



3D Plant Design Course: Piping Routing, Clash Checks and Isometrics



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Introduction:

3D plant design, covering piping routing, clash checks and isometrics, is a 5-day course for piping designers, plant layout engineers and plant design coordinators that ends with a modelled small process unit and its extracted isometric and drawing package. Projects lose weeks when catalogues drift from piping specifications, equipment nozzles move after routing, clashes surface at site and isometrics carry wrong bills of material. Nominees already work in a plant modelling tool and learn through hands-on lab exercises on a tool-neutral workflow with examples from Smart 3D, AVEVA E3D and AutoCAD Plant 3D. CoreConcept Training Center delivers this 3D plant design course.

Course Objectives:

- Set up a plant design project hierarchy, naming rules, access permissions and reference data for a multidiscipline 3D model
- Configure component catalogues and piping specifications so that every routed fitting, branch and bolt set comes from the approved piping class
- Model and place equipment with correct nozzle orientation, then route spec-driven piping, structural steel, pipe supports, cable trays and HVAC ducts around it
- Run clash detection, classify hard and clearance clashes and close them through discipline ownership and 30, 60 and 90 percent model reviews
- Extract isometrics, general arrangement drawings and material take-off reports from the model and check them against the line list
- Prepare model data handover packages with attributes, tags and revision status for construction and operations teams

Target Audience:

- Piping designers who route lines, place components and issue isometrics from a 3D model
 - Plant layout engineers who position equipment, set access corridors and develop equipment arrangement models
 - Plant design coordinators who administer the model, catalogues and specifications and chair model reviews
 - Structural, electrical and HVAC designers who model steelwork, cable trays and ducts in a shared plant model
 - Engineering checkers who verify extracted drawings, bills of material and model progress before issue
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Course Outline:

Day 1: Plant Design Project Workflow and 3D Model Set-Up

- Plant Design Deliverables Map From P&ID to Isometric
- Smart 3D, AVEVA E3D and AutoCAD Plant 3D Workflow Comparison
- Model Hierarchy Set-Up by Site, Area, Unit and System
- Naming Convention, Tag Rules and Model Access Permissions
- Existing Model Health Check Against Line List and Equipment List

Day 2: Catalogues, Piping Specifications and Equipment Modelling

- Component Catalogue Structure for Fittings, Flanges and Valves
- Piping Class Specification Build With Branch Tables and Bolt Sets
- Spec Editor Checks for End Connections and Size Ranges
- Parametric Equipment Modelling From Vendor Datasheets and Nozzle Schedules
- Equipment Placement on Plot Plan Grid With Maintenance Envelopes

Day 3: Spec-Driven Piping Routing, Structures and Multidiscipline Items

- Spec-Driven Pipe Routing Between Nozzles Including Sloped Lines
- Pipe Rack Routing Bands, Elevations and Line Spacing Rules
- Structural Steel Modelling for Platforms, Stairs and Ladders
- Pipe Support Placement Using Standard Support Catalogue Families
- Cable Tray and HVAC Duct Routing Basics in Shared Models

Day 4: Clash Detection, Model Reviews and Drawing Extraction

- Clash Detection Runs for Hard, Clearance and Access Clashes
- Clash Ownership Matrix and Resolution Tracking Between Disciplines
- 30, 60 and 90 Percent Model Review Checklists
- Isometric Extraction Settings for Welds, Spools and Bills of Material
- General Arrangement and Orthographic Drawing Extraction From the Model

Day 5: Lab Capstone on a Small Process Unit Model and Isometric Set

- Process Unit Brief With P&ID, Line List and Equipment Data
 - Pump and Drum Unit Equipment Placement and Spec-Driven Routing
 - Capstone Clash Run and Model Review Comment Close-Out
 - Material Take-Off Report and Model Progress Against the P&ID
 - Isometric Set and Model Data Handover Package Completion
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Skills You Will Gain:

- Plant Model Hierarchy Administration
- Piping Specification Configuration
- Equipment Modelling and Placement
- Spec-Driven Pipe Routing
- Multidiscipline Clash Resolution
- Model Review Facilitation
- Isometric and Drawing Extraction
- Material Take-Off Verification

Why Attend This Course:

- Deliver a modelled process unit with its extracted isometric set and material take-off to the lead piping engineer or design manager
- Decide whether a clash is resolved by rerouting, moving equipment or changing steelwork, and which discipline owns the change
- Avoid site rework, wrong bills of material and late isometric revisions caused by specification drift and unresolved clashes
- Share catalogue checks, review checklists and extraction settings with colleagues who model on the same project

Conclusion:

Back at work, the participant hands the lead piping engineer or design manager a modelled small process unit with its isometric set, general arrangement drawings, material take-off and handover data. The design team can use this package as the reference for model set-up, specification checks and clash ownership on the next project area, and as the basis for the 30, 60 and 90 percent review agenda. After the first model review run this way, the team should review open clash counts, isometric revision rates and take-off discrepancies against the line list.

Frequently Asked Questions FAQ:

What should participants know before the 3D plant design course on piping routing, clash checks and isometrics?

Participants should already read P&IDs, line lists and equipment data and have used a plant modelling or CAD tool at work. Bringing a line list or model extract from a current project helps them apply the lab exercises to their own plant.

How does the 3D plant design course differ from a piping code or pipe stress analysis course?

It teaches building and coordinating the plant model and extracting deliverables from it. Piping code courses cover materials, wall thickness and testing, and stress courses cover flexibility and nozzle loads; both appear here only where they affect routing and supports.

Why does 3D plant design rely on spec-driven piping routing?

Spec-driven routing draws every pipe, fitting, flange, gasket and bolt from the approved piping class, so the model cannot place a component outside its class or size range. Isometrics and material take-off then inherit correct data without line-by-line manual checks.

What do participants take back from the 3D plant design course on piping routing, clash checks and isometrics?

Participants take back a modelled small process unit with its isometric set, general arrangement drawings, material take-off report and model data handover package, together with review checklists and extraction settings they can adapt to their own project.