



Packaging solutions

We work with companies, manufacturers and exporters to optimise existing packaging products and develop sustainable packaging for the future.





Optimising paperboard box performance

Boxes in the supply chain fail due to the accumulated deformation acquired after being held under compressive loading for long periods. Moisture and changes in humidity can hasten failure. However, developing and testing improved boxes can be lengthy and expensive.

Scion's unique controlled temperature and humidity facility (WHITE Room) allows box performance evaluation under simulated supply chain conditions. Fitted with 25 compression testers, whole box performance can be assessed accurately and in a timely fashion. Testing includes:

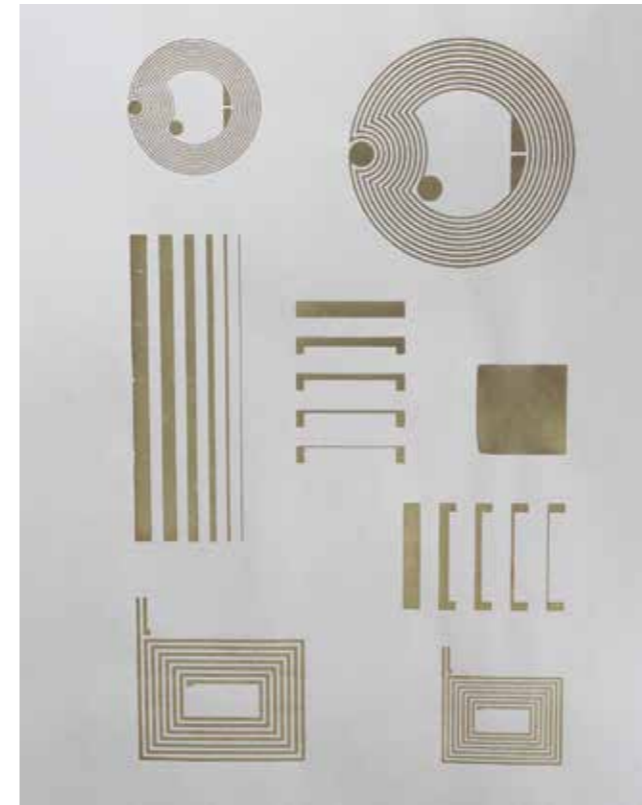
Box creep testing. A constant compressive load is applied and relative humidity is cycled. The changing humidity causes the paper to contract and expand. Changes in box height are recorded over time allowing strain rate and the point of failure to be calculated.

Box compression testing. A pure top-to-bottom compression test carried out at a constant compression rate; usually 10-13mm/min. Force and strain are recorded continuously until failure occurs. The maximum force is reported.

Printing and coatings

Functional coatings applied to paper-based packaging materials enhance the materials' performance. Coatings can function as moisture and gas barriers, have antibacterial and antioxidant properties and add gloss strength and extra protection against scuffing.

Scion's focus is on using printing technology to apply waterbased dispersion coatings/inks to the surface of substrates using standard industry printing equipment.



Printed electronics. We are using special inks to print electronic devices such as near field communication antennae on packaging that can be used to provide information on product origin, use or otherwise engage the end user.

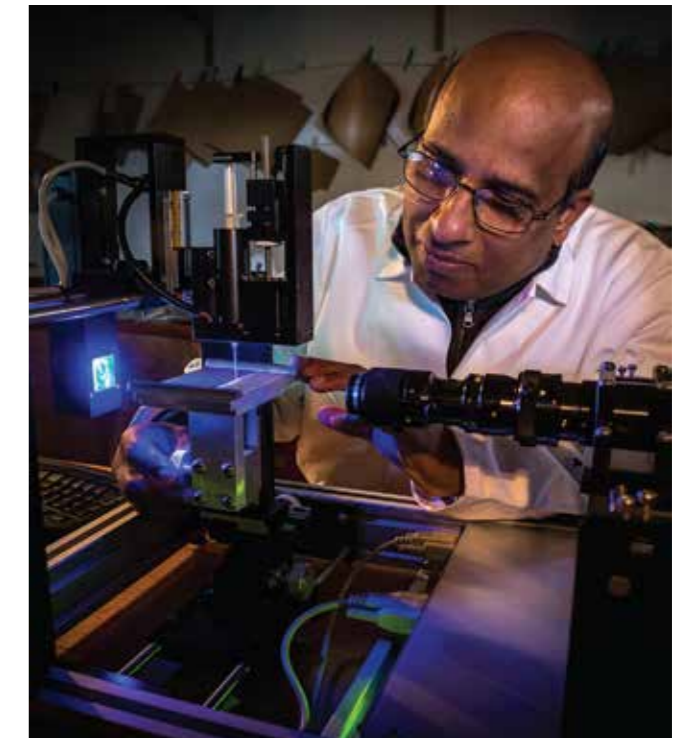
Measuring water permeability. A Dynamic Contact Angle Surface Tension Analyser measures the degrees of wettability of any surface. The analyser captures both the static and dynamic interactions of surfaces such as coated paperboard.

Sustainable packaging

Reduced product loss, better recyclability and increasing use of bio-based materials all contribute to increased packaging sustainability. Our research focusses on design and material choice to reduce weight, improve performance.

Bio-based materials. Scion has specialised equipment and capability to produce, characterise, modify, formulate and process plastics, biopolymers, additives, wood plastic composites and their derived products. This equipment includes: extrusion, injection moulding, film blowing, foaming and thermoforming.

Compostability and biodegradation testing. Our facility for testing the compostability of materials to ISO 14855-1 is available commercially to industry clients.



Advanced material characterisation and testing

We have a range of microscopy, mechanical and thermal analysis and advanced chemical characterisation equipment.

- **Microscopy.** Our scanning electron and confocal microscopes can be used to analyse the physical characteristics of materials. Our equipment is among the most powerful available in New Zealand.
- **Mechanical and thermal analysis.** Scion works with manufacturers and product developers to characterise the properties of materials as they change with temperature. We offer a suite of thermal analysis solutions, including dynamic mechanical thermal analysis, rheometry, differential scanning calorimetry, thermogravimetric analysis, melt flow index and intrinsic viscosity.
- **Advanced chemical characterisation.** Nuclear magnetic resonance, spectroscopy, mass spectrometry and high performance liquid chromatography-infrared spectroscopy are used to analyse solid compounds, liquids and gases.

Scion has the expertise and equipment to support advanced packaging development.

Multi-disciplinary research teams can be assembled to provide the full range of skills needed for any given project. We can also call on our national and international partners to help bridge gaps between ideas, research and technologies and commercial needs.

We have lab and pilot scale capability in pulp, paper, biopolymers and biocomposites manufacture and testing, providing manufacturers with the R&D support they need on one site.

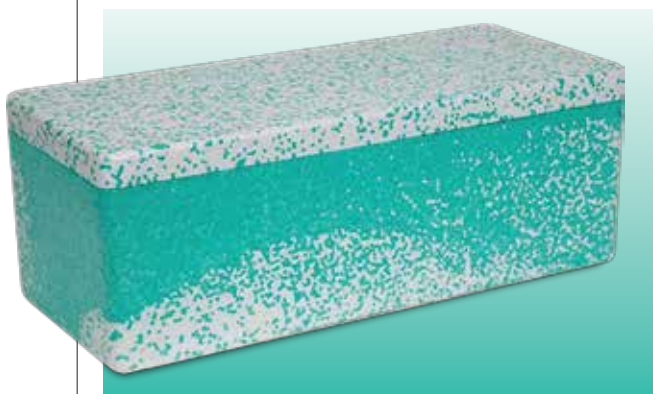
Our range of testing and analytical services includes compression and creep testing, supply-chain testing, biodegradation and compostability. These services can be used to help manufacturers meet regulatory standards, customer specifications, codes of practice or to troubleshoot problems.



Case study: Development of ZealaFoam™

Scion's laboratory-scale foaming and moulding equipment is capable of producing expanded polylactic acid (E-PLA) as a replacement for expanded polystyrene. Impregnation pressure vessels are used to inject CO₂ into beads. The resulting foam is produced using a process patented by the Bio polymer Network Ltd (BPN). A laboratory-scale prefoamer applies heat as steam or hot air, expanding beads to a desired density.

A pilot plant, owned and operated by BPN, enables pilot-scale manufacture of E-PLA products. The resulting foam, called ZealaFoam™, can be manufactured on existing polystyrene production lines with little modification. The pilot plant, located in Nelson, is used to mould fish boxes and other products from ZealaFoam™. This foam can have other uses as well as applications in sporting goods, furniture and insulation. ZealaFoam™ provides potential marketing advantages for New Zealand's primary exports, in particular, fresh fish and other chilled goods.



We provide

- **Packaging development services** including material and process analysis, troubleshooting and making prototypes.
- **Testing services** ensuring compliance with regulatory and non-regulatory standards, manufacturers' specifications, customer specifications and codes of practice.
- **Product design capability** through partnerships with universities.
- **Pursuing funding opportunities** for research and development working with industry partners.
- **IP expertise** and specialised legal advice to protect intellectual property.
- **Tailored relationships** to meet individual customer needs, including providing services such as specialised testing, one-on-one confidential research, joint development partnerships and strategic multi-party alliances.

Contact information

Lou Sherman

Research Leader Packaging

Email lou.sherman@scionresearch.com

Telephone +64 7 343 5503

About Scion

Scion is the Crown research institute that specialises in research, science and technology development for forestry, wood and wood-derived materials, and other bio-material sectors.

Scion's purpose is to create economic value across the entire forestry value chain, and contribute to beneficial environmental and social outcomes for New Zealand.



Te Papa Tipu Innovation Park,
49 Sala Street, Rotorua
Private Bag 3020, Rotorua 3046,
New Zealand

Telephone +64 7 343 5899
Facsimile +64 7 348 0952
Email enquiries@scionresearch.com
www.scionresearch.com

Prosperity from trees *Mai i te ngahere oranga*