

Test Before You Invest: The igus® Test Lab

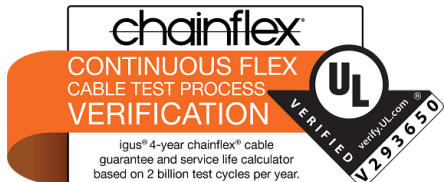
As effective and useful as online tools and configurators can be, especially for product recommendations and determining component service life, nothing is better than real world test data. However, obtaining this data — outside of doing the testing yourself — can prove difficult. This is why igus offers customers the ability to test their exact application in a 41,000-square-foot test lab.

This lab is the largest of its kind, and supplies data from billions of test cycles a year to the wide range of tools and configurators igus offers. Multiple factors can be tested for, such as wear, stress, and friction.

Product Testing

chainflex® Cables

The chainflex test lab is one of the most robust at igus, responsible for over two billion test cycles a year. Factors tested include travel directions, torsion resistance, and abrasion resistance.



All igus testing is focused on addressing real-world requirements, and thus chainflex tests are broken out into five different categories: materials testing, design validations, in-process quality testing, service life endurance testing, and customer-specific application testing.

Each cable is subjected to testing immediately after manufacture. To this day, worldwide cable standards don't include manufacturing and testing regulations in energy chain applications.

This means that relevant manufacturers try to prove the durability of a cable for energy chains based on existing tests or standards. However, these do not represent realistic energy chain applications.

Furthermore, these tests suggest that an e-chain cable reflects the stress in an e-chain. But bending loads in the energy chain always follow the chain radius, with constant bend radius and direction. This results in a significantly higher mechanical stress on the cables.

Standard tests are therefore not suitable for checking an energy chain cable properly. As a result, the chainflex lab is specialized in its own realistic experiments and tests.



e-chain® Cable Carriers

The e-chain lab consists of 53 testing machines that conduct over 15,000 tests a year for all e-chain products. Some of these include chip tests, bending/braking tests, cold tests, and cleanroom tests.

Since e-chains are used in such a wide variety of applications, the e-chain test area needs to account for this with an equally wide variety of tests. Browse reports of some of these tests below.

[Tensile testing with e-chains in oil](#)

[Noise testing on P4 profile roller e-chain](#)

[Tensile and breaking test of the largest plastic e-chain](#)

iglide® and igubal® Bearings

The iglide and igubal test area is able to carry out over 300 tests in parallel. These tests are not only conducted on bearings, but approximately 250 newly developed polymer compounds each year. The new compounds developed each year undergo approximately 11,300 tribological examinations in order to ensure new materials will prove useful in real-world applications.

All materials are tested for different movement directions like rotating, pivoting, linear motion, and tumbling, as well as various external influences such as weather conditions, as well as shocks and impacts typically found in heavy-duty applications.

Check out two customer-specific tests that were carried out in the iglide test lab below.

[iglide Q plain bearing out rivals brass bearing on shaft](#)

[iglide TX1 less wear with edge loads than brass bearings](#)

drylin® Linear Bearings

The drylin test lab conducts about 500 tests per year, with approximately 10% of those tests conducted for customer-specific applications. Factors like friction and wear, functionality, durability, and service life are all tested.

Linear bearings, linear actuators, and lead screw assemblies are all tested in the drylin lab. Various combinations of shaft and bearing materials are tested in combination with each other to determine which combinations are the most effective under different testing conditions.



Unique Test Environments

The wide range of applications igus parts are used in demands an equally wide-ranging testing facility. To this end, igus has developed the means to replicate various environments in the test lab, including underwater and cleanroom environments.

Cleanroom Testing

As part of a partnership with the Fraunhofer IPA, a customized ISO Class 1 cleanroom laboratory has been designed and implemented for igus to use in testing new cleanroom-certified products. These tests are all conducted in accordance with ISO 14644-14 standards. Noise, endurance, and bending tests have all been conducted in this custom lab, and represent only a fraction of the possible test characteristics.



Underwater Testing

Since igus products do not require any external lubrication, they are particularly well suited for underwater applications. This necessitates a way of testing products in underwater environments, which has been achieved in the igus test lab.

Rotational and linear wear rate testing can already be performed underwater in the igus test lab. These tests include various loads, surface speeds, shaft diameters, and temperatures across the range of self-lubricating plastics igus manufactures.



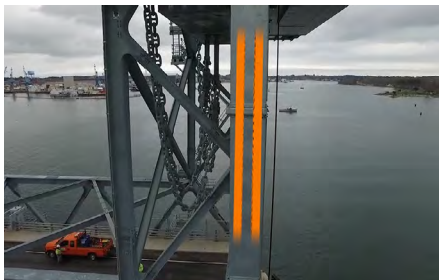
Use Cases

Since customer testing is such a large focus of the igus test lab, there are countless use cases involving customers who have had igus carry out such tests. Read on to learn about select customer use cases that found success through the igus test lab.

Redesigning the Portsmouth Memorial Bridge With Modernized Engineering

In 2012, the Portsmouth Memorial Bridge needed to be redesigned, as the original historic design presented safety hazards. The new design included a lift mechanism requiring robust cable management.

Ultimately e-chain cable carriers were chosen, as they could stand up to the harsh New England weather they'd be exposed to. Within the cable carriers were motor, control, and fiber optic chainflex cables.



Due to the extensive service life required from these cables and the safety implications of the application, all selected cables were batch tested in the igus test lab for billions of cycles in real-world conditions. This helped to ensure a fail-safe design.

The redesigned bridge was opened in 2013, and still remains in operation today.

Read the full story [here](#).

Plastic Bushings on Bike Shocks

As part of a high speed mountain bike coil shock, a manufacturer originally planned to use PTFE-lined, metal-backed bearings. However, these bearings were not surviving the shocks they underwent long term. Warranty costs were rising as a result.

This led the manufacturer to igus and their iglide G300 bearings. G300 could mate with the stainless steel shaft used in the coil shock while offering silent, low-friction operation.

Ultimately, this solution was found due to testing in the igus lab, which determined the plastic G300 could outlast the PTFE-lined alternative five times over in the application.

Read the full story [here](#).

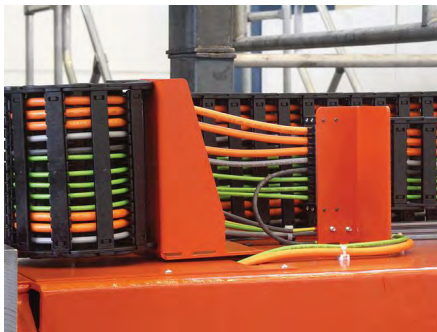
Servo Motor Feedback Cables Reduce Machine Tool Manufacturing Costs

As part of the demands of their own customers, machine tool manufacturer Waldrich Coburg needed an energy supply system with a service life of 20–30 years, if not longer. A plug-and-play readychain solution was ultimately decided upon.

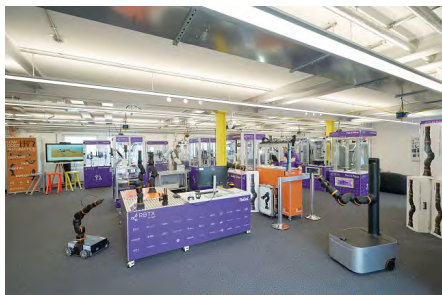
In the design process, particular focus was given to cable connectors. A custom solution was needed, which meant extensive testing in the igus laboratory.

Series of tests were conducted to find the best connection solution, which was then sent to the user for a final test under realistic machine loads. The solution was found to be exactly what the customer was looking for, and used to great success.

Read the full story [here](#).



RBTX Customer Testing Area



With the creation of the RBTX low-cost robotics marketplace, a new testing area geared exclusively to testing automation solutions was needed. Thus, the RBTX Customer Testing Area was created. Through the Customer Testing Area, customers can get expert advice and see feasibility testing for their application being conducted live. This eliminates the need for customers to build and test their own applications, and ensures the finalized application will perform as expected at the lowest possible cost.

Currently, over 1,000 customer tests have already been performed with more being scheduled daily.

Conclusion

The igus test lab has long been a key component in the product development process for igus. Every new product is tested extensively before hitting the market, and existing products are often tested under customer-specific conditions to ensure optimal performance. The test lab will continue to enable new customer innovations, as well as power the online tools and calculators offered for free to all visitors of the igus website.