

**Adhesive Bonding Technology**  
**--Materials and Applications--**  
ADBT-8828

**Course Objectives:**

The overall objective of this course is to offer a comprehensive and sound assessment of the latest developments in adhesive bonding technology in manufacturing, available materials, processes and trouble shooting. The course will focus on general industrial, automotive, aerospace and electronics applications, discuss case histories, and present approaches to solving problems in selection and processes, testing and efficiency improvements. The course will provide the knowledge and skills necessary for successful adhesive bonding.

**Expected Outcome:**

Upon completion of this course, attendees will have gained a full understanding of the factors influencing the performance of joints, how to select adhesives and fabricate adhesive joints.

**Who Should Attend?**

All manufacturing personnel working with adhesives; process, design and production engineers and technicians, chemists and personnel in inspection, quality control, technical sales and those who need a working knowledge of adhesive bonding technology. If you are contemplating adhesive application, need to meet certain specification and regulation, or want to resolve problems, this course will provide the valuable insight.

**How you will benefit from this course:**

- ◆ Learn how to select environmentally compliant adhesives, primers, sealant, and become familiar with their properties and application methods.
- ◆ Develop an overall understanding of adhesion phenomenon and engineering requirements.
- ◆ Become familiar with surface properties and learn effective methods of surface treatments.
- ◆ Gain a valuable understanding of joint design and bonding techniques.
- ◆ Learn how to save costs by judicious choice of materials and efficient application methods.
- ◆ Reinforce your mastery of troubleshooting and problem solving capabilities.
- ◆ Learn how to pinpoint causes of failure and how to prevent them.

## **Course Outline:**

### **Fundamentals of Adhesive Bonding**

- ◆ Advantages and Limitations
- ◆ Adhesion Phenomena
- ◆ Factors affecting Adhesion
- ◆ Requirements for adhesion
- ◆ Methods of Promoting and Maintaining Adhesion

### **Surface Engineering**

- ◆ Surface nature and Characteristics
- ◆ Surface Cleaning and Preparation of Metals, Plastics and Composites
- ◆ Physical Modification
- ◆ Mechanical Modification
- ◆ Chemical Modification
- ◆ Specific Methods of Modifying Plastic/Composite Surface
- ◆ Evaluation of Surface Preparations

### **Manufacturing with Adhesives**

- ◆ How to Convert to Adhesive Bonding
- ◆ Joint Design and Load Analysis
- ◆ Selecting adhesives for Specific Joints
- ◆ Adhesive Types, Cure (Drying) Methods and Mechanism

- ◆ Special Requirements, Properties, and Selection

- Acrylics
- Epoxy
- Phenolics
- Polyurethanes
- Polyamides/polyimide
- Silicone and Silicone Modified Adhesives
- Conductive Adhesives
- Sealants
- Anerobics
- Cynoacrylates
- Hot Melts
- Rubber-based Adhesives
- Pressure Sensitive Adhesives
- Radiation Cure Adhesives

### **Adhesive Bonding of Composites, Plastics and Rubbers**

- ◆ Special Consideration for Thermoplastic Materials
- ◆ Surface Preparation Specific to Plastics and Composites

- ◆ Parameters Affecting the Joint Strength in Plastics
- ◆ Special Processes and Application Methods
- ◆ Adhesive Selection

#### **Water-based Adhesives and Primers**

- ◆ Understanding Water-based Adhesives
- ◆ Special Processing Requirements
- ◆ Selecting Water-based Adhesives

#### **Evaluations of Bonded Joints**

- ◆ Methods of Non-destructive Testing
- ◆ Destructive bond strength evaluation
- ◆ Advanced Test Methods

#### **Durability of Adhesively Bonded Joints**

- ◆ Why Does a Joint Fail?
- ◆ Mechanisms and Modes of Failures
- ◆ Fatigue and Fracture in Bonded Joints
- ◆ Methods of Enhancing the Durability
- ◆ Screening Structural Adhesives
- ◆ Testing Adhesively Bonded Joints

#### **Advanced and Future Technologies**

- ◆ Adhesives for Severe Environments
- ◆ High Performance Adhesives

#### **◆ Case Histories in Adhesive Bonding**

#### **◆ Submittals From Attendees**