



# Reliability Testing Capability

## Introduction

Reliability testing allows the assessment of a product's response to the physical and climatic conditions that may occur throughout the operating life of the product. This testing provides recognition of compliance, analysis and resolution of damage issues, together with assurance of reliability and durability.

Many engineering sectors use reliability testing as a regular part of product design and validation, including the electronics industry, medical and healthcare sectors, and defence, automotive, space and aerospace industries.

ITRI Innovation has a variety of chambers for thermal cycling & humidity testing in addition to the capability for combined thermal, vibration and mechanical shock testing.

## Combined Thermal, Vibration and Mechanical shock Capability

ITRI Innovation's combined environment test chamber provides the flexibility to adapt to changing test requirements.

This type of equipment was originally designed for defence and aerospace industry applications to perform a specific series of temperature, humidity and vibration tests conforming with MIL-STD 781 and MIL-STD 883.

It has now been adapted to perform reliability, qualification, and Environmental Stress Screening (ESS) tests for the electronics, automotive and telecommunications industries.



## Thermal Chamber

PERFORMANCE	<p>The chamber, with mechanical refrigeration and resistive type heaters, is capable of the following average air temperature heating and cooling rates.</p> <p>Temperature Range: -100°F to 350°F (-73°C to 177°C)</p> <ul style="list-style-type: none"> <li>• 55°C to -54°C (131°F to -65°F) with 650 lbs of aluminium billets 5°C per minute</li> <li>• 71°C to -54°C (160°F to -65°F) with 550 lbs of aluminium billets 5°C per minute</li> <li>• 71°C to -40°C (160°F to -40°F) with 200 lbs of aluminium billets 10°C per minute</li> </ul>
TEMPERATURE CONTROL	<p>±2°F (1°C) from control point after stabilization at the control sensor. Standard temperature transition rates of 5°C per minute up to 30°C per minute are available.</p>
FORCE RATINGS	<ul style="list-style-type: none"> <li>• Sine: 2,250 pounds force (10 kN) peak</li> <li>• Random: 2,250 pounds force (10 kN) RMS*</li> <li>• Shock: <ul style="list-style-type: none"> <li>11ms, Half Sine <ul style="list-style-type: none"> <li>100g with 15 pounds( 6.8kg) **</li> <li>50g with 120 pounds( 54.5kg) **</li> <li>30g with 280 pounds( 127kg) **</li> </ul> </li> <li>4ms, Half Sine <ul style="list-style-type: none"> <li>200g with 7 pounds (3.2kg) **</li> <li>100g with 67 pounds (30kg) **</li> <li>50g with 205pounds (93kg) **</li> </ul> </li> </ul> </li> </ul>
FREQUENCY RANGE	5 to 3,000 Hz, dependent on controller resolution
DISPLACEMENT	<p>Rated: 2" (5 cm) peak to peak continuous.</p> <p>Between Stops: 3" (7.6 cm)</p>
VELOCITY	<p>Sine: 90 ips (2.28 mps). Shock: 170 ips (4.32 mps)***.</p> <p>Maximum Bare table: 100 g</p>
ARMATURE SIZE	12" (30.5 cm) nominal
MOVING ELEMENT MASS	22.5 lbs (30.2 kg), 25 lbs (11.4kg) with Thermal Barrier and Raised Aluminium Standoffs
AXIAL RESONANCE	2900 Hz
PAYLOAD SUPPORT	500 lbs (227 kg)
STRAY MAGNETIC FIELD	Less than 5 gauss at 6" (15.2 cm) above mounting surface with degauss coil
CENTERING	Automatic, with read out and electronic over travel protection
WORKSPACE VOLUME	32 cu ft (906L)
TEMPERATURE CHANGE RATE	5-15°C per minute
CALIBRATION	The equipment is calibrated to the ISO 17025 and ANSI/NCSL Z-540-1 calibration standards by A2LA
CONTROL SYSTEM	The Control System allows the user to define temperature and vibration profiles and how multiple accelerometers and thermocouples are used to control and monitor the chamber. An extensive multi-level, password-based security system protects sensitive data. A true, always-on paperless recorder, the Control System saves tamper-proof data

\* For a uniform power spectral density over the frequency range of 20-2,000 Hz with 50 lbs (22.7 kg) or greater load, all other ratings bare table

\*\* Load attached to Armature

\*\*\* 11ms half sine shock pulse with 40% pre/post pulse and reduced field

## Vibration

Electrodynamic vibration provides a testing platform for transportation simulation, mechanical shock, mission profile, and Environmental Stress Screening (ESS). With dynamic factors such as displacement, velocity, acceleration, and force, electrodynamic vibration accurately simulates a wide range of conditions that can help improve the quality and reliability of many products. As a closed loop vibration control system, electrodynamic shakers can accurately reproduce real world vibrations on electronic, automotive, aerospace, and military products. The shaker is equipped with an insulated top to isolate the components from the shaker when in the chamber.

ITRI Innovation's equipment performs random, sine-to-shock, sine-on-random, and random-on-random tests.

Force Rating (Lbf/kN)	Avail. Armature Sizes	Max. Velocity (ips/mps)	Shock*	Amplifier (KVA)	Displacement (in/mm)
2,250 / 10.0	12 in / 30.5 cm	90 / 2.28	Up to 200g	15 KVA	2.5 / 63

## RATES

Tests utilizing this equipment, run by our experienced technologists with setup and guidance provided by our consultant experts is charged at £975 per day plus the prevailing rate of VAT.

## AVAILABILITY

Time slots can usually be booked to commence within 3 months. Please contact Dr Wayne Lam on +44 1727 871 328 or email [wayne.lam@itri.co.uk](mailto:wayne.lam@itri.co.uk) for up to date availability information.

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