

OUR ENGAGED  
EXPERTS PROVIDE  
INNOVATIVE SOLUTIONS  
TO NON-METALLIC  
MATERIAL CHALLENGES



NON-METALLIC TESTING  
SERVICES



## WHO WE ARE

Element is one of the world's leading providers of Testing, Inspection and Certification (TIC) services.

Element delivers critical services in Materials Testing, Product Testing, Certification, Device Calibration, and Advisory Services to the Aerospace, Transportation, Energy, Fire and Building Product sectors, where failure in service is not an option.

Everything Element does is designed to help our customers to build better products, get their products to market on time, save time and money, and minimize the risk associated with their investments in product development and production.

Our purpose as an organization is a very simple one. To make certain that the materials and products we test, inspect, and certify for our customers are always compliant, safe, quality, and fit for purpose in their end application.

**That is the Certainty of Element.**

## OVERVIEW

Non-metallic materials include a wide range of composites, polymers, elastomers, organic and non-organic compounds. Our expert's research, publish and work on the latest materials and techniques, and bring that knowledge to their clients in the form of customized test programs.

Non-metallic materials can be evaluated for strength, flexibility, fatigue, and many of the other physical properties that metals are tested to. Understanding the limits of your material is vital in determining its integrity and useful lifespan.

All of our facilities are ISO 17025 accredited and we operate in accordance with all applicable local, regional and international standards. Our experts can help you select non-metallic materials, test your samples to various industry standards or your quality system, and work with you to turn the materials into better, stronger products.

## OUR SERVICES

Element's global laboratories offer a wide range of non-metallic testing services, including:

- Mechanical testing of polymers and composites
- High pressure high temperature (HPHT) testing
- Composites and polymer evaluation
- Wet thermal insulation qualification
- Coatings testing
- Analytical and chemical testing
- Consultancy

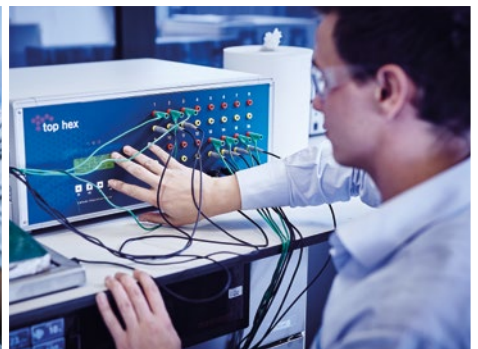
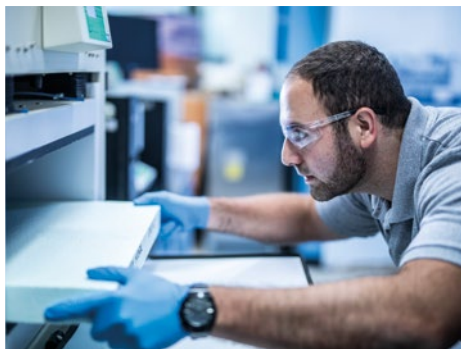
## MECHANICAL TESTING OF POLYMERS AND COMPOSITES

Mechanical testing reveals the properties of a material under dynamic or static force. Designed to ensure that materials are suitable for their intended applications, mechanical testing includes methods such as tensile strength, compression strength, impact resistance, fracture toughness, and fatigue.

Element offers a full suite of mechanical testing services for metallic and non-metallic materials, as well as components and specialty products.

The range of mechanical testing services we offer include:

- Tensile, compression and shear testing
- Bulk modulus
- Creep and stress relaxation test
- Hardness testing
- Density testing
- Fibre, resin and void volume fraction
- Fracture and fatigue testing
- Customized/bespoke testing for polymeric components
- Compression after impact (CAI)
- Bolted and bonded joint testing
- Impact testing
- Structural Adhesive Testing





# NON-METALLIC TESTING SERVICES

## HIGH PRESSURE HIGH TEMPERATURE (HPHT) TESTING

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As a world-leading testing partner for the Energy industry, Element performs HPHT (high pressure, high temperature) testing, also known as Autoclave testing, for many applications including, polymers, composites, and coatings. Qualifying and assessing materials that can perform under extreme conditions for decades of useful service is a high priority for rapidly advancing industries.

HPHT testing services offered by Element include:

- Exposure to sweet environments
- Exposure to sour environments
- Rapid gas depressurization (RGD)
- Accelerated aging: thermal and chemical
- Custom tests to suit client needs

## COMPOSITES AND POLYMER EVALUATION

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Element's state-of-the-art polymer test laboratories utilize proprietary methods and analytical instrumentation to carry out characterization and failure analysis of polymers and composites.

From materials selection, qualification and quality assurance, to documentation and testing, Element provide accurate, independent data that helps our customers to develop more technically advanced, and ultimately better, products and materials. Our services include:

- Polymer expansion in CO<sub>2</sub>
- Permeation & diffusion: pressure differential, pipe/hose test, GC, cup weight loss, moisture absorption
- Compatibility of polymers
- Hose testing - hydraulic, umbilicals, pneumatic

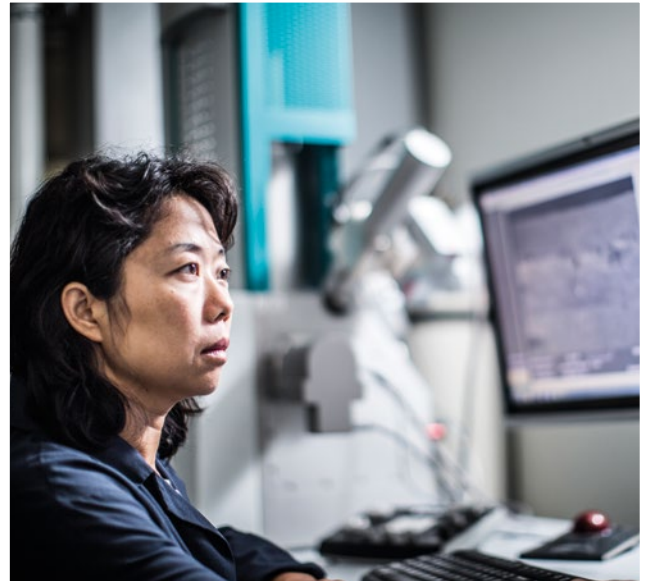
## WET THERMAL INSULATION QUALIFICATION

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Thermal insulation coatings provide a variety of benefits to pipeline systems besides temperature control such as corrosion inhibition, impact, and abrasion resistance. Our laboratories offer thermal insulation coating qualification for wet thermal insulation coatings intended for pipelines, flow lines, subsea equipment and structures.

Element's testing services help ensure pipeline coating performance throughout their service life:

- Simulated service testing (SST)
- Post simulated service test (SST)
- Mechanical property testing





## COATINGS TESTING

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Coatings provide critical asset protection in some of the harshest operating environments within the global Energy sector. As a recognized leader in the provision of coatings testing, inspection, and advisory services, Element helps you understand how your coating products and systems will perform once deployed in the field.

Our testing capabilities include:

- Accelerated weathering and corrosion testing
- Marine environment
- Chemical resistance
- Pipeline insulation and field joints
- Mechanical testing
- Physical properties
- Linings and CUI
- Bespoke programmes and consultancy

## ANALYTICAL AND CHEMICAL TESTING

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Element's chemical characterization testing and analysis help to confirm the identity and composition of chemical substances and materials. Our chemical analysis laboratories house a wide array of analytical equipment, including advanced spectroscopy systems, and our team of chemists is highly-trained and skilled at applying a combination of chemical characterization techniques to assist with the analysis.

Our areas of expertise include:

- Dynamic Mechanical Analysis (DMA) - glass transition temperature, change in stiffness with temperature
- Differential scanning calorimetry (DSC) - glass transition temperature, melting point, crystallinity, curing, OIT, specific heat capacity
- Thermo mechanical analyzer (TMA) - coefficient of thermal expansion (CTE)
- Thermogravimetric analysis (TGA)
- Thermal conductivity

## CONSULTANCY

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Element offers a complete suite of non-metallics testing, inspection and consultancy services. Our experts provide a comprehensive scope of materials testing services, including the chemical composition of metallics, mechanical testing, metallurgical analysis, radiography, specialized test design, and performance.

Our consultancy services include but are not limited to:

- Failure analysis
- Engineering consultancy - methodology review and validation, report and design review
- 3rd Party inspection/audit

[www.element.com](http://www.element.com)