dryspin® lead screw technology

Solutions for the automotive industry

motion plastics®

igus®.eu

www.igus.eu/dryspin-automotive

Lead screw systems from a single source

The proportion of electronic and electromechanical components in vehicles has been growing continuously for years. Increased comfort and the safety requirements promote this development. In addition, alternative drives pose enormous challenges to the components in terms of noise, weight and durability.

Many moving components in the interior and exterior of vehicles are driven by actuators. The motion transmission is often achieved with the help of lead screws and nuts. The dryspin® lead screw technology helps you to design these systems with mechanical and economical efficiency. Optimised flank angles of the threads ensure a higher effective burr than with conventional high helix threads. Nuts produced in plastic injection moulding from iglidur® materials ensure almost free design and do not require additional lubrication.

Our experts support you in selecting the right lead screw drive according to your technical requirements and help to implement your individual solution within the shortest possible time. More than 4,200 employees worldwide in 35 branches and 80 igus® support points ensure cross-border support at almost all industrial locations in the world and enable short-term deliveries for prototypes and samples.

We look forward to the details of your application.

Dirk Tietz
Cologne Industry Manager Automotive
Phone: +49-2203 9649-562
Mobile: +49-162 4074975
e-mail: dtietz@igus.net

Thorben Hendricks
Cologne, Head of Business Unit dryspin® lead screw drive
Phone: +49-2203 9649-9809
Mobile: +49-172 2561822
e-mail: thendricks@igus.net

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Application examples

with motion plastics® from igus® ...

The wide choice of materials and complete absence of a need for lubrication or maintenance mean that the lead screw drives can be used in almost any area of the automotive industry. They are ideally suited for small installation spaces and run almost silently even with low drive torques. In addition, the uncomplicated system integration in your vehicle or assembly speaks for the cost-effective alternative to conventional lead screw drives made of metal.

Here you will find an overview of possible applications of dryspin® lead screw drives in vehicles.

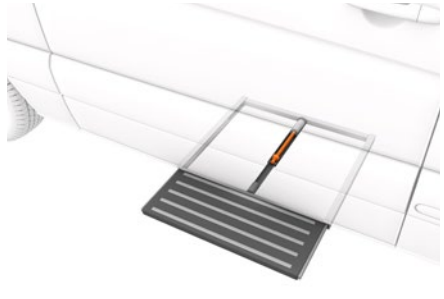
Automotive exterior

- Resistant to dust and dirt
- High load capacity
- Maintenance-free
- Corrosion-free
- Resistant in salt spray test
- Resistant to water splashes

dryspin® lead screw technology in the variable front spoiler

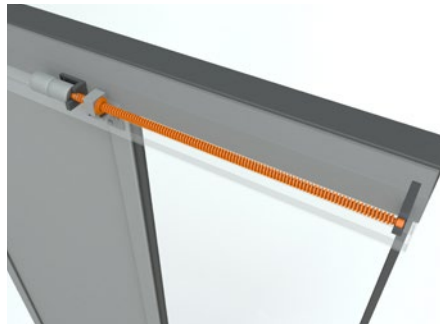
dryspin® lead screw technology in bus doors

dryspin® lead screw technology in tailgate actuator



dryspin® lead screw technology in electronic boarding help

dryspin® lead screw technology in lock park actuator



dryspin® lead screw technology in sliding doors

dryspin® lead screw technology in the pressure accumulator for electronic brake boosters

dryspin® lead screw technology in powered sun roof

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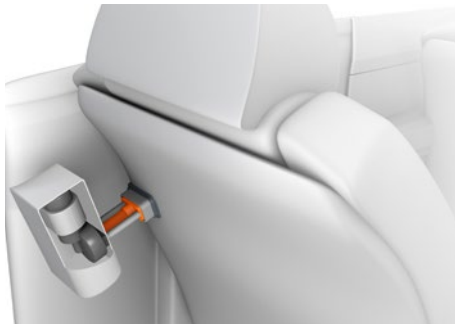
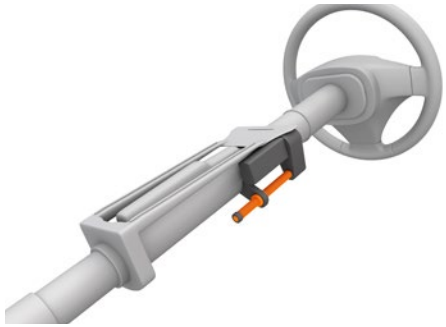
Automotive interior

- Absolute lubrication-free
- Maintenance-free
- Lightweight
- Ideal for small installation spaces
- Silent and vibration-free
- Easy installation and system integration



dryspin® lead screw technology in rear seat adjustments

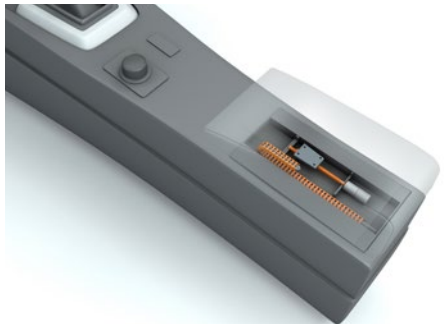
dryspin® lead screw technology in seat length adjustment



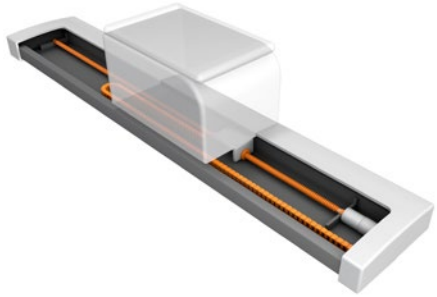
dryspin® lead screw technology in steering column adjustments

dryspin® lead screw technology in the side door drive

dryspin® lead screw technology in linear actuator



dryspin® lead screw technology in centre armrest

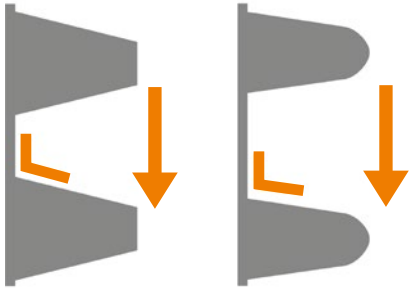


dryspin® lead screw technology in adjustable centre consoles

Here you will find our Automotive Exterior and Interior Solutions

www.igus.eu/dryspin-automotive

Structure of the dryspin® high helix thread technology

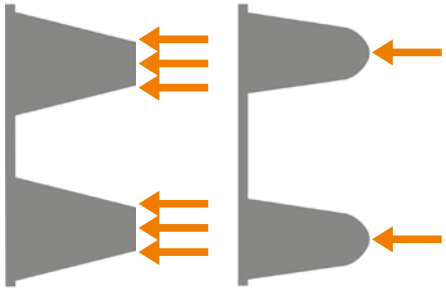


Steeper thread angle, standard geometry

Flatter thread angle, dryspin® geometry

Higher efficiency due to optimised thread angle

Due to a flatter thread angle in dryspin® high helix lead screws (similar to a trapezoidal thread), the applied force is efficiently converted into a translational motion. Compared with a steeper thread angle, this means a lower power loss.

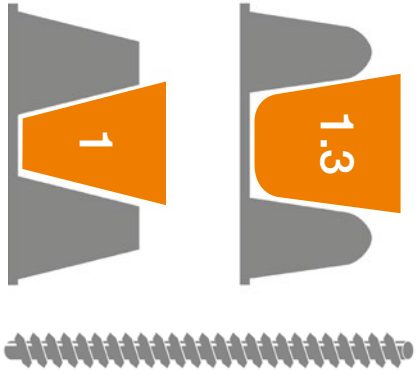


Angular tooth profile, standard geometry

Rounded tooth profile, dryspin® geometry

Quiet operation with vibration dampening

Due to the rounded tooth geometry, the contact surface between the lead screw nut and the lead screw is reduced. Thereby the dryspin® lead screw nuts move without vibration, virtually silent. The greater the contact of two surfaces moving against one another, the more vibrations are transmitted, which can be perceived as a rattle or squeak.



Symmetrical standard geometry

Asymmetrical dryspin® geometry

Longer service life due to asymmetry

Due to the larger distances between the individual thread turns, the thread ideally matches the specifications of the lubrication-free high performance polymers. The proportion of the tribologically optimised polymer in the thread pitches can be extended by a factor of 1.3 for all sizes. More wear-resistant material and higher levels of efficiency are crucial for up to 5 times longer service life of standard geometries. The larger the lead screw diameter, the stronger the impact of this effect.

What advantages does dryspin® offer?

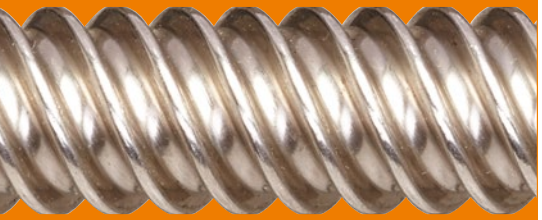
Tech up

- Up to 25% less wear compared to conventional lead screw nuts based on standard plastics
- Efficiencies up to 82% due to optimised flank angles
- Up to 30% longer service life due to asymmetry compared to conventional standard plastic-based lead screw nuts
- Weight saving compared to metal lead screw nuts
- 100% free of lubrication and maintenance, no oil or grease in the interior
- 100% corrosion-resistant
- Optimised also for small installation spaces and high drive torques
- Quiet and vibration-free operation due to rounded tooth flanks
- Insensitive to dirt, very advantageous in exterior areas

Cost down

- Up to 50.9% more cost-effective compared to metal, ball-guided thread systems
- Customer-specific solutions for lead screw and nuts individually configurable online
- Fast processes and short delivery times
- Preliminary tests in igus® test laboratories
- Easy installation and system integration
- Provision of unprocessed materials

Materials



Stainless steel

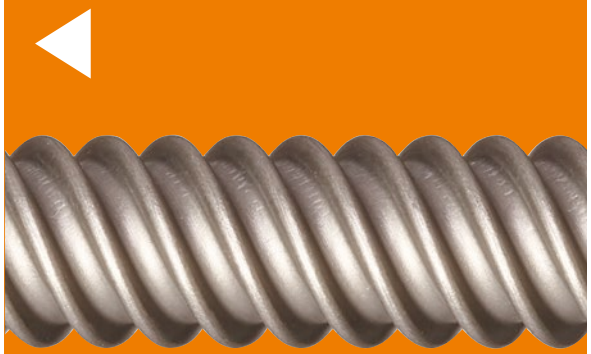
The standard alloy type for our lead screws is stainless steel. Stainless steel is resistant to corrosion and temperature, durable and conductive.

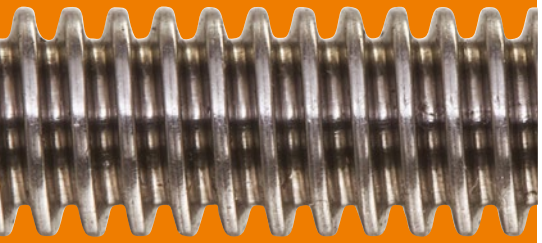
Our thread types high helix thread, trapezoidal thread and metric thread are all available from us in stainless steel.

Aluminium EN AW 6082

This is a standardised aluminium alloy of the AlMgSi group with 0.7% to 1.3% silicon as the main component, as well as additions of magnesium, manganese, iron, chromium, zinc, titanium and copper.

Our high helix and trapezoidal lead screws are available in aluminium EN AW 6082.





CF-15 steel (AISI 1015)

The material C 15 belongs to the low-alloy materials with a carbon content of 0.10% to 0.20%. To increase strength, the low-carbon material is "used" in an atmosphere containing carbon (case hardening).

Only the trapezoidal lead screws are available in standard CF-15 steel (1.0401).

Thread direction

Right-hand thread

For lead screws with right-hand thread, the thread flanks rise from bottom left to top right. In production drawings right-hand threads are often marked with the letters RH, e.g. TR20x4-RH.

A left-hand thread rises from bottom right to top left. An alternative designation for it is the left rising thread. Left-hand threads are usually marked with the letters LH in production drawings, e.g. TR20x4-LH.

Left-hand thread

Reverse thread

In addition to the standard right-hand and left-hand thread directions, reverse lead screws with right-hand and left-hand threads offer the designer more design freedom, as a second lead screw adjustment including a second drive is not required. Except for a few millimetres in the middle, the entire length can be used as a stroke. Reverse lead screws are usually marked RH/LH or R/L, e.g. DST-LS-10x12-R/L-ES.

Lead screw nuts

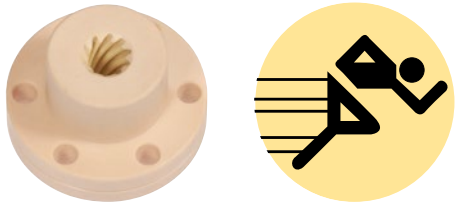
dryspin® lead screw nuts are made from tribologically optimised iglidur® materials. Already during the development phase, the focus is on optimising the friction properties of the dryspin® lead screw drives, with the objective of attaining the lowest possible coefficient of wear and friction.

- **Lubrication and maintenance-free**
- **Service life can be calculated online**
- **Resistant to dirt**
- **Quiet operation**
- **Corrosion-free**

Materials

iglidur® J

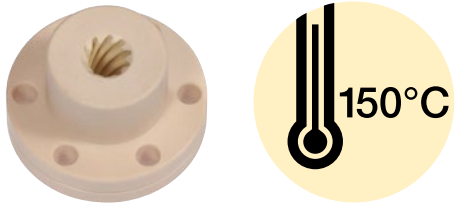
- Very good counter partner in combination with stainless steel lead screw drives
- Characterised by best coefficient of wear and friction
- Low moisture absorption



Area of application: exterior e.g. front spoiler

iglidur® J350

- High temperature resistance
- Performs best under medium to high loads
- Use up to 150°C possible



Area of application: chassis e.g. parking lock

iglidur® RN293

- Specially developed for interior applications
- Meets low fogging requirements
- Cost-effective material with good wear properties

Area of application: interior e.g. seat length adjustment

Customised solution

We will find the right material for your application. With the APQP questionnaire, which our experts work through with you, we can determine the right material for your individual application.

Standard designs

The dryspin® lead screw nuts are available in five different designs as standard: cylindrical lead screw nuts with and without spanner flats, flange lead screw nuts with and without spanner flats and heavy-duty lead screw nuts. In addition, igus® offers special lead screw nuts to reduce the axial clearance.

Cylindrical & with spanner flats

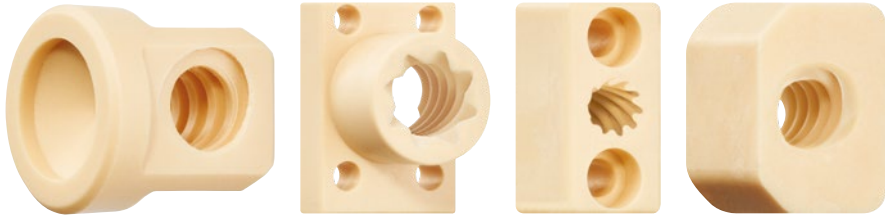
With flange & with spanner flats

With pretension & Anti/Zero backlash

Special designs for the automotive industry

For the application of lead screw nuts in vehicles, we recommend the use of special designs. Due to the adapted type of construction, the special requirements for the lead screw drives can be implemented in the best possible way. With the help of our machining service, we manufacture the lead screw nuts according to individual customer requirements.

- **Customised geometries**
- **Your injection moulded component**
- **Tolerance agreements with regard to possible manufacturing processes**



We accompany you from the enquiry up to the series

In addition to the specific design of the lead screw nut and lead screw, we can also coordinate the optimum integration into your assembly.

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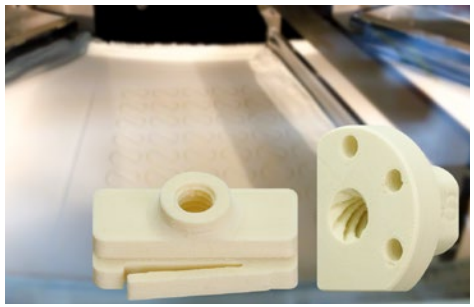
Customised - from enquiry up to volume production

Injection-moulded parts and series production all from a single source

In order to create prototypes that are close to volume production from digital models as quickly as possible, igus® offers various rapid prototyping and rapid tooling options.

- **Additive manufacturing in the laser sintering process for first design samples**
- **Mechanical production for functional prototypes according to drawing**
- **Additively manufactured injection moulds for technical prototypes in series production material**
- **Pre-series injection moulds for industrial prototype and series start-up**

Additive Manufacturing



- Configure models online or upload models
- No tooling costs
- Prices and delivery time are displayed
- Shipped from 24hrs

igus.eu/3d-printing-service

Rapid Tooling (print2mold)

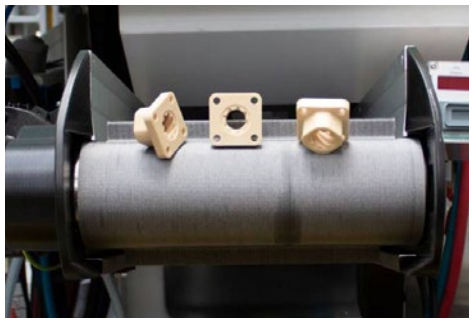
- Quick, economical tool construction with additive manufacturing
- All 55 iglidur® materials
- Ideal for test components and pre-production runs of the original material
- Special injection-moulded parts in as little as five business days

igus.eu/info/3d-print-injection-moulding-tools

High-volume production with the plastic injection moulding method

Precise tools are the prerequisite for high-quality components. We at igus® manufacture the tools for our injection moulding in our own in-house iform® tool shop. From tool development, production and sampling up to quality control with computer tomographic support, a tool is made completely by igus®. This gives us the opportunity to implement requests for individual components at short notice and in full quality.
Since the tool shop is involved in the development and consultations with customers at an early stage, we can offer not only suitable materials but also the appropriate tool manufacturing processes to reduce overall costs. Depending on the order volume, a mould can also be produced as print2mold in 3D printing, naturally at our premises and from our proven high-performance polymers.

Injection moulds from our own tool making department



- More than 60 iglidur® materials
- For large volume production from a few thousand up to several million units
- Fast delivery thanks to high number of injection moulding machines

igus.eu/individual-injection-moulded-parts

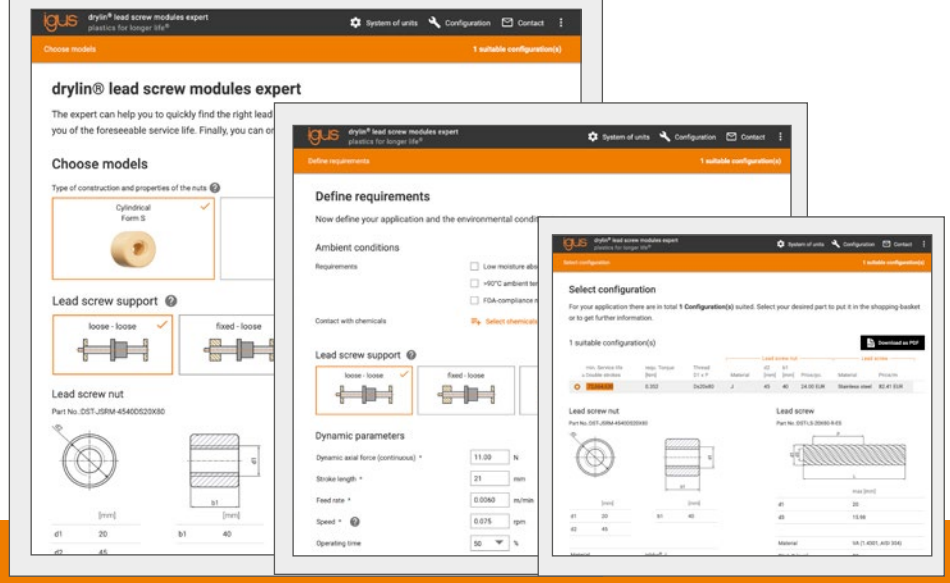
We would be happy to advise you – igus® will support you in all product development steps.

www.igus.eu/drylin-automotive

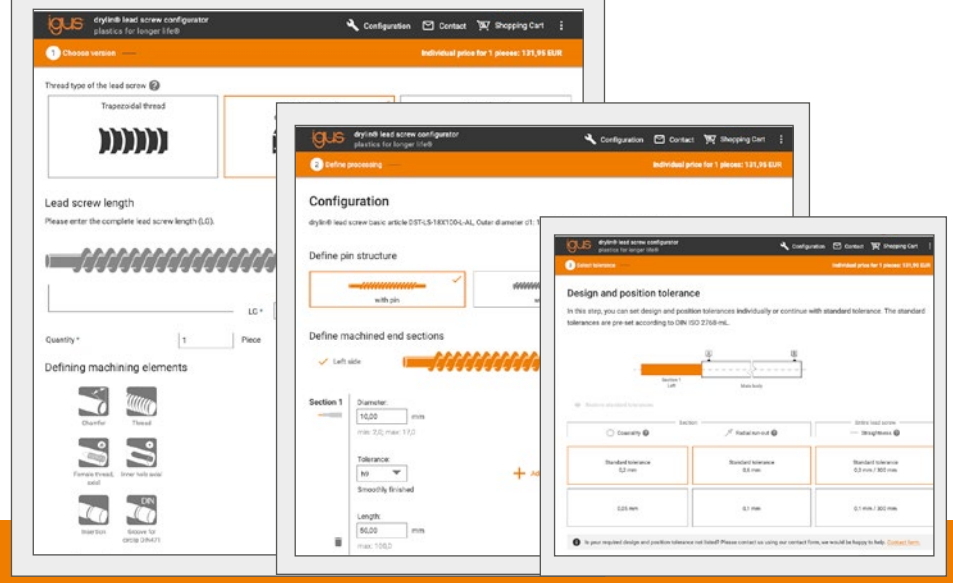
Customer-specific solutions

Can be configured individually online

Configure complete lead screw drives



Individually machine threaded pin



Calculate service life and find the right lead screw drive

- Service life calculation for required lead screw drive configuration
- Overview of configuration
- PDF download with all details for the required application

Configure your individual lead screw online

- Pin machining without CAD software
- 2D dimensioned drawing and 3D step file, generated directly online
- Immediate price calculation, order online immediately or request a quote

Try it out now:

igus.eu engineers-toolbox

www.igus.eu/drylin-automotive

Click here for our blog with more exciting info
igus.eu/blog-dryspin

Click here for the test reports of the dryspin® technology
igus.eu/dryspin-test-reports

Questions and answers
Some FAQs from our blog

Should igus® lead screw drives be lubricated?
It is not necessary to provide external lubrication for the lead screw drives. All of the materials we use have been tribologically optimised and designed for dry operation. If you should want to lubricate, however, you can do so in combination with a silicon-free lubricant.

How do I prevent unwanted bearing clearance?
In addition to the correct choice of material for the lead screw nut, a preload mechanism against unwanted bearing clearance has proven to be an effective measure in practice. For trapezoidal threads and dryspin® high helix threads, anti backlash, zero backlash and low clearance versions with preload of the thread nut are available.

Can drylin® lead screw drives replace a ball screw drive?
Basically, yes. It is necessary to adhere to the application parameters (axial load, speed, etc.) and reach the required positioning accuracy. Our lead screw drive expert offers optimal help for choosing the perfect lead screw system for every application.

What does self-locking lead screw technology mean?
Self-locking means that lead screw nuts and lead screws cannot be moved without the application of external force. It has to do with the pitch and coefficient of friction.

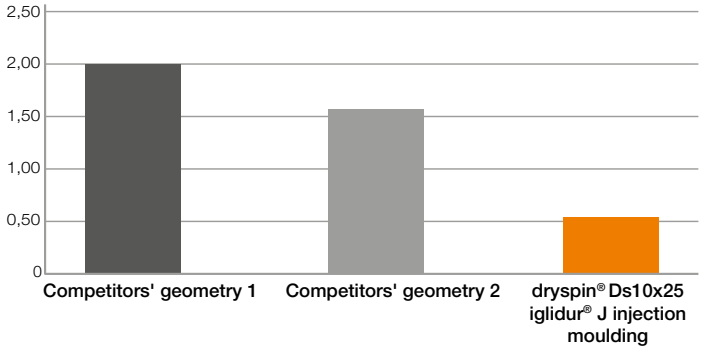
How high is the manufacturing tolerance?
Apart from the pitch accuracy of 0.1mm to 300mm, customer-specific tolerances are implemented in the end machining of the lead screws and the machining of nuts.

No experiments
We will test your application, too!

If you do not wish to experiment, but you want to test materials for your application before use, Or do you have an unusual application and are looking for a suitable solution? No problem. We will test your application in our test lab and will use our expertise to find the best igus® solution for you.

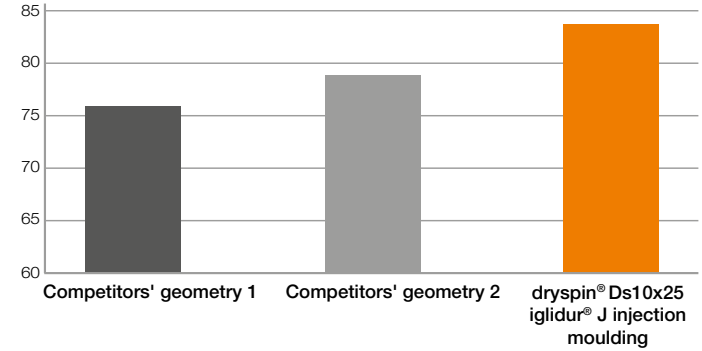
Wear results after 630,000 double strokes

Stroke: 140mm
Speed: 100rpm
Axial load: 200N
Run time: 630,000 cycles



Lead screw drive efficiency

Stroke: 140mm
Speed: 100rpm
Axial load: 200N
Run time: 630,000 cycles

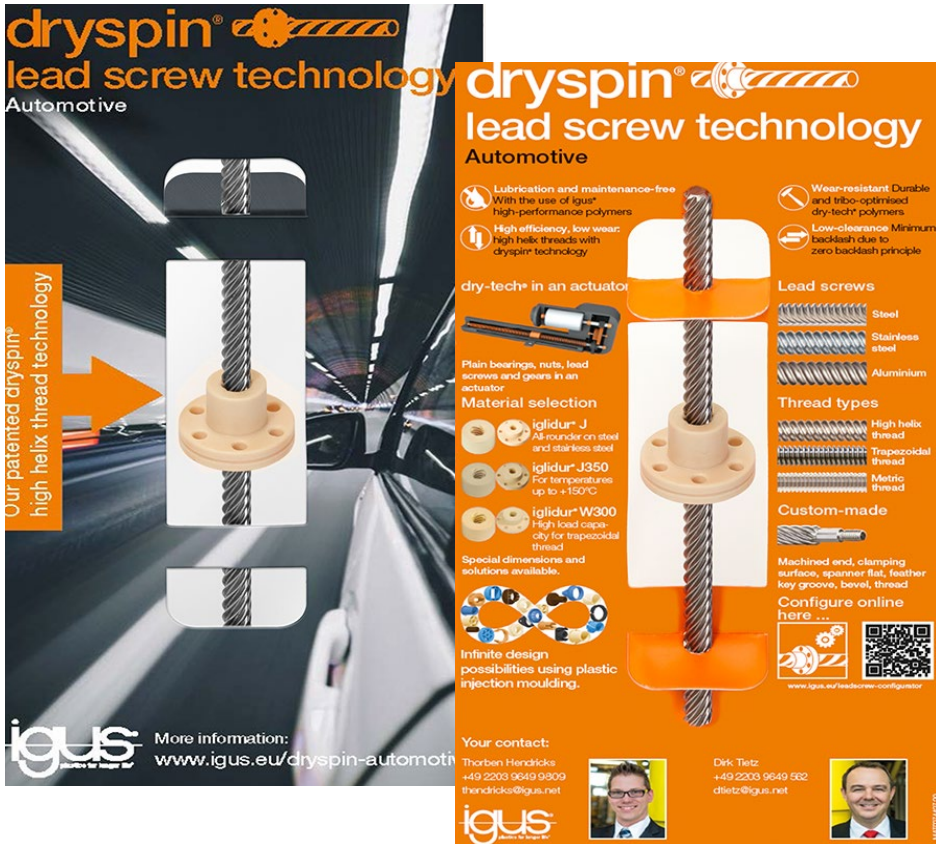


www.igus.eu/dryspin-automotive

Free sample

Request your own sample lead screw drive here

In our sample you will find all advantages and important information of the dryspin® lead screw technology summarised at a glance. Request your own free lead screw drive for testing here and convince yourself of the dryspin® technology.



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igus® Corner

The huge motion plastics® sample box

Would you like to always have the latest igus® products on hand to try out? Then simply order the igus® corner for your premises. A sales colleague will bring the display unit to you, set it up on request and equip the compartments with the products of your choice.

igus.eu
/corner

www.igus.eu/dryspin-automotive

igus® Automotive Specialists

Close to you all over the world

Competent advice from our specialists on site.

igus® Germany
Cologne
Industry Manager Automotive

Dirk Tietz
Phone: +49-2203 9649-562
Mobile: +49-173 7626993
dtietz@igus.net

igus® Germany
Cologne
Automotive Sales Manager

Sebastian Bloechl
Phone: +49-2203 9649-7718
Mobile: +49-173 4537974
sbloechl@igus.net

igus® Austria
Ampflwang

Christoph Föttinger
Phone: +43 7662 57 76 317
cfoettinger@igus.net

igus® North America
Detroit office

Sam Valentine
Phone: +1 401 438 220
svalentine@igus.net

igus® Germany
Cologne, Head of Business Unit dryspin® lead screw drive

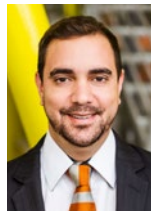
Thorben Hendricks
Phone: +49-2203 9649-9809
Mobile: +49-172 2561822
thendricks@igus.net

igus® Canada
Toronto

Kevin Wright
Phone: +1 905 760 8448
kwright@igus.net

igus® India
Bangalore

Sandesh Solanki
Phone: +91 4512 7800
Mobile: +91 93 255 02106
ssolanki@igus.net



igus® Brazil
Santo Amaro

Márcio Marques
Phone: +55 11 3531 4489
Mobile: +55 11 9833 27207
mmarques@igus.net

igus® France
Fresnes (Paris)

Christophe Garnier
Phone: +33 6 86 16 28 02
c.garnier@igus.net

igus® Spain
Barcelona

Jon Mentxaka
Phone: +34 647 488 250
jmentxaka@igus.net

igus® Japan
Tokyo

Yusuke Sawada
Phone: +81 3 581 92030
Mobile: +81 0 806 845 97 12
ysawada@igus.net

igus® Malaysia/Singapore
Singapore

Kai Hua Aw
Phone: +65 648 71411
Mobile: +65 967 98960
kaw@igus.net

igus® UK
Northampton

Dave Spence
Phone: +44 780 295 91 20
dspence@igus.net

igus® Italy
Robbiate (Milan)

Giulio Ferrante
Phone: +39 039 590 61
gferrante@igus.net

igus® Korea
Incheon

Daehyung Lee
Phone: +82 70 428 387 09
Mobile: +82 10 306 029 11
dlee@igus.net

igus® China
Shanghai

Carte Miao
Phone: +86 21 8036 6198
Mobile: +86 13 671 996231
cmiao@igus.net

igus® Turkey
Istanbul

Cihan Dogan
Phone: +90 542 442 3283
cdogan@igus.net

igus® Poland
Warsaw

Michal Obrebski
Phone: +48 223 163621
Mobile: +48 728 877976
mobrebski@igus.net

igus® Taiwan
Taiwan
Taichung City

Sean Hsiao
Phone: +886 9 118 126 54
shsiao@igus.net

igus® Mexico
Toluca

Francisco Marquez
Phone: +52 728 284 3185
Mobile: +52 1 72 226 43923
fmarquez@igus.net

www.igus.eu/dryspin-automotive

/9001:2015
/16949:2016

igus® is certified in accordance with ISO 9001:2015 and ISO/TS 16949:2016 in the field of energy supply systems, cables and harnessing, as well as polymer bearings.

/14001:2015

igus® is certified according to ISO 14001:2015. This accepted basis for environmental management systems supports us on our way to a CO2-neutral factory.

/newsletter

Get more information about motion plastics® innovations and trends: exciting applications, videos, test results, online seminars and much more. Compact and free of charge. Register now at: www.igus.eu/newsletter

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You can find more on the topic of automotive production at www.igus.eu/automotive

igus®

dryspin® Lead screw technology for the automotive industry

* The igus® chainflex® guarantee of up to 36 months is valid for the number of double strokes calculated according to the online service life calculator: www.igus.eu/ChainflexTools/ServiceLifeCalculator. The guarantee conditions available at www.igus.eu/guarantee apply.

** The igus® e-chain® guarantee of up to 36 months is valid for the number of double strokes calculated according to the online service life calculator: www.igus.eu/info/energy-chains-service-life-calculator. The guarantee conditions available at www.igus.eu/guarantee apply.

igus® GmbH
Spicher Str. 1a
51147 Cologne, Germany
Phone +49-2203 9649-0
www.igus.eu

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