

## 3-Day Workshop Outline at ATIRA with CECA in April 2024

### 03 days Master Workshop on "Beyond the Surface: In-Depth Testing and Certification of Composites"

Date and time : 21<sup>st</sup> – 23<sup>rd</sup> April, 2025  
10:00 AM to 05:00 PM

Venue : CoE- Composites, ATIRA Ahmedabad

**Objective:** To provide comprehensive knowledge and hands-on experience in the testing and certifying of composites, covering destructive and non-destructive methods.

**Target Audience:** Professionals from the composites industry, quality assurance engineers, R&D personnel, and testing lab technicians.

**Mode of delivery:** Theory sessions combined with hands-on practical training.

#### Outcome of the program:

- Enhanced skills in testing and certification of composites
- Understanding of standards and methodologies
- Hands-on experience with testing equipment

#### Registration Link:

<https://docs.google.com/forms/d/e/1FAIpQLScLGVP5f9ejY6JAuSqiMwUDzLmnyuCmRA05fJwODA6B4jKeGw/viewform>

#### Program Structure:

##### Day 1: Fundamentals, physical and Mechanical Testing

##### Morning Session: Theory

##### 1. Introduction to Composite Testing

- ✓ Importance and applications of testing in composites
- ✓ Overview of destructive and non-destructive testing (NDT)
- ✓ Introduction to test standards (ASTM, ISO)

##### 2. Mechanical Properties Testing - Overview

- ✓ Purpose of Physical and Mechanical characterization (i.e., Density, void content, hardness, tensile, compression, bending, shear, impact tests, etc.) of the composites
- ✓ Basics of stress-strain behavior

##### Afternoon Session: Practical

##### 1. Hands-on Testing

- ✓ Density and void content measurement
  - ✓ Tensile testing: Sample preparation, testing procedure, and result interpretation
  - ✓ Compression testing: Techniques and equipment handling
  - ✓ Bending and shear testing demonstrations
  - ✓ Poisson's Ratio/IPSS Testing
2. **Group Activity:** Analyze results and identify performance trends for provided samples.
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## Day 2: Measurement of Thermal and Electrical properties

### **Morning Session: Theory**

1. **Physical Properties Testing - Overview**
  - ✓ Thermal properties: Heat resistance
  - ✓ Electrical properties: Conductivity, resistivity, and dielectric strength
  - ✓ Environmental testing: Effects of moisture, temperature, and chemical exposure
2. **Microscopy Techniques in Composites**
  - ✓ Dimensional stability analysis
  - ✓ Imaging techniques for structural evaluation

### **Afternoon Session: Practical**

1. **Thermal Testing**
    - ✓ Equipment setup and testing for thermal stability
    - ✓ Practical demonstration of heat resistance
  2. **Electrical Testing**
    - ✓ Measurement of electrical resistance
    - ✓ Measurement of dielectric strength
    - ✓ Measurement of Dry Arc resistance
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## Day 3: Chemical and NDT Testing

### **Morning Session: Theory**

1. **Chemical and Analytical Testing in Composites**
  - ✓ Resin and filler content analysis
  - ✓ Ignition loss, Resin viscosity and gel time

- ✓ DSC and DMA principles for material characterization
- 2. **Non-Destructive Testing Methods**
  - ✓ Visual inspection for surface defects
  - ✓ Advanced scanning techniques for subsurface evaluation
- 3. **Testing Methodology and Conditions**
  - ✓ Purpose and methodology for each test
  - ✓ Sample preparation and condition considerations
  - ✓ Analysis and reporting of results
- 4. **Standards and Certifications**
  - ✓ Understanding ASTM and ISO standards for chemical tests
  - ✓ Certification requirements

### **Afternoon Session: Practical**

1. **Chemical Testing Hands-On**
    - ✓ DSC: Data collection and thermal property analysis
    - ✓ Resin content analysis
    - ✓ Viscosity and gel time measurement
    - ✓ Acid value Measurement
  2. **UV and Flammability Testing Demonstrations**
    - ✓ Equipment usage and result interpretation
    - ✓ UL94
    - ✓ Cone calorimetry
    - ✓ Smoke Density
    - ✓ Toxicity
    - ✓ Spread of flame test
  3. **Non-Destructive Testing**
    - ✓ Visual inspection with magnification tools
    - ✓ Practical demo of scanning techniques
1. **Group Activity:**
    - ✓ Case studies: Correlating NDT and destructive test results

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### **Workshop Closing:**

- Open forum for Q&A and feedback
- Certificate distribution and group photograph

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