

WHITE PAPER

# 10 potential savings

Saving through the use of linear plain bearings

## This white paper shows 10 ways that costs can be reduced by using linear plain bearings:

### 1 No external greases and oils



Choosing the right lubricating grease can be a complex matter. Depending on the application conditions, grease must be suitable for low/high temperatures, high loads, food suitability and much more. Linear plain bearings are completely self-lubricating and operate dry, cleanly, quietly and without external lubricants - gentle escaping into the environment. Furthermore, additional lubrication devices can be disposed of: grease nipples, grease squeezers, injection presses, grease guns, oil cans, etc. become redundant due to dry operation. Linear plain bearings are dry-operating and maintenance-free. Lubrication and greasing devices are therefore not required.

### 2 Lightweight



Weight-reduced linear guides are urgently required in many industries. Every gram of weight counts, especially in automotive, aerospace and railway engineering. A lighter aircraft consumes less kerosene, produces fewer exhaust gases, loading capacities can be increased and strict CO2 emission guidelines are more likely to be met. The main components of linear plain bearings are made of lightweight materials such as plastic and aluminium. On the one hand, the low inertia reduces the weight of the structure, and on the other hand, this increases the dynamics and efficiency in production.

### 3 Fast and uncomplicated delivery

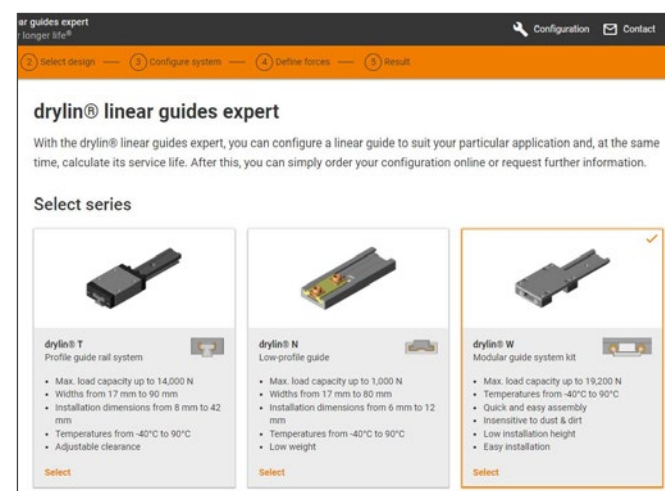


Ordered today and delivered tomorrow - this delivery promise is often made in the B2C sector. However, many people expect this performance in the workplace. Linear plain bearings are made of plastic and aluminium, i.e. lightweight components. This simplifies shipping and increases the choice of courier and parcel services. The choice of a particular parcel service provider alone limits the permissible weight of a parcel. Components made of steel, on the other hand, very quickly exceed this permissible freight weight. This is particularly important for worldwide shipping, in order to be able to keep promises of response and 24-hour shipment.

### 4 Predictable service life

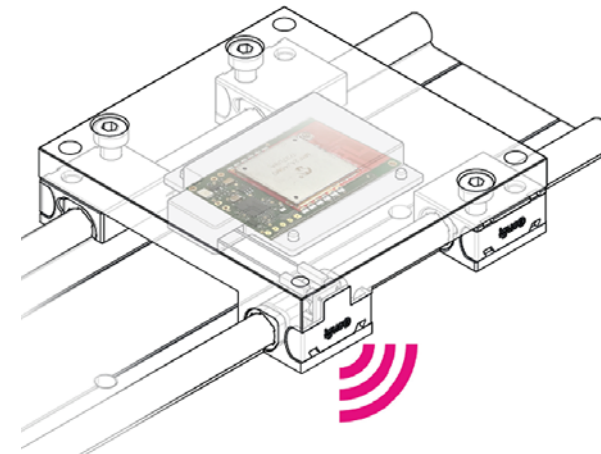


With freely available online programmes, almost any application with linear plain bearings can be calculated in terms of function and service life. This makes maintenance intervals more predictable and reduces downtimes.



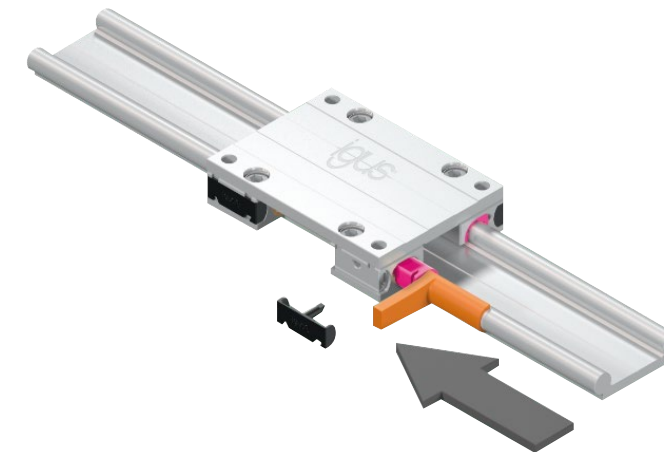
### 5 Predictable maintenance intervals with intelligent linear plain bearing technology

A sensor integrated in the plastic uses radio technology to signal when wear reaches a specific level. Timely replacement of the bearing prevents unforeseen machine failures and unnecessary costs due to downtimes. Thanks to intelligent smart plastics, system availability increases and maintenance costs decrease.



### 6 Smart bearing replacement

intelligent linear plain bearings can be changed directly on the guide rail. Simply loosen the side cover and slide the linear carriage out of the housing using a handy assembly tool or a standard screwdriver. The new liner is then clipped on and pushed into the bearing. The housing lid serves as an axial safety device. The changeover takes less than 30 seconds and can be carried out directly on the unit in the linear carriages of toothed belt axes, multi-axis linear robots and delta robots, among others. Complete disassembly of the linear unit is not required and in a few minutes the system is like new and ready for



use. All other components can be reused. Any settings created, such as belt tension, are retained. Quick-change linear plain bearings ensure 24/7 operation, increase runtime and minimise machine downtime.

### 7 Simplified maintenance rules



Special greases, risk of washout, high-pressure cleaning, etc. ... each machine and each bearing requires a separate cleaning and maintenance regulation. These are governed within the scope of the guarantee in accordance with the regulations of the machine manufacturer or in accordance with the regulations of the system operator. Basically, this means elaborate manuals and descriptions in several languages. Linear plain bearings make life easy for the user. Install and forget is the principle. All bearing points can be cleaned quickly and easily, using high pressure or the washdown process. No time-consuming regulations and, due to the fast cleaning, downtimes are also significantly reduced.

### 8 Quiet operation

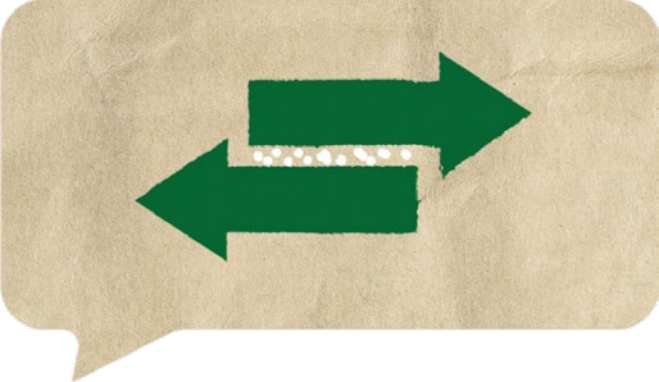


In contrast to recirculating ball bearing systems, linear plain bearings use sliding elements for linear motion. Sliding is low-vibration and virtually silent. This means that linear plain bearings can be used without additional acoustic enclosures, e.g. in the case of a bearing in a car. The materials can be used, for example, in sales rooms, in interiors (furniture/aircraft, etc.) as well as in laboratory, medical and analysis technology. In addition, they contribute towards meeting legal regulations on noise emissions.

9 Variety

The variety of possible applications of linear guide systems in the igus® drylin® W series alone results from the large number of different components that can be combined with each other. For this profile rail guide more than 25 different profile rails and over 50 carriage options are available. The individual components are assembled in a modular system. In contrast to metallic bearings, linear plain bearings do not require hardened shafts for operation. This allows flexibility in the selection of materials for linear rails and shafts. Best performance is achieved with hard-coated aluminium, low weight with profiles made of carbon fibre shafts, and extreme corrosion resistance with soft VA shafts. For every area of application, from lightweight constructions to food, cleanrooms or pharmaceuticals, the best pairing in terms of technology and cost is with linear plain bearings. This increases both run times and reduces downtime. Due to the environmentally friendly absence of lubrication, linear plain bearings are suitable for both indoor and outdoor applications.

Sustainability



- 1. Linear plain bearings require no external lubricants such as greases and oils
- 2. Linear plain bearings are odourless and allergy-free
- 3. There is no risk of contamination of products, water and environment

10 Cleanliness and hygiene



In order to ensure trouble-free operation, linear bearings with ball bearings must be permanently lubricated. This is done via grease nipples or directly via the round shaft. This creates a lubricating film over the entire linear path. In contrast, linear bearings with plain bearings operate completely dry. Due to solid lubricants in the plain bearing material, external lubrication by oil and grease can be completely dispensed with. All bearings as well as rails and shafts are absolutely clean. No dust or dirt particles can adhere to the running surfaces, therefore meeting the high hygiene regulations in the food, pharmaceutical and medical industries. In operation, linear plain bearings are odourless, allergy-free and environmentally friendly, ensuring safe handling. Extensive warnings notices are no longer required. From unpacking and assembly to use in production, there is no risk of contamination.



- 4. Tribologically tested linear plain bearings generate extremely low micro-abrasion and are suitable for clean rooms
- 5. Linear housings can be 100% reused when using linear plain bearings. Only liners or sliding elements are replaced and the system is as good as new.

Fact check: plain bearings vs. rolling bearings

Specifications	Specification igus® plain bearingsw	Specification rolling bearing	Technical data igus® plain bearings	Technical data of rolling bearings	Especially relevant for the following industries
Precision	+	+++	0.02-0.15mm	0.001-0.01mm	Machine tools, CNC machining, electronics manufacturing
Maintenance-free	+++	+			Medicine, packaging, food, cleanroom, consumer goods
Weight advantage	+++	+	aluminium approx. 2.7g/cm³ Polymer approx. 1.5g/cm³	Steel approx. 7.8g/cm³	Industry-wide
High dynamics with low load	+++	+			Handling, automation laboratory, leisure
High dynamics at high load	+	+			Packaging, handling, Automation
Stroke length variance	+++	+++			Packaging, handling, automation
Coefficient of friction	+	++	0.15 - 0.3µ	0.001-0.05µ	Camera technology, textile
Susceptible to dirt	+++	+++			Packaging, stone, textile, paper, painting systems
Noise reduction <sup>1</sup>	+++	++	45-60dB	60-70dB	Medicine, laboratory, furniture
Cost benefit	+++	++			Industry-wide
Corrosion protection	++	+			Filling technology, chemicals, food
Magnetism	+	+	Plastics, aluminium	Steel	Medicine, test equipment
Chemical resistance	+++	+	1.4751 + iglidur® X	1.4112	Medicine, food, electroplating, filling technology
Compatibility of the assemblies	+++	+			Jig and fixture construction, assembly automation
Quiet vibration-free operation	+++	++			Camera technology, inspection, medicine, 3D printer
Short-stroke suitability	+++	+			Textile, handling
Simple, fast assembly	+++	+			Jig and fixture construction, assembly automation
Stiffness	+	+++			Machine tools, CNC machining, electronics manufacturing
Long travels over 10m	++	+			Camera, conveyor technology, material handling
Temperature-resistant	+++	+	up to +250°C		Chemicals
Smooth running	+	+++			Manual adjustment
Acceleration, maximum <sup>2</sup>	+++	++	50m/s²	15m/s²	Automation, handling
Speed, maximum <sup>2</sup>	+++	+	30m/s	5-10m/s	Automation, handling

Specification:

- +++ strong
- ++ average
- + weak

<sup>1</sup> Measured in the igus® laboratory on 400mm stroke manual adjustment  
<sup>2</sup> With low loads, depending on installation size 0.1-5kg