

COMPANY UPDATE FROM CRANAGE – NEW FACILITIES FOR CLIMATIC AND ENVIRONMENTAL SIMULATION UNVEILED



With over 30 years experience working in the product testing and certification industry, Cranage is further expanding in response to customer needs

The influence of climatic conditions, which may be considered exceptional, and the UK government's strategy to support British businesses looking to export to the

global market will require manufacturers to familiarise themselves with country-specific regulations and consider the potential impact of the surrounding natural and man-made environment on their products. The consequences of natural and adverse induced environments is now, more than ever before, being anticipated and allowed for in product design, which in turn, is being integrated into the strategic management of the supply chain to provide a sustainable competitive advantage.

Cranage's new facilities were conceived in 2020 with a vision to provide a convenient, fast, and affordable all-year-round solution to climatic testing in the UK. It is a laboratory facility to simulate the effects of weathering, ageing, and degradation of products and materials due to physical agents and environmental conditions. Such effects may render a product or material completely unsuitable for its intended use. As a means of accelerating the impact of environmental stress, it develops an alternative service to sending products and materials overseas for long-term testing in natural outdoor sites and provides a flexible solution for evaluating the performance of products for the global market.

The environmental test facility at Cranage is a multipurpose resource for simulating the majority of environments in which products may be operated, stored and transported. It houses a vast range of specialised equipment to apply environmental stress parameters to suit worldwide climatic conditions which include naturally occurring ambient anticipated for the area of use, induced ambient resulting from the modification of a natural climatic condition which may arise in transit, and steady state ambient that exists in controlled environments such as storage areas.

Simulating worldwide environments

Using meteorological data from various sources including NASA, Cranage has simulated a tropical humid climate with solar radiation and heavy rainfall typical of a monsoon for a railway signalling project exported to Southeast Asia. In complete contrast, outdoor use products exported to Saudi Arabia are tested under hot arid climatic conditions at low humidity with exposure to intense solar and ultraviolet radiation.

Closer to home, products exported to Europe and those placed on the UK market are routinely subjected to environmental conditioning as part of the safety evaluation process. Depending on the type and/or use of the product, materials and components may also be subjected to climatic tests for safety purposes, eg. BS

EN 62368-1 Annex C, which concerns the protection of materials in equipment from UV radiation. Notwithstanding the requirements for product safety, the UK is classified as having a maritime regional climate with additional hazards arising from atmospheric deposition, for example, from salt mist and sulfur dioxide pollution, both of which are known to accelerate material degradation. Products which are made or coated with polymers that are able to absorb or retain large amounts of moisture are particularly vulnerable to damage and in order to simulate a weathering process accurately, or the potential for induced environmental damage, the test parameters must include temperature and humidity. Products designed for use in highly polluted environments may additionally need to be weathered with acid deposition.

Facilities for large equipment

The new environmental facility at Cranage not only deals with the physical, chemical and optical effects of UV radiation, heat, humidity, wetting and acidic deposition, but also expands on their existing IP rating service to include a new 50m² indoor test area for evaluating water ingress and a large walk-in dust test chamber with an internal test volume of 18m³ for testing machinery with a maximum footprint of 3m x 2m. Featured is a fully compliant IPX9K high temperature and pressure test system for evaluating washdown devices and machinery used in highly regulated industries such as food and beverage, medical and pharmaceutical, oil, gas and chemical industries. Large products such as food processing machinery and road signs are required to be evaluated for environmental performance which includes being immersed and operated in ambient conditions of cold, dry heat and damp heat. This requirement has prompted the installation of a 17,500ltr walk-in climate chamber with a testing range of -40°C to +80°C and humidity range of 20% to 93% to accommodate commercial specifications.

Climatic and environmental testing ensures durability and reliability of engineered products. It helps to ensure regulatory and contractual conformity, identify potential component weakness, validate reliability and ruggedness, analyse and resolve design issues, reduce damage and costs and provide assurance of fitness for purpose. Sectors engaged are aerospace, automotive, defence, electronics, healthcare, and industrial.

In the industrial sector, manufacturers of variable message traffic signs are subjected to stringent environmental testing and assessment methods detailed in BS EN 12966. They are also required to verify environmental performance on an

ongoing basis by a process known as AVCP (assessment and verification of constancy of performance). Products in this sector are exposed to severe physical and climatic hazards throughout their operational life and so it's vitally important to assure road authorities and private developers of their products durability to such environmental hazards. These products, which incorporate electronic assemblies, are also tested to be resistant to mechanical impacts and vibrations which arise in the environment because adverse structural or component resonances can exhibit unexpected and damaging responses.

Almost any product, including packaging, which is exposed to physical disturbances or handling, transport, or delivery hazards is capable of demonstrating an adverse response and testing is used as a means to make improvements.

Climatic and environmental testing capabilities offered by Cranage:-

- Solar Radiation (Steady State and Cycling)
- UVA, UVB Actinic Testing
- Combined Climate Cycling (Temperature, Humidity, Rain, Wind, Solar)
- Temperature Conditioning (Low and High temperature)
- Temperature & Humidity Cycling
- High Humidity (Steady State and Cycling)
- Salt Spray and Salt Mist
- Acidic Precipitation (pH3.5)
- Altitude (Static Low Pressure)
- Shock (Mechanical Stress)
- Vibration (Resonance and Fatigue)
- Drop and Topple
- Compressive Static Mechanical Load Testing
- Dust Ingress
- Water Ingress (Immersion, Splash, Drops, Mist, Spray)
- Flammability (Fire Hazard)
- Resistance to Heat
- Tracking Index (CTI & PTI)
- Endurance and Durability
- Lightning & Electrostatic Discharge
- Magnetic fields
- Electromagnetic Radiation (induced Voltages and Currents)

Environmental standards in common use:-

IEC 60068-2-1 Test A: Cold
IEC 60068-2-2 Test B: Dry Heat
IEC 60068-2-5 Test Sa: Simulated solar radiation at ground level
IEC 60068-2-6 Test Fc: Vibration
IEC 60068-2-11 Test Ka: Salt Mist
IEC 60068-2-13 Test M: Low Air Pressure
IEC 60068-2-18 Test R: Water
IEC 60068-2-27 Test Ea: Shock
IEC 60068-2-29 Test Eb: Bump
IEC 60068-2-30 Test Db: Damp heat, cyclic
IEC 60068-2-31 Test Ec: Drop and topple
IEC 60068-2-32 Test Ed: Free fall
IEC 60068-2-38 Test Z/AD: Combined temperature/humidity cyclic test
IEC 60068-2-52 Test Kb: Salt mist, cyclic
IEC 60068-2-64 Test Fh: Vibration broadband random
IEC 60068-2-68 Test L: Dust and Sand
IEC 60068-2-75 Test Eh: Hammer test
IEC 60068-2-78 Test Cab: Damp heat steady state