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**New Renishaw environmental testing facility puts product packaging to the test.**

Renishaw, a global leader in precision engineering and manufacturing, is committed to delivering products that meet the highest standards of safety, quality and reliability. Such standards are only achieved by adopting a rigorous testing program for all its products. To further reinforce this commitment, Renishaw has recently made a multi-million-pound investment in a new dedicated facility, significantly enhancing the company’s ability to test its products under the environmental and electrical conditions encountered during transportation.

The new testing facility houses a variety of state-of-the-art equipment, including a large electromagnetic compatibility (EMC) chamber, devices to test electrical safety, and for environmental simulation such as accelerated life testing. The latter includes electrodynamic shakers that identify the resonant frequency of Renishaw products and then subject them to many years of use in just a few hours.

“We push our products to their limits, aiming to test them to the highest standards in the industry,” says Ian Jennings, Group Product Safety Manager. “This means our products aren’t just made better than market alternatives, our aim is to demonstrate that they perform better and last longer.”

As a global supplier of system-critical precision metrology and manufacturing products, a crucial aspect of Renishaw’s relationship with its worldwide customer base is ensuring that products reach their destinations in perfect working order, regardless of the environmental conditions encountered during transit.

To achieve this, the new testing facility also houses equipment that is designed to simulate a wide range of conditions faced during transportation. This includes temperature ovens, climatic chambers, a negative pressure vessel, and a positive pressure vessel. By running a comprehensive series of tests, Renishaw can identify any potential issues with packaging and make any necessary improvements before a product is shipped.

**Challenge**

Environmental testing is crucial for packaging design for several reasons:

* Packaging must protect products from extremes of temperature, humidity, and physical impacts during transportation and storage.
* Many industries have specific regulations regarding packaging to ensure safety and quality.
* Testing can help in selecting materials that are not only effective but also reduce the environmental impact of packaging.

Luke Worthington, Senior Environmental Test Engineer at Renishaw, explains how packaging is tested: “We use the temperature ovens to try and replicate the worst-case scenario of an air freight journey. If [the product package] goes up to altitude in an unpressurised hold then we expect it to get extremely cold. If that plane lands in a very warm country, we could expect the package to sit on the tarmac for several hours in very hot and humid conditions.”

**Testing**

All the package tests feature packaging with a product inside, and the sign-off criteria for a successful test is the powering up of this product without any observed degradation in performance.

**Transport temperature testing**

One of the primary tests conducted in the lab is the transport temperature test. This is designed to replicate the extreme temperature cycles that a package might experience during transit. The test involves exposing the package to temperatures as low as -25°C and as high as +70°C, with each temperature maintained for 16 hours. This test cycle is repeated to give a combined 32 hours at each temperature extreme. The goal is to ensure that the packaging can protect the product from extreme cold and heat, and that it arrives in good condition.

Temperature ovens are used to simulate the harshest environments, such as an unpressurized hold on an air freight journey. If a plane ascends to high altitude, the air temperature can drop significantly, whereas upon landing in a warm country, the package might experience much higher temperatures.

**Humidity testing**

In addition to temperature testing, Renishaw also conducts humidity testing using climatic chambers. These tests simulate high humidity conditions that a package might encounter, such as when sitting on the airport tarmac in a hot, humid country.

The typical humidity test involves maintaining a constant temperature of 42°C and a relative humidity of 93%. This rigorous testing ensures that the product and its packaging can withstand high humidity without any adverse effects.

Humidity testing is crucial for checking the integrity of vacuum-sealed products and ensuring that moisture does not penetrate the packaging. This is particularly important for products that might be exposed to varying humidity levels during transit through different countries.

**Pressure testing**

Renishaw also tests products for their ability to withstand negative and positive pressure environments. Negative pressure testing is conducted in a vacuum chamber to simulate high-altitude, non-pressurised conditions equivalent to 55 kPa (550 mbar) for 16 hours. This is particularly important for sealed product packaging that might be transported inside aircraft cargo holds with large pressure differentials at high altitude.

Positive pressure testing is also performed on some products that require IPX8 certification using a pressure vessel that simulates immersion in water at an equivalent depth of 10 m (an absolute pressure of 2 bar) for a period of 24 hours. Renishaw does positive pressure testing on certain products in either dry or wet conditions.

These tests ensure that the packaged product can withstand significant pressure changes without compromising performance.

**Vibration Testing**

Another critical aspect of environmental testing is vibration testing. This test simulates the vibration g-forces that a package might experience during transit — whether by road, sea, or air.

The lab is equipped with three electrodynamic shakers that can apply various vibration profiles to the product packaging. The tests are conducted over three axes to replicate the worst-case scenarios. The vibration profiles include sinusoidal, random, and pulse shock tests, each designed to simulate different types of vibration and impact.

The sinusoidal profile mimics the gradual build-up of vibrations during an airplane take-off, which is generated by rotating propellers and turbofan engines. The random profile simulates the unpredictable vibrations encountered in trucks or vans. The pulse shock test replicates the sudden impacts that a package endures during handling.

**Summary**

Renishaw's extensive environmental testing program is designed to ensure that its products and packaging can endure the most extreme conditions during transit. By subjecting packaging to tests for extreme temperatures, high humidity, varying pressures, and vibrations, Renishaw guarantees that customers receive products in optimal condition, no matter where they are in the world. This dedication to quality and reliability underscores Renishaw's commitment to outstanding customer service and product excellence.

Luke elaborates on the significance of package testing at Renishaw: “By implementing comprehensive testing at Renishaw, we ensure that product quality and reliability are upheld to the highest standards. Our continuous efforts to enhance our testing facilities and methodologies keep us at the forefront of innovation in environmental testing. Every product we manufacture is built to last and rigorously tested, contributing to Renishaw's reputation as a leader in precision engineering and manufacturing.”

**-ENDS-**

**Notes to editors**

**About Renishaw**

Renishaw is a world leading supplier of measuring systems and manufacturing systems. Its products give high accuracy and precision, gathering data to provide customers and end users with traceability and confidence in what they’re making. This technology also helps its customers to innovate their products and processes.

It is a global business with over 5,000 employees located in the 36 countries where it has wholly owned subsidiary operations. The majority of R&D work takes place in the UK, with the largest manufacturing sites located in the UK, Ireland and India.

For the year ended June 2024 Renishaw recorded sales of £691.3 million of which 95% was due to exports. The company’s largest markets are China, USA, Japan and Germany.

Renishaw is guided by its purpose: Transforming Tomorrow Together. This means working with its customers to make the products, create the materials, and develop the therapies that are going to be needed for the future.

Further information at [www.renishaw.com](http://www.renishaw.com/)