



**KINECTRICS**

# Polymer Component Solutions

Comprehensive Field and Lab Based Capabilities to Support a Wide Range of Industry Needs





# Capabilities designed to support innovation, reliability and performance of polymer components.

## Unique Capabilities

- Burst test facility
- Dielectric properties characterization
- Environmental Qualification (EQ) facility for design basis accident simulation
- Radioactive laboratory for examination of contaminated samples

## Mechanical Testing

- Custom mechanical testing design for complex geometry & unique components
- Portable cable and elastomer indenter
- Temperatures from -125 °C to 1000 °C
- Universal testing machines (100N to 2,600kN)

## Physical & Thermal Characterization

- Differential Scanning Calorimetry (DSC)
- Dynamic Mechanical Analyzer (DMA)
- Thermal aging chambers
- Thermogravimetric Analysis (TGA)
- Water and oil baths

## Chemical Characterization

- Fourier transform infrared spectroscopy
- Gas chromatography mass spectrometry
- Inductively Coupled Plasma (ICP) analysis
- Near infrared spectroscopy
- Wet chemistry laboratory

## Imaging

- Digital Image Correlation (DIC)
- Image analysis software
- Scanning Electron Microscope (SEM) with EDS capability
- Stereo and standard optical microscopes

## Materials

- Elastomers
- Electrical insulation paper
- Fiber reinforced composites
- Thermoplastics
- Thermosets

## Components

- Composite piping (glass/carbon reinforced)
- Elastomeric bellows
- Elastomeric hoses
- Elastomeric seals (o-rings, gaskets, diaphragms)
- Expansion joints
- Extruded cables (low to high voltage)
- Oil-paper insulated cables
- Paints and coatings
- Sealants
- Thermoplastic piping







**Best-In-Class services** tailored to meet the highest industry standards.

### → **Condition & Life Assessment**

- Condition assessment of components through material characterization
- Physical, mechanical and chemical testing with comprehensive in-house capabilities
- Determination of remaining life through analytical and experimental approaches
- Reverse engineering of material composition

### → **Failure Analysis**

- Determination of failure mode and failure mechanism
- Comprehensive destructive and non-destructive testing
- Disassembly and dissection of large equipment and sub-components
- Multidisciplinary approach to root cause analysis

### → **Field Inspection**

- Condition assessments of installed components with non-destructive techniques (hardness, indenter, portable FTIR and NIR)
- In-situ material identification
- Custom repairs recommendations

### → **Research & Development**

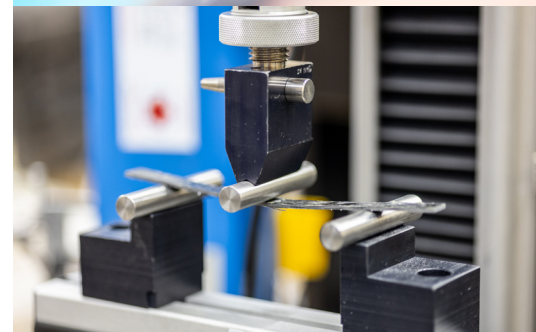
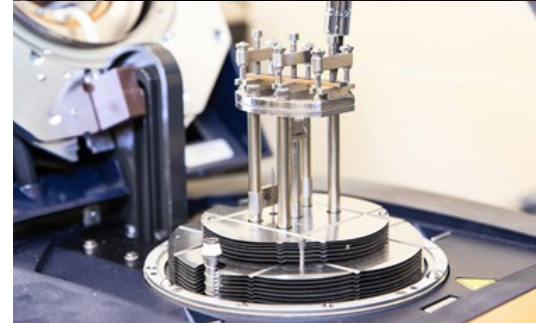
- Custom test programs to support material or component development
- Expertise in effects of environmental stressors on polymers long term performance
- Design, fabrication and execution of unique test set-ups
- Development of aging models for in-situ non-destructive evaluation of components

### → **Training Programs**

- Available courses on the use of elastomeric materials in the nuclear industry, failure analysis of solid dielectrics and aging management of extruded cables
- Development and delivery of customized courses on polymeric materials

### → **Quality Assurance & Qualification**

- Accredited laboratory facilities audited to perform work under several quality programs (ISO 9001, Z299. 10 CFR 50 Appendix B, etc)
- Witnessing and qualification activities available for design work, in-house large component fabrication etc





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