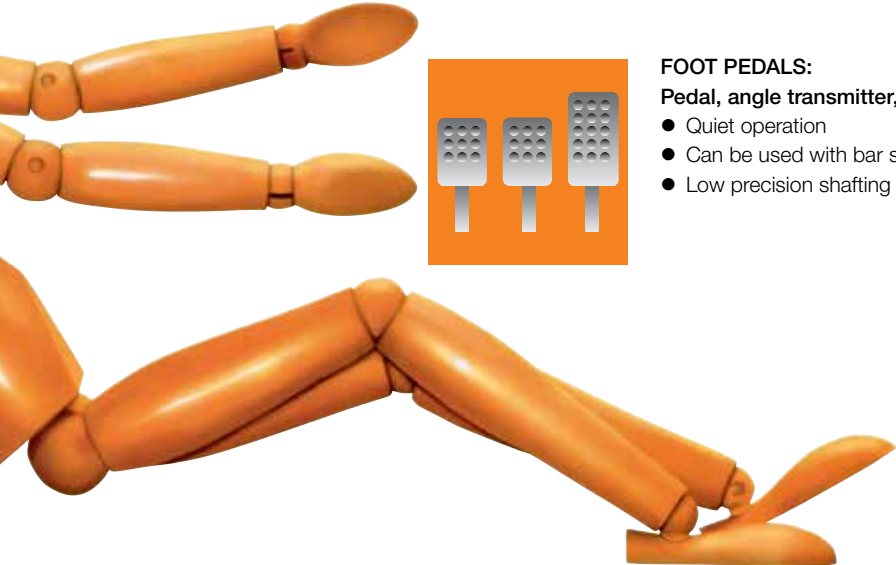
- Low coefficient of friction
- Can be used with bar shock shafting
- High rigidity
- No need for polished shafting



**ENGINE COMPARTMENT:**

**Variable air intake, EGR (exhaust gas re-circulation), belt tensioner, throttle valve**

- Long term operating temperature up to 482°F (250°C)
- Resistant to fuel, gear oils, brake fluids, etc.
- Over molding with plastic possible
- Good vibration damping characteristics



**FOOT PEDALS:**

**Pedal, angle transmitter, sensors**

- Quiet operation
- Can be used with bar shock shafting
- Low precision shafting possible



**GEAR BOX:**

**Actuator and fork**

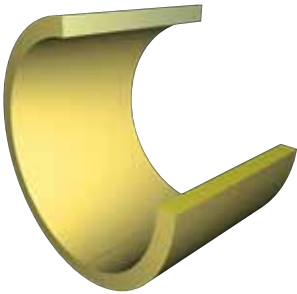
- Vibration damping
- Resistant to gear oils
- Long term operating temperature up to 392°F (200°C)
- Economically priced

# 100% self-lubricating ...

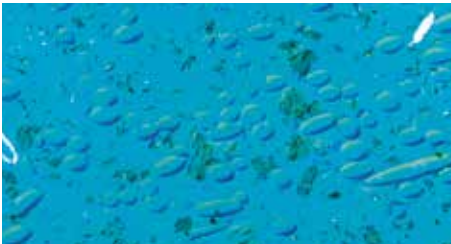
## What is iglide® and what can it do?

### What is iglide®?

iglide® plastic materials are tribologically optimized with solid lubricants and reinforced by specialized fibers. All iglide materials are tested thousands of times, and proven over millions of cycles. Homogenous blending means that unlike components that are lined or coated, there is no anti-friction film that can be forced apart under pressure.



iglide® plain bearings composed of a homogenous blend of a base polymer, composite fibers, and solid lubricants.



iglide® compounds: Basic polymers with fibers and solid lubricants, magnified 200 times, dyed.

### What can iglide® achieve in automotive applications?

- Low weight
- Great performance ratio
- Tailor-made materials and solutions
- Low clearance bearings, exactly designed for your housing bore and shaft tolerance
- Re-calibrated bearings for equalizing tolerances on punched bores
- Preloaded bearings for equalizing tube tolerances for pedal systems
- Bearings with special damping action for bearing assemblies for control forks in transmissions
- Self-lubricating bearings insensitive to dirt in the suspension system
- One-stop shopping: research and development, application assistance, production, installation and world-wide logistics

# iglide® materials for automotive

The most important materials for automotive applications are listed below. We have subdivided the materials into "groups" so as to make your choice easier. Over 7,000 standard sizes from Ø (2 mm to 150 mm) are available from stock, in over 30 materials. Inch sizes are also available from stock. Short delivery times for special sizes.

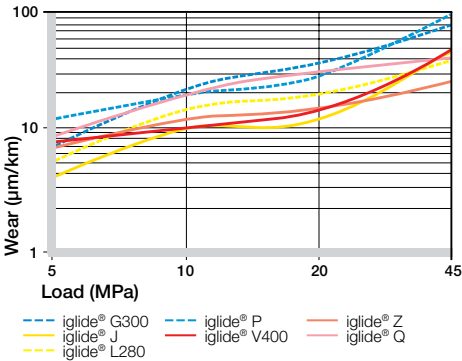
<b>Economy</b>	 <b>M250</b>	<b>iglide® M250</b> <ul style="list-style-type: none"> <li>● Excellent vibration dampening</li> <li>● Resistant to edge loading</li> <li>● Cost-effective</li> </ul>	<b>Spezialisten</b>	 <b>P210</b>	<b>iglide® P210</b> <ul style="list-style-type: none"> <li>● Even for soft shafts</li> <li>● Low wear</li> <li>● Low friction</li> </ul>
	 <b>GLW</b>	<b>iglide® GLW</b> <ul style="list-style-type: none"> <li>● Short gliding travels, high static loads</li> <li>● Suitable for E-coating</li> <li>● Applications: e.g. seats</li> </ul>		 <b>J350</b>	<b>iglide® J350</b> <ul style="list-style-type: none"> <li>● Temperature resistant</li> <li>● Wear resistant</li> <li>● Impact resistant</li> </ul>
	 <b>RN56</b>	<b>iglide® RN56</b> <ul style="list-style-type: none"> <li>● Suitable for E-coating</li> <li>● Resistant to dirt</li> <li>● Cost-effective</li> </ul>		 <b>RN248</b>	<b>iglide® RN248</b> <ul style="list-style-type: none"> <li>● Suitable for E-coating</li> <li>● Extremely conductive</li> <li>● Wear resistant</li> </ul>
<b>Basic</b>	 <b>G300</b>	<b>iglide® G – general purpose</b> <ul style="list-style-type: none"> <li>● Higher wear-resistance than iglide® GLW</li> <li>● Suitable for E-coating</li> <li>● Applications: convertible tops, fittings</li> </ul>	<b>Premium</b>	 <b>H4</b>	<b>iglide® H4</b> <ul style="list-style-type: none"> <li>● Resistant to all fuels, gear oils and brake fluid</li> <li>● Minimum moisture absorption</li> <li>● Applications: throttle valves, intake manifolds</li> </ul>
	 <b>J</b>	<b>iglide® J</b> <ul style="list-style-type: none"> <li>● Best friction values for dry running</li> <li>● Good glide surface also for all "soft" materials</li> <li>● Applications: with quick rotation; seat adjustment and mirror actuators</li> </ul>		 <b>T500</b>	<b>iglide® T500 - material for high temperatures</b> <ul style="list-style-type: none"> <li>● High compressive strength</li> <li>● High chemical resistance</li> <li>● Long term application temperature: 482°F (+250°C)</li> </ul>
	 <b>RN89</b>	<b>iglide® RN89</b> <ul style="list-style-type: none"> <li>● Conductive material for all applications with E-coating</li> <li>● Applications: Seat and convertible top systems</li> </ul>			
	 <b>H2</b>	<b>iglide® H2:</b> <ul style="list-style-type: none"> <li>● For high temperatures</li> <li>● High chemical-resistance</li> <li>● Cost-effective</li> </ul>			
			<b>Customized</b>		<b>Customized:</b> Individually matched materials with special properties: we develop the plastic which your application needs. We find the optimum solution together with you.

# Predictable ...

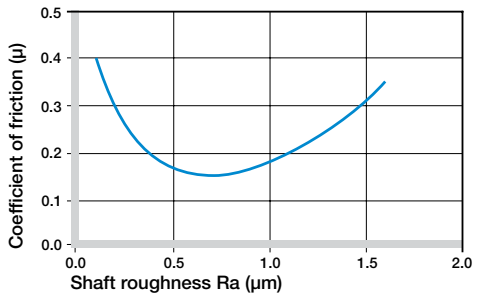
## Precisely calculate material properties

iglide® plain bearings mean a step up from the plastic bearing to a tested and calculable machine element. Our extensive database for plastic bearings can help you to select the optimum material for your application.

### The iglide® wear-resistant material



### Works with rougher shafts



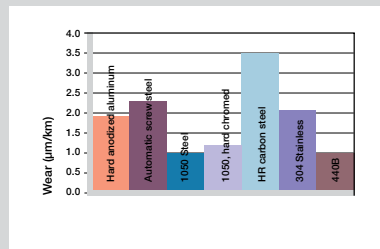
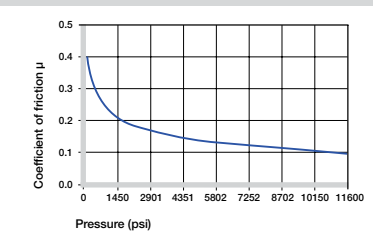
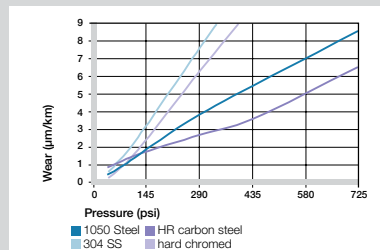
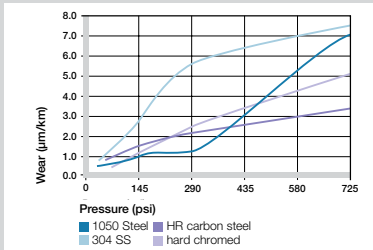
Coefficient of friction of iglide® G300 depending on the shaft surface (shaft Case hardened steel)

Wear of iglide® bearings at medium and high loads.

Shafts which are too smooth are often unfavorable and may lead to stick-slip phenomena and noise.

## Reliable database: Thousands of test results

Results of over 15,000 tests per year are incorporated in the iglide® database.





# Tested ...



## igus® test laboratory

Applications with high cycle rates, speeds and accelerations in demanding environmental conditions require tested and reliable plastic bearings and linear systems. igus® constantly conducts tests in its in-house laboratory under real-world conditions. Every year over 5,000 tests are carried out on plain bearings.



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



Measuring the inner diameter of a press-fitted bearing

# Material data ...

Material		General properties						Mechanical properties				
		Density (g/cm <sup>3</sup> )	Max. moisture absorption at +73°F / 50 % r. h. (% weight)	Max. moisture absorption (% weight)	Coefficient of sliding friction. Dynamic against steel (μ)	PV value. max. (dry) (psi · m/s)	Fire classification	Modulus of elasticity (psi)	Tensile strength at +68°F (psi)	Compressive strength (axial) (psi)	max. permissible static surface pressure (+68°F) (psi)	Shore-D hardness
iglide® M250		1.14	1.4	7.6	0.18-0.40	3,400	V-2	391,600	16,240	7,542	2,901	79
iglide® GLW		1.36	1.3	5.5	0.1-0.24	8,600	HB	1,117,000	34,080	10,730	11,600	78
iglide® RN56		1.47	0.7	4.0				1,088,000	29,010		11,600	80
iglide® G300		1.46	0.7	4.0	0.08-0.15	12,000	HB	1,131,000	30,460	11,310	11,600	81
iglide® J		1.49	0.3	1.3	0.06-0.18	9,700	HB	348,100	10,590	8,702	5,076	74
iglide® RN89		1.44	0.9	3.9				855,700	21,760		6,527	79
iglide® H2		1.72	0.1	0.2	0.07-0.30	16,500	V-0	1,494,000	30,460	15,810	15,950	88
iglide® P210		1.40	0.3	0.5			HB	319,100	9,427		7,252	75
iglide® J350		1.44	0.3	1.6	0.08-0.2	13,000	V-0	291,100	7,977	8,702	8,702	80
iglide® RN248		1.25	1.4	7.6				391,600	14,360		7,252	-
iglide® H4		1.79	0.1	0.2	0.08-0.25	9,400	V-0	1,088,000	17,400	7,252	9,427	80
iglide® T500		1.44	0.1	0.5	0.09-0.27	37,700	V-0	1,175,000	24,660	14,500	21,760	85
PA 6		1.14	2.8	8.5			V-2	464,100				
PBT		1.30	0.3	0.5			HB	1,450,000	12,330			
POM		1.41	0.2	0.8			HB	275,600	14,070	3,336	3,336	78
PTFE		2.18	0.1	0.1			V-0		2,031			51
PEEK		1.31	0.20	0.45			V-0	-	20,310			

Physical and thermal properties			Electrical properties		Wear. different shaft materials. oscillating. p=145 psi. v=0.03 ft/s						Wear. different shaft materials. rotating p=145 psi. v=0.98 ft/s					
Max. long term application temperature [°F]	Max. short term application temperature [°F]	Min. application temperature [°F]	Specific volume resistance [Ωcm]	Surface resistance [Ω]	H. a. aluminum	Automatic screw steel	Cf53	HR carbon steel	304 SS	High grade steel	H. a. aluminum	Automatic screw steel	Cf53	HR carbon steel	304 SS	High grade steel
+176	+338	-40	> 10 <sup>13</sup>	> 10 <sup>11</sup>	12.9	9.5	10.9	12.9	11.2	11.2	2.5	3.0	5.82	2.26	2.7	5.2
+212	+320	-40	> 10 <sup>11</sup>	> 10 <sup>11</sup>	4.5	17.1	5.0	22.0	18.5	1.5	11.7	98.1	9.3	28.5	14.2	16.5
+266	+428	-40	> 10 <sup>13</sup>	> 10 <sup>11</sup>	5.3		3.7	13.7	14.9	15.4						
+266	+428	-40	> 10 <sup>13</sup>	> 10 <sup>11</sup>	1.9	12.0	2.7	19.0	2.5	1.9	1.0	4.3	2.7	1.88	11.9	7.6
+194	+248	-58	> 10 <sup>13</sup>	> 10 <sup>12</sup>	0.6	4.7	1.1	1.3	1.0	1.9	0.3	1.2	0.4	0.57	0.5	0.6
+194	+338	-40	> 10 <sup>4</sup>	> 10 <sup>4</sup>	3.4	4.0	1.5	1.4	0.7	0.5	0.2	0.9	1.5	0.7	2.7	1.7
+392	+464	-40	> 10 <sup>15</sup>	> 10 <sup>14</sup>	4.5	18.7	14.6	32.3	6.4	8.5	14.6	4.8	18.76	11.9	18.3	3.8
+212	+320	-40	-	> 10 <sup>11</sup>	1.9	1.86	0.9	1.9	1.0	1.9	0.6	0.7	0.4	4.3	1.0	0.4
+356	+428	-148	> 10 <sup>13</sup>	> 10 <sup>10</sup>	0.3	5.36	0.9	2.58	0.6	0.9	2.67	2.4	1.34	1.34	1.72	1.14
+194	+338	-40	< 10 <sup>9</sup>	< 10 <sup>9</sup>	1.0		4.0	6.0	2.0	4.0						
+392	+464	-40	> 10 <sup>13</sup>	> 10 <sup>12</sup>	2.6	7.7	2.1	4.3	1.7	2.2	6.3	3.2	2.2	2.1	9.6	5.9
+482	+599	-148	< 10 <sup>6</sup>	< 10 <sup>3</sup>	12.6	6.3	5.3	9.9	8.0	9.0	20.5	1.9	8.1	5.1	5.9	12.2
+185	+320	-40	10 <sup>15</sup>	10 <sup>13</sup>	39.3		19.9		34.9							
+230	+392		10 <sup>13</sup>	10 <sup>15</sup>	9.9		50.6		36.7							
+194	+248	-58	> 10 <sup>12</sup>	> 10 <sup>12</sup>	3.7		1.7		1.7							
+500	+572	-328	10 <sup>16</sup>	10 <sup>16</sup>												
+482	+590				5.2		7.7		3.7							

# Vehicle interior...



**Seating**

Rattle-free mounting of seating systems with iglide® plain bearings, e.g. inner-tilt- and seat height adjustment.

- Tolerance compensation possible
- Suitable for E-coating
- High static loads of up to 120MPa
- Quiet operation



**Convertible systems | multi-joint hinges**

All articulation points are furnished with iglide® bearings.

- Self-lubricating, maintenance-free
- Corrosion-free
- Quiet operation
- Suitable for E-coating



**Hinges**

iglide® is used in door and multi-joint hinges, such as in the trunk, hood, pedestrian protection, etc.

- Corrosion-free
- Tolerance compensation possible
- Suitable for E-coating
- Quiet operation



**Pedal**

Axial and radial pre-stressed iglide® plain bearings avoid vibrations and noises.

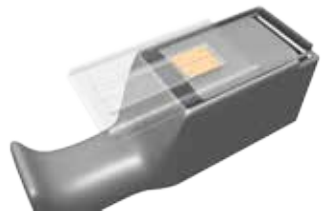
- Tolerance compensation possible
- Resistant to edge load
- High static loads



**Steering system**

Various bearing points in steering columns and shafts can be equipped with iglide® plain bearings.

- Noise dampening
- High resistance to stock loads
- Wear-resistant
- Cost-effective



**Armrests**

DryLin® linear guides replace telescopic guides.

- High rigidity
- Easy assembly
- Self-lubricating

# Engine compartment



**Shift forks**

In gear links and shift forks, iglide® plain bearings replace metal bearings and roller bearings.

- Noise dampening
- Resistant to transmission oil
- Corrosion-resistant



**Belt tensioner**

iglide® plain bearings run with an assembly lubrication provided under extreme operating conditions.

- High-frequency oscillating motion
- Heavy dirt accumulation
- Running temperature from:  
-40°F up to 248°F (-40°C up to +120°C)



**Throttle bodies**

iglide® plain bearings replace needle bearings.

- Cost-effective
- Capable of overmolding with plastics



**Valve (FGR and Turbo-loader)**

iglide® plain bearings run in short-stroke linear motion with extreme soot pollution from exhaust fumes and high temperatures.

- Low friction
- Wear resistance
- High temperature resistance



**Active intake manifolds**

Flap mounting of variable intake manifolds with iglide® plain bearings.

- Economic product design, i.e. pillow blocks
- Tolerance compensation by means of an o-ring



**ABS pump**

Guide troughs made of iglide® materials are used in high frequency short stroke movements up to 50Hz.

- Wear-resistant
- Fulfills cleanliness requirements
- Fulfills high accuracy requirements

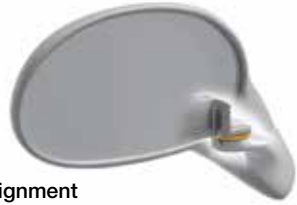
# Exterior ... Utility vehicles



**Chassis**

iglide® slide bearings replaces roller bearings and POM ball sockets in heavily stressed axle journals.

- High absorption
- Low sticking friction
- High compression strength
- Lightweight



**Mirror alignment**

iglide® thrust washers replace metallic bearings and simple plastics.

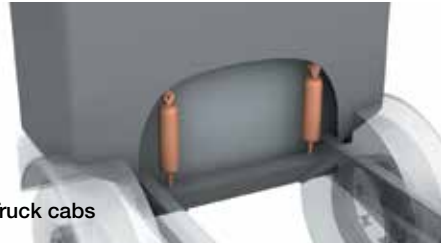
- Low sticking friction
- Quiet operation
- Special design possible



**Brake calipers**

iglide® plain bearings replace metallic bearings for use under extreme conditions – no knocking under extreme vibrations.

- High media resistance
- Lightweight
- Cost-effective



**Truck cabs**

iglide® plain bearings often replace metallic bearings in the hinge eyes of hydraulic dampers.

- Low sticking friction
- Good vibration dampening
- Resistant to dirt
- Corrosion-free



**Windshield wipers**

iglide® plain bearings replace metallic bearings on wiper blades and arms.

- High alternate bending strength
- Corrosion-free
- High compressive strength
- Media resistance



**Lift gates**

iglide® plain bearings replace metallic bearings and other systems with central lubrication.

- Withstand extremely high edge loads
- Self-lubricating
- Resistant to dirt
- High wear-resistance

# Clips

## Solutions for punched steel

### iglide® easyclip



- Easy axial push-in
- Axial safety through the 2nd flange
- Simple installation by wrapping
- One-side thrust surface

### iglide® double flange bushing



- Compress and slide in
- Loss-proof pre-assembly
- "Right" axial thrust surfaces on both sides
- Flanging not required

### iglide® flange bushing



- "Right" axial thrust surfaces on both sides
- Simple, automated flanging
- Tolerance compensation through axial pre-tension

### iglide® SnapOn



- Washer is pre-assembled on bushing with undercut
- Axial compensation of tolerance
- Loss-proof pre-assembly

# Customized ...

## Solutions for individual requirements

### Everything is possible – iglide® specials and solutions

Special design solutions such as non-clatter and low-play bearings, axial tolerance compensation, anti-rotation, knurled surfaces, lubrication pockets – virtually anything is possible.



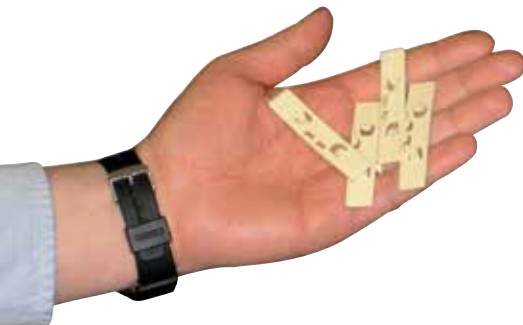
### What is speedigus?

Simple; choose any iglide® material, get molded parts in 1 to 10 days, depending on complexity of the part. Full technical component information given with every quotation, including lead time options. Absolute maximum delivery is 15 days.



**QuickSpecial**  
Customized bearing parts

► [www.igus.com/speedigus](http://www.igus.com/speedigus)





# Backlash ...

## Solutions for E-coating processes

### Low clearance iglide® bearing by recalibration during E-coating process

Seating, convertible systems and articulating joints often use simple punched housings or drawn sheet metal. Nevertheless, there should be a low clearance bearing to obtain quiet operation.

#### Our solution is:

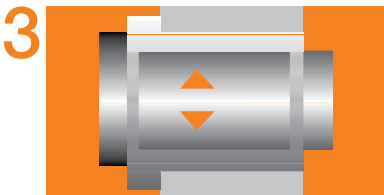
iglide® bearings use the high temperatures of the E-coating process to calibrate the bearing.



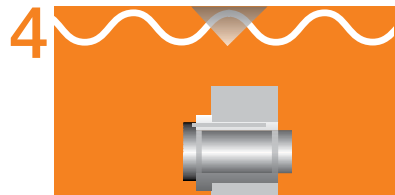
Poor tolerance of punched housing or drawn sheet metal



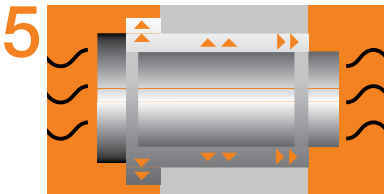
Assembly of iglide® bearing with transition fit



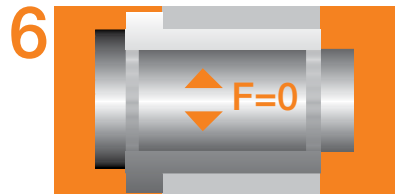
Assembly of shaft/rivet with overlap fit



e-coating process



Recalibration during drying process (max. 60 minutes at max. 220 °C)



Result: Low clearance bearing in spite of poorly tolerated housing bore/shaft

# Spherical bearings ...

## Self-lubricating and maintenance-free

- Maintenance-free igubal® spherical bearings diameters from (2 to 50 mm)
- Resistant to chemicals and corrosion
- Very good vibration dampening properties
- High frequencies and speeds possible
- Predictable lifetime

igubal® is a system of self-aligning bearing elements completely made of plastic.

With the igubal® series, a complete system of self-aligning bearing elements are available for the design engineer: Rod end bearings, clevis joints, flange bearings, spherical bearings and pillow block bearings.

Self-aligning bearings are easy to mount, suit all angular variations, and in many cases have already been able to replace special housings.

The igubal® user utilizes all advantages of the employed high performance plastics. They have excellent vibration dampening properties, and are technically applicable in dry operation. They are insensitive to dirt, can operate in liquids and even in chemicals and are completely resistant to corrosion.



Rod end bearings with male/female thread; right/left, also as HT version for up to +392°F.



Angle and axial joints, fitting screws.



Clevis joints and spring loaded pins, individual or combined (also with rod end bearings).

# Available from stock ...



Various types of pillow block bearings, with shared housing and/or spherical ball (optional).



Flange bearing with 2 or 4 bore holes, also as an HT version for up to 392°F.



Spherical bearings and self-aligning clip bearings.



Spherical balls made from iglide® materials.



Double spherical bearings and coupling bars.

# Easy removal ...

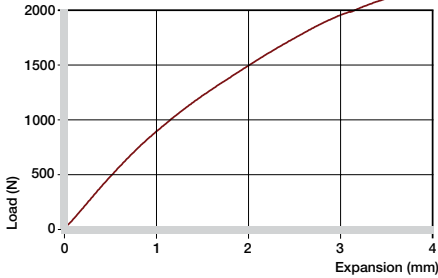
## igubal® double joint bars

igubal® plastic double joint bars as mechanical connecting element between 2 components.

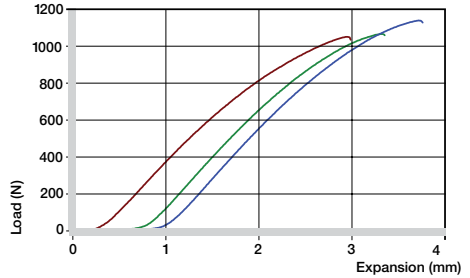
- Up to +250°C operating temperature
- Lightweight
- Self-lubricating
- Corrosion-resistant
- Customized design
- Rapid prototypes available in 5 days



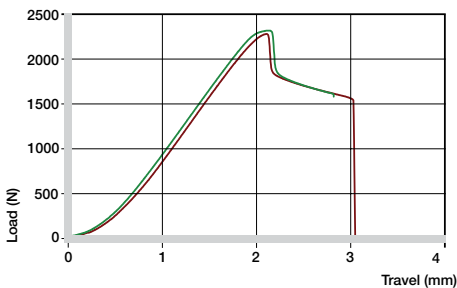
Tensile stresses at ambient temperature



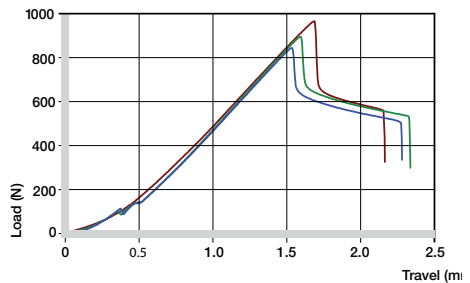
Tensile stresses at 248°F (120°C)



Compressive loads at ambient temperature



Compressive loads at 248°F (120°C)



## Self-lubricating and maintenance-free



Turbo charger

igubal® double joint bars made of high-temperature material replace metallic coupling bars for applications of up to 392°F (200°C).

- Good vibration damping characteristics
- High long term application temperature
- High wear resistance



Gear box

igubal® double joint bars replace metallic connections.

- Noise reduction
- Vibration damping
- High rigidity
- Cost-effective



Active intake manifolds

Plastic double joint bars replace mechanical joint bars.

- Weight reductions of up to 90%
- Low wear rates

# 100% self-lubricating ...

## DryLin® linear and drive technology

DryLin® is a range of maintenance-free and self-lubricating linear bearings in four different type series. Besides the freedom from maintenance and external lubricants, the main features include ruggedness and the insensitivity to dirt, water, chemicals, heat or impacts.

Additionally, the range is complemented by complete linear units with spindle drive or toothed belt, leadscrews nuts and threads, and new: drive technology - complete systems with linear axis and motor.

- Same mounting dimensions as linear ball guides
- Resistant to chemicals, corrosion and dirt
- Low weight permits high frequencies and maximum accelerations
- Impact and vibration resistant, quiet operation
- Predictable lifetime

### Rail guide systems



DryLin® T are the classical linear guides.

- 100% self-lubricating
- Dimensions are identical to standard commercial ball guide systems
- Automatic clearance adjustment
- High static load capacity

### Low-profile guide systems



DryLin® N flat guides have an extremely low built.

- 100% self-lubricating
- Lightweight and small construction height: 6-12 mm
- Numerous carriage options – also with preload
- Interesting alternative to miniature ball guide systems

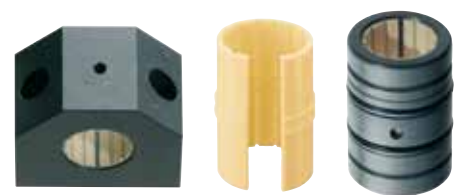
### Modular guide systems



DryLin® W guide systems offer a large and complex modular system.

- 14 different profiles and more than 50 carriage options
- Easy installation
- Versatile use, space saving and compact

### Round shaft guide systems



DryLin® R as an alternative to ball linings.

- 100% self-lubricating
- Same dimensions as standard ball bearings
- Shafts, supports and accessories available from stock
- Replaceable liners

# Sliding instead of rolling

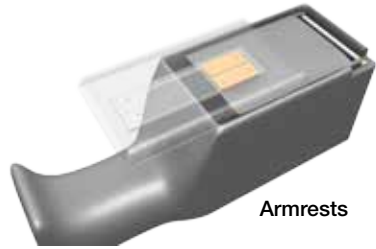
## DryLin® linear and drive technology

### Lead screw drives



Convert a rotary motion into a linear motion.

- 100% self-lubricating
- Trapezoidal or high helix thread
- Optionally clearance-free through anti-backlash feature

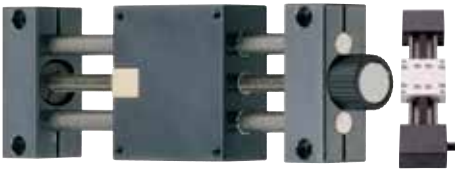


Armrests

DryLin® linear guides replace telescopic guides.

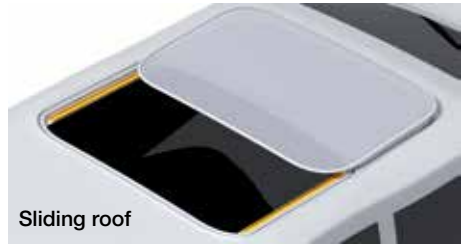
- High stiffness
- Easy assembly
- Self-lubricating

### Linear slide tables



Linear slide modules drives with trapezoidal thread, high helix thread or gear belts.

- 100% self-lubricating
- For size adjustments as far as fast small-part-handling
- Numerous accessories available



Sliding roof

Self-lubricating iglide® plain bearings fitted in DryLin® linear guides replace lubricated plastics.

- Low sticking friction
- Resistance to dirt
- Low moisture absorption

### Drive technology



DryLin® E – “E” as in electric

- Complete systems: Linear axis plus motor, ready to fit
- Self-lubricating, lightweight and silent
- Configuration online possible
- Available in 3-4 days







# Energy supply from stock

## E-Chain Systems® for modern machinery



### Designed to guide and protect

E-Chains® and E-Chain Systems® are the lifeline of modern machines. They reduce downtimes and increase the service lives of cables and hoses.

Plastic E-Chains® have been developed, produced and tested by igus® since 1971. The igus® product range includes over 80,000 innovative products from stock and from “batch size one”. From the smallest Micro Flizz® chain to the world’s biggest polymer E-Chain®.

For the safe supply of energy in production lines and other areas of the automotive industry, igus® offers an ideal solution with plastic energy supply chains. Whether in manufacturing robots or indoor cranes with long travels, many applications are possible.

### Robots, 3D and circular movements



### Triflex®, Triflex® R, E-Z Triflex®, TwisterChain®, TwisterBand

- Closed design
- Easy to equip
- For 2 or 3 axes
- Modular design

### Easy to fill



### E-Z Chain and Zipper E-Chains®

- One-piece E-Chains®
- Quick to fill from inside or outside
- Extremely fast opening and closing
- Small and medium-sized E-Chains® and E-tubes

### All around, small and medium sizes



### System E2 mini, E2 micro and E2/000

- Standard E-Chains®, small and medium sizes
- Inner heights: .20” to 1.77” (5 to 45 mm)
- Small divisions, smooth operation
- Versatile, modular interior separation, cable-friendly



Also E-Chains® can be directly used in the vehicle, e.g. in permanently powered sliding doors, seat adjusters, as conduits on the rear spoiler or in telescopic struts. If you need a cable guide or a kink protection – just ask us.

# Robotics, hose packages ...

## E-Chain Systems® for modern machines

**Triflex® R:** Cable protection for 3D and torsional movements

**Triflex® RS:** Universal modules for robots

**twisterchain®:** Circular and rotational movements up to 540°

**CFROBOT:** Chainflex® cables for torsional movements and robotic applications

**System E4-1:** Energy supply for long travels and 7<sup>th</sup> axis

**Triflex® TRL:** Lightweight and cost effective

from stock ...

## Triflex® R options and variety of components



### TRE – quick insertion of cables

- Simple filling with cables and hoses
- Especially for assembled cables
- TRC and TRE links can be combined
- Available in 7 sizes from 30 to 125 mm
- B and C version specifically for more complex applications



### Type: standard mounting bracket

- Quick and simple mounting with snap-on connection
- Extremely short downtimes for replacement of a filled Triflex® R
- With or without tiewrap plates, or as intermediate connections



### Triflex® R Quick exchange kit

- Changed in seconds without tools
- One time only alignment
- Perfect for Triflex® R ReadyChain®
- Suits all additional axles: Ø 30 mm, Ø 32 mm, Ø 34 mm

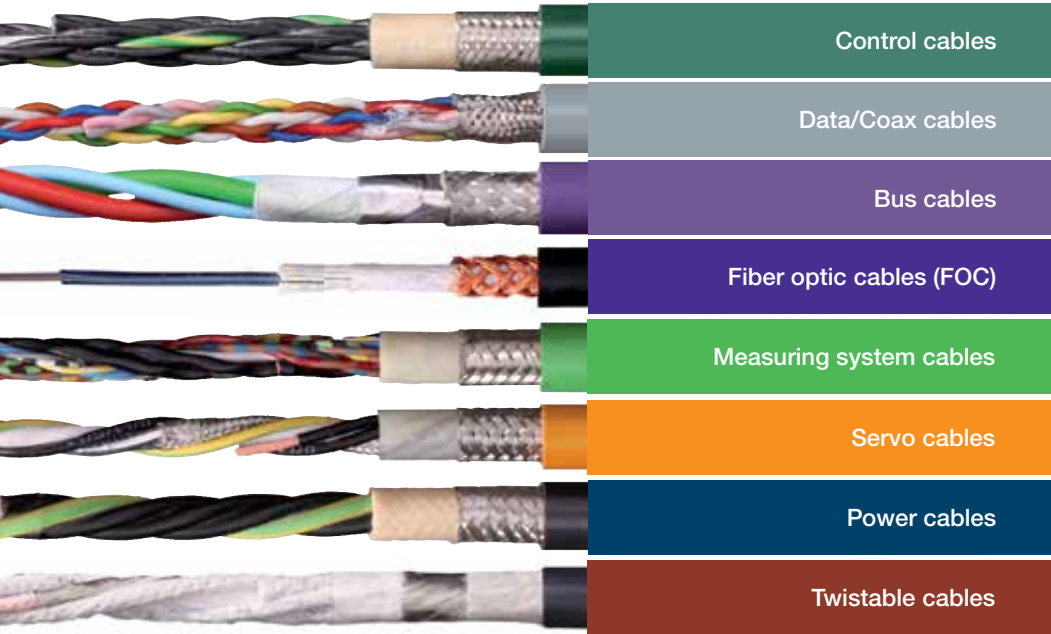


### Triflex® RS system

- Integrated recuperating spring prevents loop formations and give a directed pretension to the Triflex® R
- Toolless mounting brackets for safe fastening
- Single module, space-saving and quickly mounted on common robots; from stock

# Cables from stock ...

More than 1,000 types of cables available from stock



More than 1,000 Chainflex® cables developed especially for the use in E-Chain Systems®

- Wear resistant TPE, PUR, and oil-resistant PVC outer jackets
- Halogen-free and/or flame-retardant materials
- Certifications including: UL, CSA, CE, DESINA, CEI
- Smallest radii up to 4 x d

Certifications and approvals for Chainflex® cables

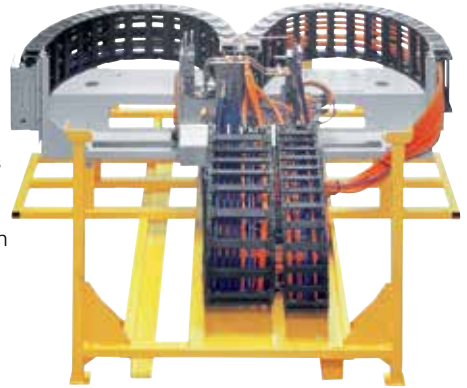


# Pre-harnessed systems ...

## Harnessed cables in shipped from stock in 24 hours and ReadyChain Systems® in 3-10 days

700 systems per week in 11 ReadyChain® factories worldwide - reduce assembly time and optimize cashflow

- Reduce storage costs for cables, chains and connectors to zero
- Reduce throughput times by half
- Get flexibility in production demand fluctuations
- Reduce number of suppliers and purchase orders by 75%
- Minimize machine downtime for your customers
- Receive a system warranty based on a free design review

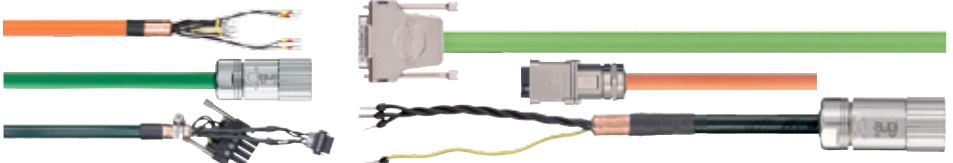


## ReadyCable - Allen Bradley, Siemens and Fanuc available from stock

igus® offers over 2,800 cables pre-harnessed to 20 different manufacturers standards\*. Professionally manufactured, 100% tested.

- Servo, motor and signal / encoder cables
- No cutting costs, no minimum charge for small quantities and packaging
- Cable length according to your needs
- Smallest bending radii from 7.5 x d
- Reduce storage costs and increase cash flow

\*For manufacturers standards other than Allen Bradley, Siemens and Fanuc, please consult igus® for lead time.



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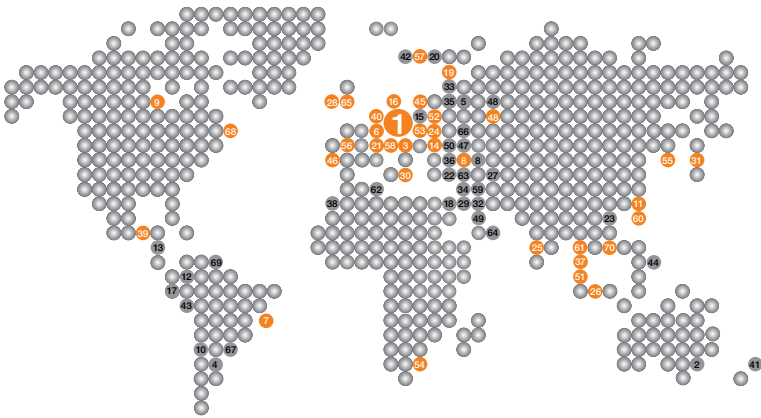
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