

Introduction to Materials Testing: Static



Objectives

After completing this course, you will be able to:

- Understand basic materials testing terminology, theory and concepts
- Understand typical force/displacement test curves and be able to distinguish between different types of curves
- Do's and Don't's when running typical tensile, compression, flexure, and peel tests
- Learn good testing procedures when using a computerized testing instrument to perform tension, compression, flexural and peel testing
- Learn the importance of system calibration for data accuracy
- Understand specimen geometry and the importance of specimen dimensions
- Calculate stress, strain, elongation, modulus, offset yield, and other advanced calculations
- Be able to interpret test curves and to label major points and results
- Understand different types of strain measurements and devices

Overview

In this one-day course, students will learn about materials testing. The course highlights the basics of materials testing including mechanical properties, different types of testing, stress/strain test curves, modulus, yield, and application testing with demonstrations on computerized materials test instruments. Students will observe tensile, compressive, flexural, and peel tests to learn to interpret test curves and calculated results.

Course Outline

Part 1: Who Tests and Why

- What is materials testing?
- Why materials testing important?
- Who does materials testing and for what applications?
- The role of materials testing in the prevention of material failures

Part 2: The Testing System

- What is static verse dynamic testing?
- Electromechanical system components
- Common system configurations

Part 3: Quantifying Results

- What are you measuring?
- Understanding system of units
- The relationship between force and stress
- The relationship between displacement and strain
- Understanding the significance of specimen geometry
- Understanding Extensometry
- The importance of calibration

Part 4: Material Properties and Results

- What are Proportional Integral Derivative (PID) controls
- Understanding common test results
- Relationship between material properties and behavior
- Understanding Elastic verse Plastic deformation
- The effect of testing conditions

Course Outline - Continued

Part 5: Test Design

The role of Standards Organizations in materials testing
Reading information from a standard
Important considerations during test design

Part 6: Fixturing and Wrap-up

Types of grips and fixtures
Understanding flexure testing
Understanding peel testing

Frequently Asked Questions

Who Should Attend?

This course is open to those who are interested in increasing their materials testing knowledge in order to improve testing techniques. It is recommended for those who operate or supervise the operation of any of Instron's Electromechanical (EM) Test Instruments which includes, but is not limited to, 3300, 5900, 3400, and 6800 systems.

What are the prerequisites?

- Some familiarity with test instrument operation desirable, but not required
- Ability to use a personal computer and/or a touch screen device such as a smart phone
- Some experience with Bluehill software desirable, but not required

How long is the course?

This course is comprised of 1 full day of lecture, discussion, and video demonstrations.

Can the course be tailored to my application?

This course is designed to be interactive, and questions and comments are encouraged. Your trainer will be happy to work with you to develop your own custom test methods. Please see our Training FAQ for more information about incorporating your samples or specimens.

Where can I get more information?

Please contact us directly at Training_Center@instron.com or by phone at 1.781.575.5246.

For logistical or administrative information, you may also visit us at www.instron.com

Locations

Courses are offered virtually through an online platform and at customer facilities across North America.

For a list of upcoming sessions, or to schedule on site training, please visit www.instron.com, or contact us at the information listed below.



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