CORE CONCEPT

# Adhesives and Sealants Manufacturing Course: Formulation, Cure Control and Bond Testing

16 – 20 May 2027
Dammam - Eastern Province five-star

# Adhesives and Sealants Manufacturing Course: Formulation, Cure Control and Bond Testing

**Ref:** 1983_29359 **Date:** 16 – 20 May 2027 **Location:** Dammam - Eastern Province five-star **Fees:** 19500 SAR

## Introduction:

Adhesives and sealants manufacturing, covering formulation, cure control and bond testing, is a 1-week course for formulation, production, quality control and application staff at adhesive and sealant producers that ends with an Adhesive Product Qualification and Bond Assurance Plan for a case producer. Producers lose customers when cartridges skin in storage, two-component mixes cure unevenly and bonded parts debond at the interface. Nominees already formulate, make, test or support adhesive products, and each day is taught through case study work on recipes, rheology data, test reports and complaint files. CoreConcept Training Center delivers this adhesives and sealants manufacturing course.

## Course Objectives:

- Compare epoxy, polyurethane, acrylic, silicone, MS polymer and hot-melt systems and match each to a construction, automotive, packaging or assembly requirement
- Design adhesive and sealant recipes by setting filler, plasticiser, adhesion promoter and catalyst levels against rheology, open time and pot life targets
- Run paste mixing, vacuum deaeration, moisture exclusion and cartridge, sausage and drum filling so that products stay stable until use
- Specify surface activation, primers and joint geometry for metal, glass, concrete and low-energy plastic substrates
- Interpret lap shear, peel and tack results and failure modes to accept a lot or trace a debond to its cause
- Produce an Adhesive Product Qualification and Bond Assurance Plan for a case producer

## Target Audience:

- Formulation staff responsible for adhesive and sealant recipes, raw material choices and new product trials
- Production staff responsible for mixers, deaeration vessels, melters and filling lines
- Quality control laboratory staff responsible for rheology, cure and bond strength testing of each lot
- Application and technical service staff responsible for customer joint design advice and complaint investigation
- Process development staff responsible for scaling recipes from laboratory mixers to plant vessels

## Course Outline:

### Day 1: Adhesive and Sealant Chemistries and End-Use Requirements

- Epoxy, Polyurethane and Acrylic Reactive Cure Mechanisms Compared
- Silicone, MS Polymer and Polysulfide Sealant Backbone Comparison
- Hot-Melt Base Polymers From EVA to Reactive PUR
- Construction, Automotive, Packaging and Assembly Performance Requirement Mapping
- Producer Baseline Review of Complaints, Debonds and Scrap

### Day 2: Formulation Design, Rheology and Adhesion Science

- Surface Energy and Wetting Criteria for Substrate Adhesion
- Filler, Plasticiser, Silane and Catalyst Selection in Recipes
- Thixotropy, Sag Resistance and Extrusion Rate Rheology Targets
- Open Time, Skin Time and Pot Life Design Windows
- Sealant Movement Capability Classes and Joint Width Sizing

### Day 3: Paste Manufacturing, Moisture Exclusion and Filling Lines

- Planetary and Dissolver Mixer Charging Sequence for Pastes
- Vacuum Deaeration and Filler Drying for Moisture-Curing Systems
- Two-Component Mix Ratio Control and Static Mixer Checks
- Cartridge, Foil Sausage and Drum Filling Line Set-Up
- Hot-Melt Melter, Drum Unloader and Heated Hose Operation

### Day 4: Surface Activation, Joint Geometry, Bond Testing and Debond Diagnosis

- Plasma, Flame and Primer Activation of Low-Energy Plastics
- Lap, Butt, Scarf and Movement Joint Geometry Choices
- Single Lap Shear Specimen Preparation and Tensile Testing
- T-Peel, Floating Roller Peel and Probe Tack Tests
- Cohesive, Interfacial and Substrate Failure Mode Interpretation

### Day 5: Case Study Building the Bond Assurance Plan

- Case Producer Complaint File Review for Debonded Joints
- Fault Tree for Premature Skinning and Cartridge Hardening
- Elastomeric Sealant Test Results Checked Against Data Sheet Claims
- Lot Acceptance Matrix With Rheology and Strength Limits
- Adhesive Product Qualification and Bond Assurance Plan Completion

## Skills You Will Gain:

- Adhesive Chemistry Selection
- Sealant Recipe Design
- Paste Rheology Control
- Moisture-Sensitive Product Handling
- Substrate Surface Activation
- Bonded Joint Design
- Bond Strength Test Interpretation
- Debond Root Cause Analysis

## Why Attend This Course:

- Present an Adhesive Product Qualification and Bond Assurance Plan to the technical director and the quality manager
- Decide whether a lot is accepted, reworked or held, and which recipe or joint change fixes a recurring debond
- Avoid hardened cartridges, uneven two-component cures, sagging joints and field failures that trigger claims and lost accounts
- Equip plant, laboratory and technical service colleagues with mixing sequences, test matrices and joint design checklists

## Conclusion:

Back at work, the participant presents the Adhesive Product Qualification and Bond Assurance Plan to the technical director, the quality manager and the technical service lead. They use it to agree lot acceptance limits for rheology and bond strength, revise mixing and deaeration settings, standardise surface preparation advice to customers and choose which recipes to requalify first. After the first quarter under the plan, the unit should compare complaint rates, held lots, shelf-life failures and debond investigations with the baseline and adjust the limits that have not worked.

## Frequently Asked Questions FAQ:

### What should participants know before the adhesives and sealants manufacturing course?

Participants should already formulate, produce, test or support adhesive or sealant products and be able to read a recipe and a test report. Anonymised complaint files, rheology data or lap shear results from their own products make the case work closer to their plant.

## How does adhesives and sealants manufacturing differ from a paint and coatings formulation course?

It deals with products that must hold two parts together or move with a joint, so it covers cure chemistry, paste rheology, moisture exclusion, joint geometry and bond strength testing. Coatings courses deal with pigment dispersion, film appearance and colour on a single surface.

## Why do adhesives and sealants manufacturing plants control moisture so tightly?

Many polyurethane, silicone and MS polymer products cure by reacting with water. Moisture carried in fillers, air or packaging starts that cure inside the vessel or cartridge, which raises viscosity, causes skinning and shortens shelf life before the customer opens the pack.

## What do participants take back from the adhesives and sealants manufacturing course?

Participants take back an Adhesive Product Qualification and Bond Assurance Plan for a case producer, with a chemistry selection map, rheology targets, a mixing and filling checklist, a joint design guide and a lot acceptance matrix with test limits.