igus[®] solutions for agricultural engineering

plastics for longer life[®]...igus igus.com/agriculture

IG-B15

Reduce cost ...



Nick Van Tol Agricultural Industry Manager Tel: 816.500.6127 Email: nvantol@igus.com

Innovations from triboplastics for agricultural machinery. The use of plastic plain bearings facilitates 8 times longer service life.

Especially in agricultural applications, you need solutions that can stand up to rough conditions, such as dirt, shock and edge loads. The absence of external lubricants and a long service life are equally important.

In many applications, metallic bearings or recirculating ball bearing guides can be replaced by self-lubricating plastic plain bearings. We would like to show you how to improve your technology and save costs at the same time.

The advantages of igus[®] plastic plain bearings, especially for agricultural applications are:

- Dry-running and corrosion resistant
- Resistant to dust and dirt
- High mechanical stability
- Vibration dampening
- Compensation of misalignment
- Custom parts to drawing even for small quantities
- Can be used on a wide variety of shafts

Our online tools also enable you to reduce process costs. igus[®] ships from stock in as little as 24 hours! Also, see our industry website.

Mww.igus.com/agriculture

I look forward to speaking with you.

improve technology

AGROBOT

with motion plastics products from igus®

đ

manna

Resistant against dirt ...

Agricultural engineering application examples ...



Disc harrow (width adjustment)



iglide® G300 plastic plain bearings

- Maintenance-free
- Insensitive to shock and edge loads
- Resistant to dirt



Reel bearing harvester



iglide® J plastic plain bearings

- Reliable even after prolonged shutdown
- Corrosion resistant
- Well suited when used with soft shafts

high loads and chemicals

many more examples online www.igus.com/agriculture

Root ball transplanter



iglide[®] G300 plastic plain bearings

- Maintenance-free dry run
- High abrasion resistance
- Resistance to dust and dirt
- More than 650 dimensions
- Available from stock
- Cost effective



Planter parallel arm linkage



iglide® plastic plain bearings

- Self-lubricating and corrosion resistant
- Insensitive to high static peak loads and edge loads
- Cost effective



Resistant against dirt ...

Agricultural engineering application examples ...



Fertilizer spreader



igubal® clevis joint

- Corrosion resistant
- Vibration dampening
- Can be combined with dimensional series E rod ends



Fertilizer factory



e-chain® E4-1

- Large module kit for custom configuration
- Media-resistant
- Extremely robust

high loads and chemicals

many more examples at www.igus.com/agriculture

Wind machine frost fan



e-spool

- Simple handling
- New compact design for small installation spaces



Harvester



E-Z chain

- Very easy assembly
- Cost effective
- For limited installation spaces



Resistant against dirt ...

Agricultural engineering application examples ...



Hay tedder



iglide® G300 plastic plain bearings

- Impact and shock resistant
- Cost effective
- Media-resistant



Track width adjustment



iglide® G300 plastic plain bearings

- High static forces
- Vibration dampening

high loads and chemicals

many more examples at www.igus.com/agriculture

Pendulum axis



iglide® G300 plastic plain bearings

- Suitable for soft shafts
- Media-resistant



Telescopic farm loaders



e-chain® E2/000

- Excellent mechanical stability
- Assembly-friendly, easy to open
- Safely guides cables and hoses



Extremely wear-resistance ...

Plain bearing technology from igus® ...



Cylinder



iglide® P plastic plain bearings

- For high surface pressures
- Resistant to impacts
- Lubrication-free

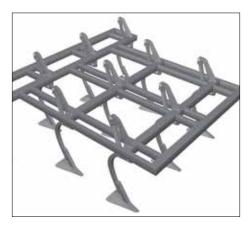


Axle bearing



iglide® Q plastic plain bearings

- Extremely robust and resistant to slurry
- Reliable even after a long period of inactivity



Set bearings



iglide® G300 plastic plain bearings

- High static and impact loads
- Self lubricating and corrosion resistant

resistant to dirt ...

in agricultural machines

Power lift



iglide® G300 plastic plain bearings

- Vibration dampening
- Media-resistant
- Reliable even after long periods of inactivity



Sowing coulter



iglide® G300 plastic plain bearings

- Vibration dampening
- Media-resistant
- Reliable even after long periods of inactivity



Front loader



iglide® Q2 plastic plain bearings

- For high-load pivoting applications
- Insensitive to shock and edge loads
- Maintenance free dry run



robust ...

Plain bearing technology from igus® ...



Steering system and pedals



iglide® J plastic plain bearings

- Low coefficients of friction
- Vibration dampening



Chassis bearings / suspension



iglide® Z plastic plain bearings

- Suitable for high loads
- Vibration dampening
- Insensitive to edge loads and impacts
- Resistant against fuel oils and oils



Tractor doors



iglide® G300 plastic plain bearings

- High static and shock loads
- Self lubricating and corrosion resistant

maintenance free ...

in agricultural machines

Trailer



iglide® Q plastic plain bearings

- Extremely robust and resistant to manure
- Reliable even after long periods of inactivity



Hay spreader



iglide® G300 plastic plain bearings

- High static and shock loads
- Self lubricating and corrosion resistant







iglide® J plastic plain bearings

- Low coefficients of friction
- Vibration dampening



Self-lubricating plastic bearings ...

Plain and spherical bearings technology from igus® ...



Rotary pump



iglide® UW plastic plain bearings

- Lowest wear in underwater applications
- Cost effective solution



Animal technology



igubal® spherical bearings

- Resistant to dust and dirt
- Self-lubricating and corrosion resistant



Fertilizer spreader



igubal® clevis joint

- Very low weight, high tensile forces
- Vibration and noise dampening
- Absolute corrosion resistance

available from stock

in agricultural machines

Combine harvester



iglide® J plastic plain bearings

- Low coefficients of friction
- Vibration dampening







drylin® W profile guide

- Resistant to dust and dirt
- Square rail with floating bearing function for lateral installation
- Lightweight and quiet operation

Mulcher (width adjustment)



iglide® G300 plastic plain bearings

- High static and impact loads
- Self-lubricating and corrosion resistant





igus[®] products in cabins

Bearings and linear bearings – self-lubricating and maintenance-free ...



Mirror adjustment iglide[®] J plastic plain bearings



- Low coefficients of friction
- Low wear

Omnitor adjustment drylin[®] W profile guide carriages



 Flexible and easy to position

Head rest back adjustment drylin[®] W profile guide



- Self-lubricating
- Modular
- Low assembly cost

Steering column bearing drylin[®] plastic linear bearing



- Quick clip-on mounting
- No axial securing required

5 Steering column bearing iglide[®] G300 plastic plain bearings



- High wear resistanceResistant to dirt
- r i

6 Operating element

triflex[®] R 3D e-chain[®]

Moving along all axes

Connection hydraulic valve igubal[®] double joint bearing



- Compensation for misalignments
- Modular construction kit

8 Armrest adjustment drylin[®] N low profile guide



 Light, low profile dry running

Seat back adjustment drylin[®] W profile guide



Self-lubricatingModular

Seat bearing adjustment e-chain[®] E2 micro, chainflex[®] cables



• Stable, quiet and quick to assemble

iglide[®] plastic plain bearings ...

A choice of 50 iglide® plastic plain bearing materials

Self-lubricating and maintenance free plain bearings made from highperformance plastics – iglide[®].

No external lubrication or maintenance required, while cutting costs and increasing service life, everything from stock and shipped in as little as 24 hours – that is the central idea of all igus[®] products. iglide[®] plastics have been extensively tested with respect to wear and friction values including other relevant material properties. iglide[®] plastic plain bearings from igus[®] signifies the step from the plastic bearing to the tested and predictable machine component.

- Self-lubricating
- Lightweight
- Maintenance-free
- High static loads

- Corrosion free
- Vibration dampening
- Metric and imperial dimensions
- Special dimension and designs

Market www.igus.com/iglide

The base polymer is crucial for the wear resistance

Fibers 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

Structure of iglide® plain bearings:

long lasting. Tested

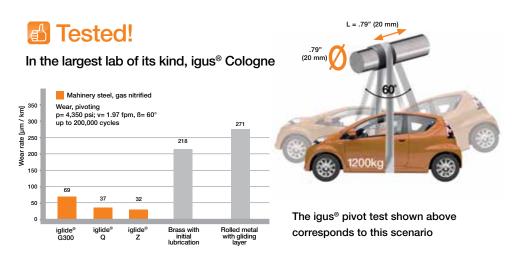
... made of high performance plastics - iglide®

The use of plastic plain bearings facilitates 8 times longer service life.

In an effort to continuously improve our product range and to address your specific needs, we are reviewing various shaft materials and extensively testing these with a variety of bearing solutions in our igus[®] dry-tech[®] lab. We are currently also conducting tests on the following shafts / coatings:

- Machinery steel / uncoated
- 1045 steel / uncoated
- Piston rods / hard-chromed
- Machinery steel / saltbath nitrocarburized
- 1045 steel / galvanized

✓ www.igus.com/iglide



Conclusion:

 All tested iglide[®] materials exhibit significantly lower wear than metal plain bearings

The shafts of the metal plain bearings exhibit significant wear and are therefore unsuited for further use.





iglide[®] high performance plastics

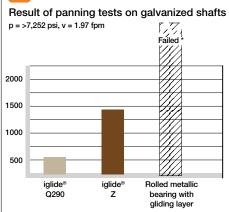


Metal solutions

iglide[®] products ...

iglide[®] plain bearings ... self-lubricating and maintenance-free

Tested!



* Shaft machinery steel/galvanized. Cycle frequency 60,000. Tested with bearing diameter 20 mm and 20 mm length. The force in the test was 6,834 lbs.



Version with iglide[®] Q290 on Machinery steel/galvanized



Metallic version on Machinery steel galvanized



NEW: iglide[®] Q290: Durable even on soft shafts and with high loads

Especially with medium to high dynamic loads, this material demonstrates its strengths: In rugged pivoting applications excellent durability can be achieved for shaft and bearings, such as in agricultural or construction machinery, and specifically on "soft" shafts!

- Long life even on soft shafts
- Insensitive to edge loads
- Continuous use up to +284°F
- Good price/performance ratio
- Self-lubricating and maintenance-free
- Standard range from stock



volume or individual production



3D printing copy shop online

- Receive prototypes and custom parts more quickly
- Use the latest technology without having to make investments
- Printed parts from abrasion and wear-resistant iglide[®] materials
- Tribological printed parts specifically for moving applications
- Start by testing products, then order large quantities



Compensate for angle

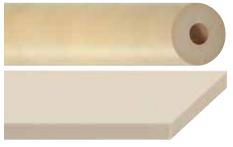
- Angle compensation up to ±7.5°
- Operating temperature: -22°F to +176°F
- Easy assembly
- Very low weight
- Self-lubricating
- Corrosion resistant





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

www.igus.com/tribotape



Bar stock

- Very high media-resistance
- Cost effective
- Wear-resistant
- Compliance with EC Directive 10/2011 EC possible
- FDA-compliance possible
- ✓ www.igus.com/barstock

drylin[®] linear technology ...

Self-lubricating and maintenance-free linear technology ...

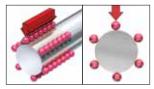
The entire line of drylin[®] linear solutions are based on the principle of sliding instead of rolling, utilizing iglide[®] high performance plastic materials as a sliding surface. All drylin[®] linear systems are 100% self-lubricating and maintenance-free.

Linear guides on rails or round shafts are available. drylin[®] drive-technology can supply ready-to-connect systems with lead screw drives or toothed belt drives, with or without motor. Besides freedom from maintenance and external lubrication, drylin[®] offers rugged construction and insensitivity to dirt, water, chemicals, heat, and impacts.

- Resistant to dirt due to dry operation
- Resistant to impact and vibrations
- High static load capacity
- Suited for short-stroke applications
- Low weight
- Vibration dampening
- Quiet operation
- Metric and imperial dimensions
- Special designs according to customer needs
- Available from stock

✓ www.igus.com/drylin

The principles of igus® linear technology:



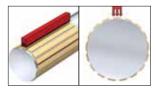
"Conventional" roller bearings – point contact:

- Increased volume
- Balls can seize
- Selective load distribution (surface pressure)

Using the example of drylin[®] W

Clean, no external lubricants required

Profiles available in various geometries, installation sizes and clearances

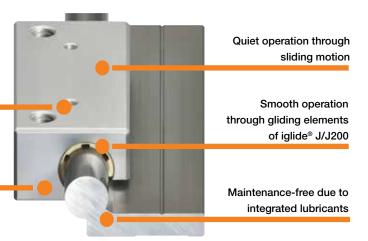


drylin[®] plain bearings – surface contact.

- Quiet operation
- No balls that could seize
- Planar load distribution (surface pressure)



Resistant to dirt, dust and moisture due to selflubricating operation and integrated dirt channels.

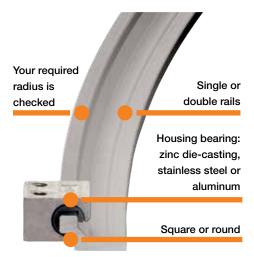


sliding instead of rolling

even curved guides according to your specifications

NEW:

Curved guides according to your specifications





drylin[®] W profile guide

- Easy installation, maintenance free
- Self-lubricating
- Curved rails
- Resistant to dirt due to dry operation
- Low weight and low noise operation
- Square rail with floating bearing function for lateral installation
- Special profile solutions



drylin[®] N low profile guide

- 100% self-lubricating
- Low installation height between 6 and 12 mm
- Very lightweight
- Numerous carriage options also with pretension



drylin® (heavy-duty) profile guide

- Shock-resistant, self-lubricating and eco-friendly
- Adjustable bearing clearance, robust overall construction
- Dimensions are identical to recirculating ballbearing guides
- Adjustable bearing clearance
- Automatic clearance adjustment

Dry-running, maintenance free ...

Self-lubricating bearing made easy. For example ...





drylin® R shaft guides

- Dimensions identical to standard commercial ball bearings
- Shafts, shaft support blocks and accessories available from stock
- Replaceable liners



drylin® shafts

- 8 different shaft materials
- Lightweight
- Round or supported





drylin® linear axes

- Self-lubricating
- For format adjustments and quick small parts handling
- With or without motor drive
- Extensive accessories



drylin® toothed belt axes

- Drive ends with grooved ball bearings
- Self-lubricating linear guide through plastic plain bearings
- With or without motor drive
- Hard-anodized aluminum profile

and resistant to dirt.

Maintenance free lead screws, spherical and ball bearings ...



igubal[®] spherical bearings

- Self-adjusting bearing component
- Easy to mount
- Adapt themselves to all angular deviations
- Self-lubricating and maintenance free

igubal® double joint

- Versatile application options through the possible combination with igubal[®] rod end bearings
- Corrosion resistant, chemically resistant
- Vibration dampening
- Self-lubricating and maintenance free



xiros® plastic ball bearings

- Self-lubricating and maintenance free
- High chemical and corrosion resistance
- For temperatures up to 302°F
- Non-magnetic
- Low weight



drylin® lead screw technology

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

Energy and media ...

Choose from 100,000 components in the e-chain® module kit



E2/000

- Energy chains of medium sizes
- Inner heights from .83 to 1.77" (21 to 45 mm)
- Snap open on left and right
- Diverse modular interior separation



E2 micro

- Energy chains with the smallest sizes
- Inner heights from .20" to .59 (5mm to 15 mm)
- Snap open along inner or outer radius
- For tight installation spaces



E4-1

- Almost all applications are possible with this e-chain[®]
- Inner heights from .83" to 3.15" (21 to 80 mm)
- e-chains[®] and e-tubes snap open along two sides
- Quick installation, cable-friendly design
- Huge modules for custom configuration



twisterband

- 7.000°* and more horizontal rotary motion and up to 3,000° in the vertical installation position
- Rotary speeds up to 360°/s possible
- Compact, modular and lightweight
- Bands can be lengthened and shortened as required
- Minimum installation space, fits very closely around the rotary axis
- Can be used in various installation positions (horizontal, vertical, overhead)

E-Z chain

- Easy insertion of cables
- Easy access from inside or outside
- Affordable one-piece energy chains
- For the smallest installation spaces and shortest assembly times



e-skin®

- Innovative corrugated hose generation
- Snap open, quick assembly
- Inherent rigidity for unsupported lengths
- Various materials and colors available, even for small quantities
- Available with interior separation

fail-safe guiding

Cables for highly flexible movements and long service life

chainflex® cables

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, Interand 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 fiber optic cables.

- Over 1,000 cable types available from stock
- Shipped in as little as 24 hours
- No cutting costs. No minimum order quantity
- Different outer jacket materials: PVC, PUR, TPE
- Oil resistant
- Flame retardant
- www.igus.com/chainflex



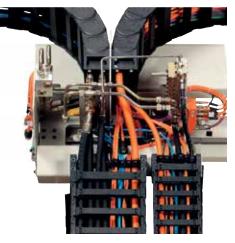


Chain - cable - guarantee ... shipped in 3-10 days

readychain[®] – pre-assembled systems

1,000 systems produced per week in 12 readychain[®] factories around the world – assembly time optimized 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%
- Minimize your machine downtime
- System guarantee depending on application
- ✓ www.igus.com/readychain



Assembled igus[®] readychain[®] systems: individual or serial production

igus[®] services ...



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

www.igus.com/constructionmachinery



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Quickly find products online, configure them and calculate their service life.

With our igus[®] product finder, quickly find the right product and calculate the estimated service life of igus[®] products in your application.

√ www.igus.com/online

For any task – in any batch size

Different industries need different solutions. No matter your industry igus[®] offers customized support for special applications. igus[®] has more than 50 years of experience and specialized resources in many industries.

√ www.igus.com/industries

quick and reliable







The igus® delivery service

More than 97% of components from the igus[®] catalog are available from stock.

- More than 100,000 products from stock
- No minimum order quantity
- No minimum order price
- No cutting charges for cables
- No packaging costs

Modern and economic molding technology

igus[®] utilizes high tech, cost-effective solutions. Modern injection molding technology allows thousands of standard and countless custom components to be manufactured with high precision and quality.



The igus® lab

The massive igus[®] lab (29,600 ft²) conducts more than two billion test cycles per year on more than 100 test rigs.

Extensive test databases

Customized tests on request

✓ www.igus.com/test

igus[®] motion plastics

One vision has been driving us for more than 50 years – motion plastics: innovative moving parts made of plastic that cost less and last longer. Our core technology consists of tribo-plastics – highperformance plastics which have been optimized for friction and wear. This technology has made us into a world-wide leader for developing and manufacturing energy supply systems and plain bearings.



igus[®] contacts ...



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