Engineered Packaging and Distribution Research Group Facilities and Equipment

Our research group undertakes local, national and international scientific research aimed at developing environmentally sound and optimised solutions to support the distribution of products and produce.

Contact us
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Environmental and Distribution Dynamics Laboratory

Large Vibration Table - servohydraulic
Specifications: max. payload: 2,500 kg, max acceleration: 10 g, Nominal frequency bandwidth: 0 - 500 Hz, table dimensions: 1.52 m x 1.52 m. Can be configured for larger footprint loads and for various temperatures (-10C - 30C)
Suitable for random / sinusoidal / transient vibration and repetitive shock tests.

Large Compression Testing MachineLarge Compression Testing Machine.
Specifications: 60 kN, 1.22 m x 1.22 m x 1.980 max, vertical clearance.
Suitable for short-term compression tests, creep and stress relaxation.

Programmable Shock Generator
Specifications: max. payload: 225 kg, table dimensions: 0.65 m x 0.81 m, max. acceleration: 600 g, max velocity change: 7.6 m/s.
Suitable for product fragility and shock survivability tests.

Free-fall Drop Testing Machine
Specifications: max. payload: 55 kg, max. specimen dimension (front-back): 0.61 m, drop height range: 0.3 -3.0
Suitable for package performance evaluation. Can be fitted with accelerometers to measure critical element response and cushion effectiveness.

Cushion Testing Machine
Specifications: max. specimen dimensions: 0.23 m x0.23 m, max. drop height: 0 - 1.52 m, max. impact velocity:
Suitable for Cushion effectiveness tests, cushion curves determination & repetitive shock tests.

Large environmental chamber
Specifications: Temperature range: -10C - 70 C, RH range: 0% - 99%, internal dimensions: 2.9 m wide, 1.98 m deep, 2.1 m high, Door dimensions: 1.4 m wide, 1.79 m high.

Cool Room
Specifications: Temperature range: Ambient to -40 C, Internal dimensions: 4 m wide, 2.8 m high, 3 m deep.

High speed camera

Specifications: 10 Bit Grey Scale,1 Mpixels native resolution @ 3000 frames per seconds, max. frame rate: 250,000 fps. Fully configurable.

Thermal imaging

Specifications: 320 x 240 elements, 500 ^{o}C max. Fully configurable.

Measurement and analysis

The laboratory contains a range of devices for the measurement of various quantities (temperature, RH, strain

Self-contained and PC-based data acquisition systems

Customised to suit application

Dynamics Research Laboratory

Medium Vibration Table - servohydraulic

Specifications: max. payload: 200 kg, max acceleration: 50 g, Nominal frequency bandwidth: 0 - 500 Hz, table dimensions: 0.55 m x 0. 6 m. Can be configured for larger footprint loads.
Suitable for random / sinusoidal / transient vibration and repetitive shock tests.

Small Vibration Table - electrodynamic

Specifications: max. payload: 50 kg, max acceleration: 50 g, Nominal frequency bandwidth: 0 - 5000 Hz, table dimensions: 0.3 m x .3 m. Can be configured for larger footprint loads.
Suitable for random / sinusoidal / transient vibration and repetitive shock tests.

Cushion Testing Machine

Specifications: max. specimen dimensions: 0.23 m x0.23 m, max. drop height: 0 - 1.52 m, max. impact velocity:
Suitable for Cushion effectiveness tests, cushion curves determination & repetitive shock tests.

Small environmental chamber

Specifications: Temperature range: -10C - 70 C, RH range: 0% - 99%, internal dimensions: 0.5 m wide, 0.5 m deep.

300 kN Universal Testing Machine - static

Specifications: ± 300 kN, Clearance: 0.6 m wide, 3.0 m high, stroke:300 mm.
Suitable for static (short term) tests.

100 kN universal Testing Machine - static

Specifications: ± 50 kN, Clearance: 0.55 m wide, 1.2 m high, nominal frequency bandwidth: 0 - 500 Hz, stroke: ±
Suitable for static (short and long term) tests.

50 kN universal Testing Machine - static and dynamic capability

S ifi ti ± 100 kN Cl 0 8 id 1 2 hi h t k 1 2 Specifications: ± 100 kN, Clearance: 0.8 m wide, 1.2 m high, stroke: 1.2 m.
Suitable for static (short and long term) and dynamic tests. Can be programmed to apply complex loading functions and fatigue tests.

20 kN universal Testing Machine - static

Specifications: ± 20 kN, Clearance: 0.6 m wide, 1.2 m high, stroke: 1.2 m.
Suitable for static (short and long term) tests.

High speed camera
Specifications: 10 Bit Grey Scale,1 Mpixels native resolution @ 3000 frames per seconds, max. frame rate: 250,000 fps. Fully configurable.

Thermal imaging
Specifications: 320 x 240 elements, 500 ^{o}C max. Fully configurable.

Measurement and analysis
The laboratory contains a range of devices for the measurement of various quantities (temperature, RH, strain,

Self-contained and PC-based data acquisition systems
Customised to suit application

Materials Engineering Laboratory

20 kN universal Testing Machine - static
Specifications: ± 20 kN, Clearance: 0.6 m wide, 1.2 m high, stroke: 1.2 m.
Suitable for static (short and long term) tests.
Equipped with large strain (2000%) non-contact externsomenter

Hardness testing machine
Rockwell, Vickers

Furnaces
A variety of digitally-controlled furnaces for a range of applications

Digital Microscope
5X, 10X, 20X, 50X

Thermal imaging
Specifications: 320 x 240 elements, 500 ^{o}C max. Fully configurable.

Measurement and analysis
The laboratory contains a range of devices for the measurement of various quantities (temperature, RH, strain, etc.)

Polymer Research Laboratory (Werribee campus)

Perkin Elmer DSC7/TGA7
Differential Scanning Calorimeter for measuring phase transitions in polymers
Thermogravimetric Analyser for measuringmaterial stability during heating or pyrolysis

Waters Alliance GPCV 2000
Gel permeation chromatography for detemining molecular weight and branching of polymers
Includes refractive index and viscometry detectors; polystyrene standards

Shimadzu Total Organic Carbon Analyser (TOC-VCSH)
For measuring organic substances

Temperature controlled ovens

Compression moulding press

UV Ageing Apparatus

Analytical Laboratory (Werribee campus)

Shimadzu Fourier-Transform Infrared Spectrophotometer (IR Affinity-1)
Materials analysis and identification
With VeeMax specular reflectance/ATR capabilities

Shimadzu Spectrofluorophotometer (RF-5201PC)
Measuring fluorescence of aqueous solutions

Shimadzu UV-Visible Spectrophotometer (UV-1800)
Measuring UV/Visible absorbance of aqueous solutions

Shimadzu Liquid Chromatograph/Mass Spectrometer (LCMS-2010EV)
For detection and identification of chemicals in complex mixtures

Shimadzu High Performance Liquid Chromatograph
To separate, identify, quantify and purify components of a mixture

Shimadzu Ion Chromatograph
To separate ions; used in protein purification, water analysis, and quality control

Shimadzu Gas Chromatograph/Mass Spectrometer (GC-2010)
For detection and identification of substances, trace elements

Shimadzu Inductively Coupled Plasma Emission Spectrometer (ICPE-9000)
For high sensitivity elemental analysis

Shimadzu Atomic Absorption Spectrophotometer (AA-6300)
For high sensitivity elemental analysis

JOEL NeoScope (JCM-5000) Scanning Electron Microscope (room 22.51)
For high resolution microscopy (up to 40,000 x magnification)
Equiped with gold coating apparatus: NeoCoater (MP19020NCTR)

Food Research Laboratory (Werribee campus)

Malvern Zetasizer Nano
For measuring particle size and zeta potential
Equipped with MPT2 autotitrator

TA XT Plus Texture Analyser
For measuring properties of food prouducts under compression/tension

Anton Paar Physica MCR 301 Rheometer
For measuring rheological properties of foods and other materials

Instron 4465 Universal Testing Machine

Other Equipment (Werribee campus)

Alltech 301 HPLC pump with a LDC Analytical Conductivity Detector
Alltech 426 HPLC pump with a Varex MKII Evaporative Light Scattering Detector
Anton Paar Rheometer
Bartelt Instruments Innovonics, Gene Machine
Beckman P/ACE 5010 CE, Capillary Electrophoresis
Bradson Sonifier 450, Ultrasonic probe
Brookfield, Viscometer
Cecil CE 2020, UV-Vis Detector
Dynanac FD 300 Freezer Drier and a Mini Freezer Drier
Foss 2100, Kjeltec Distillation Unit with a 2020 Digestor Unit
Fujifilm FLA-300, Fluorescent Image Analyser
Funnigan LCQ Deca XP Mac LC-MS, with a Surveyor PDA (Photo Diode Array Detector), Auto-sampler and LC Pump
Gallentamp, Vacuum Oven
GBC 902, AAS Hewlett Packard 5890 Series II, GC-MS with a 5971A Mass Selective detector
Metrohm Polarcord E306, Polarography
Minolta CR-200, Colorimetry
New Brunswick Scientific Bioflo 3000, Batch/Continuous Bioreactor
Peltier effect Cycling PTC-1000 Programmable Thermal controller, PCR (Polymerase chain reaction)
Peltier effect Cycling PTC-200, PCR (Polymerase chain reaction)
Perkin Elmer 1310 Infrared Spectrophotometer (Wavelength 600-4000nm)
Perkin Elmer LS50B, Infrared Spectrophotometer (x 2)
Perstarp Analytical NIR, Near Infrared Analyser
Pharmacia Wallac 1410, Liquid Scintillation counter
Savant SC110, Speed Vac and a RT400 Refrigerated Condensation Trap
Spectra Physics Analytical HPLC 4 Value pump-head with a Bio-rad 1305 UV Monitor Detector
UVP, White/Ultraviolet Transilluminator
Varian 3400 CX GC (x 3)
Varian 9070, Fluorescence Detector
Varian Cary 300, UV-Vis Spectrometer with temperature controller
Varian ERC-7515A, Reflective Index Detector
Varian GC-MS, Saturn 2000 MS MS, with a Genesis Head Space
Varian HPLC (High Performance Liquid Chromatography), 9050 UV-Vis Detector, 9100 Autosampler, 9012 pump (x 4)
Varian9065, Diode Array Detector (x 2)
Varian Prostar Prep HPLC Prostar1320 UV-Vis, Prostar 215 Pumphead and Prostar 410 Autosampler
Varian Spectra AA 400, AAS with a Zeeman GTA –96 Plus Graphite Furnace
Wallac 1470 Wizard Automatic Gamma Counter

Other equipment: shaker incubators, general incubators, centrifuges, drying ovens, autoclaves, fermentators, pasteurisers, water baths, rotary wvaporators, -80°C freezers and other general laboratory equipment