CORE CONCEPT

# Polyurethane Foam and Mattress Manufacturing Course: Slabstock, Moulded Foam and Fire Safety

4 – 8 January 2027
Dubai - Five-star CBD venue

# Polyurethane Foam and Mattress Manufacturing Course: Slabstock, Moulded Foam and Fire Safety

**Ref:** 1998_29489 **Date:** 4 – 8 January 2027 **Location:** Dubai - Five-star CBD venue **Fees:** 19500 SAR

## Introduction:

Polyurethane foam and mattress manufacturing, covering slabstock, moulded foam and fire safety, is a 1-week course for foam plant chemists, production crews and quality control staff that ends with a Foam Line Formulation and Fire Safety Plan for a case plant. Plants lose money when buns split, density and hardness drift, fresh blocks scorch in curing storage and operators breathe isocyanate vapour. Nominees already run foaming lines, mix polyol blends or test cushions, and each day uses case study work on recipe sheets, block records and test data. CoreConcept Training Center delivers this polyurethane foam course.

## Course Objectives:

- Balance polyol, TDI or MDI, water, amine and tin catalysts and silicone surfactant at a set isocyanate index to hit a target foam grade
- Operate slabstock foaming machines and moulded foam lines so that rise profile, cell structure and demould times stay within limits
- Control foam density and indentation hardness by adjusting water, auxiliary blowing agent, index and filler levels
- Reduce scorch and self-heating fires through exotherm monitoring, block spacing and curing store rules
- Apply isocyanate exposure controls, air monitoring and protective equipment around pouring, cutting and spray foam work
- Test foam with ASTM D3574, ISO 845, ISO 2439 and ISO 1856 methods and release mattress assemblies against agreed limits

## Target Audience:

- Formulation and process chemists responsible for foam recipes, raw material lots and new grade trials
- Foam line production staff responsible for slabstock machines, moulded seating lines and block cutting
- Quality control laboratory staff responsible for density, hardness, compression set and airflow testing
- Mattress assembly supervisors responsible for core lamination, quilting, ticking closure and final inspection
- Plant safety and maintenance staff responsible for isocyanate handling, curing stores and fire protection
- Insulation foam operators responsible for spray and rigid panel foam application

## Course Outline:

### Day 1: Polyurethane Foam Chemistry and Plant Product Landscape

- Gel and Blow Reactions in Flexible Foam Rise
- TDI Versus MDI Isocyanate Selection by Foam Type
- Polyether Polyol Grades for Conventional and High Resilience Foam
- Open-Cell Flexible Versus Closed-Cell Rigid Foam Structure
- Plant Baseline Review of Off-Grade Buns and Returns

### Day 2: Formulation Design, Isocyanate Index and Foam Grade Targets

- Isocyanate Index Calculation From Recipe Parts per Hundred
- Water and Auxiliary Blowing Agent Effects on Density
- Amine and Tin Catalyst Balance Between Gel and Blow
- Silicone Surfactant Choice for Cell Size and Stability
- Viscoelastic Memory Foam Recipe Adjustments for Slow Recovery

### Day 3: Slabstock Foaming, Moulded Foam Lines and Mattress Assembly

- Slabstock Machine Mixing Head, Trough and Conveyor Settings
- Rise Profile and Block Height Monitoring on Continuous Lines
- Moulded Seating Foam Pour Patterns, Mould Temperature and Demould
- Block Cutting, Peeling and Contour Cutting Yield Control
- Mattress Core Lamination, Quilting and Tape Edge Closure

### Day 4: Foam Defects, Curing Store Fire Risk and Isocyanate Exposure

- Splits, Collapse, Shrinkage and Closed Cell Defect Diagnosis
- Exotherm Scorch and Self-Heating Ignition in Fresh Blocks
- Curing Store Spacing, Temperature Logging and Fire Detection
- GHS Sensitiser Labelling and Isocyanate Air Monitoring Routines
- Spray and Rigid Insulation Foam Application Hazard Controls

### Day 5: Case Study Building the Foam Line Formulation and Fire Safety Plan

- ASTM D3574 Density, Hardness and Resilience Test Matrix
- ISO 1856 Compression Set Results Checked Against Grade Sheets
- Case Plant Recipe Review for Drifting Hardness Lots
- Case Plant Curing Store Fire Risk Assessment Walk Sheet
- Foam Line Formulation and Fire Safety Plan Completion

## Skills You Will Gain:

- Foam Formulation Balancing
- Isocyanate Index Control
- Slabstock Line Operation
- Moulded Foam Processing
- Foam Defect Diagnosis
- Curing Store Fire Prevention
- Isocyanate Exposure Control
- Cushioning Foam Testing

## Why Attend This Course:

- Present a Foam Line Formulation and Fire Safety Plan to the plant manager, the technical lead and the safety officer
- Decide which recipe change corrects a soft, dense or scorched lot and whether that lot is released, regraded or scrapped
- Avoid curing store fires, isocyanate sensitisation cases, collapsed buns and mattress returns that stop lines and lose accounts
- Train line operators, laboratory testers and assembly teams with recipe worksheets, test matrices and storage checklists

## Conclusion:

Back at work, the participant hands the Foam Line Formulation and Fire Safety Plan to the plant manager, the technical lead and the safety officer. They use it to fix index and blowing agent windows per grade, set exotherm and curing store rules, agree release limits for density, hardness and compression set, and tighten isocyanate monitoring. After the first month of production under the plan, the team should compare off-grade buns, scorch incidents, exposure readings and mattress returns with the baseline and revise any limit that failed.

## Frequently Asked Questions FAQ:

### What should participants know before the polyurethane foam and mattress manufacturing course?

Participants should already run foaming lines, prepare polyol blends, test foam or supervise mattress assembly, and be able to read a recipe sheet. Anonymised recipe sheets, block records or test reports from their own plant make the case work closer to daily practice.

## How does polyurethane foam and mattress manufacturing differ from a thermoplastic extrusion course?

Foam is made by a chemical reaction that sets in seconds, so the course covers recipe balance, rise, exotherm and curing. Extrusion courses melt finished plastic pellets and shape them through screws and dies, with no foaming chemistry.

## Why do polyurethane foam and mattress manufacturing plants worry about fresh blocks catching fire?

The foaming reaction releases heat that stays trapped inside large blocks for hours. If the recipe runs hot or blocks are stacked too closely, core temperature can climb until the foam scorches or ignites, so curing stores need spacing, monitoring and detection.

## What do participants take back from the polyurethane foam and mattress manufacturing course?

Participants take back a Foam Line Formulation and Fire Safety Plan for a case foam and mattress plant, with an index and blowing agent worksheet, a defect guide, a curing store checklist, an exposure monitoring routine and a foam test matrix.