



Building Plumbing and Drainage Design

Course: Fixture Units, Booster Pumps and Venting



Building Plumbing and Drainage Design Course: Fixture Units, Booster Pumps and Venting

Introduction:

Building plumbing and drainage design is a 5-day course for MEP, public health and plumbing design teams and site supervisors that ends with a Plumbing and Drainage Design Package for a case building. Organisations face low pressure on upper floors, slow hot water, foul odours from siphoned traps, blocked kitchen drains and costly rework when fixture units, booster sets, stacks and vents are sized by habit rather than calculation. Nominees already prepare or check water and drainage drawings and learn through a modelling build of sizing workbooks. CoreConcept Training Center delivers this building plumbing and drainage design course.

Course Objectives:

- Assign water supply and drainage fixture units to a fixture schedule and convert the totals into probable peak flows and daily demand
- Size break tanks, roof tanks, booster pump sets and pressure-reducing valve stations for a multi-storey building split into pressure zones
- Select hot water generation, storage and return loop recirculation arrangements and balance the circuits for prompt delivery at outlets
- Calculate supply pipe sizes, drainage stack and branch sizes, horizontal drain gradients and vent arrangements using plumbing code tables
- Specify roof rainwater outlets, grease interceptors, oil separators and sump ejector pits for the spaces a building contains
- Supervise pressure tests, drainage tests and commissioning records and reject installations with common site defects

Target Audience:

- Public health and plumbing design teams responsible for water supply and drainage calculations on building projects
 - MEP consultant teams responsible for checking contractor shop drawings and plumbing submittals
 - Contractor engineering teams responsible for coordinating risers, plant rooms and pipe routes with other building services
 - Site supervision teams responsible for inspecting plumbing installation, witnessing tests and closing defects
 - Facility engineering teams responsible for alterations, fit-outs and plumbing upgrades in occupied buildings
-

Course Outline:

Day 1: Plumbing Design Basis, Fixture Units and Water Demand

- Plumbing Design Basis Report and Occupancy Data Collection
- Sanitary Fixture Schedule by Occupancy Type and Accessibility
- Water Supply and Drainage Fixture Unit Values per Fixture
- Probable Peak Flow Conversion from Fixture Unit Totals
- Water Efficiency Targets with Low-Flow Fixtures and Submetering

Day 2: Cold and Hot Water Supply System Architecture

- Break Tank and Roof Tank Storage Volume Sizing
- Booster Pump Set Duty Point and Variable-Speed Control
- Pressure Zones and Pressure-Reducing Valve Stations in Towers
- Centralised and Point-of-Use Hot Water Generator Selection
- Hot Water Return Loop Recirculation and Balancing Valves

Day 3: Pipe Sizing, Sanitary Drainage and Venting Calculations

- Velocity and Pressure Loss Method for Supply Pipe Sizing
- Pipe Material Selection Between Copper, PPR, PEX and uPVC
- Drainage Stack and Branch Sizing from Drainage Fixture Units
- Horizontal Drain Gradient, Self-Cleansing Flow and Cleanout Spacing
- Trap Seal Protection with Vent Stacks and Air Admittance Valves

Day 4: Rainwater, Interceptors, Testing and Site Defect Control

- Roof Rainwater Outlet and Downpipe Sizing with Overflow Provision
- Grease Interceptor Sizing and ASME A112.14.3 Performance Testing
- Oil Separator and Sump Ejector Pit Arrangements in Basements
- Supply Pressure Test, Drainage Air Test and Commissioning Records
- Common Site Defects in Falls, Joints, Supports and Venting

Day 5: Modelling Build of the Plumbing and Drainage Design Package

- Case Building Brief with Floor Plans and Fixture Counts
 - Fixture Unit and Storage Calculation Sheet for Case Building
 - Booster Pump and Hot Water Recirculation Sizing Workbook
 - Drainage and Vent Riser Schematic with Stack Loadings
 - Plumbing and Drainage Design Package Completion and Peer Review
-

Skills You Will Gain:

- Fixture Unit Calculation
- Booster Pump Selection
- Pressure Zone Planning
- Hot Water Circuit Balancing
- Drainage Stack Sizing
- Vent System Layout
- Interceptor Specification
- Plumbing Test Witnessing

Why Attend This Course:

- Deliver a Plumbing and Drainage Design Package with sizing calculations for a case building to the lead MEP engineer and the project design manager
- Decide where to split pressure zones, which booster arrangement to use and how to vent each stack, based on calculated loads rather than habit
- Avoid low upper-floor pressure, trap siphonage, kitchen drain blockages and failed pressure tests that cause rework and delayed handover
- Share fixture unit sheets, booster and recirculation workbooks and site defect checklists with design and supervision colleagues

Conclusion:

Back at work, the participant gives the lead MEP engineer and the project design manager a Plumbing and Drainage Design Package containing a fixture schedule, demand and storage calculations, booster and pressure zone selections, hot water recirculation sizing and drainage and vent riser schematics. The design team uses it to issue or check plumbing drawings, approve contractor submittals and plan test witnessing on site. After the first project issue, the unit should review pressure readings, hot water delivery times and test results against the calculated values.

Frequently Asked Questions FAQ:

What should participants know before a building plumbing and drainage design course?

Participants should already read building services drawings and take part in plumbing design, checking or site supervision. Basic hydraulics is helpful. Bringing floor plans or a fixture schedule from a current building lets participants test the sizing workbooks on their own project.

How does building plumbing and drainage design differ from a stormwater drainage or water network course?

It stays inside the building: fixtures, tanks, booster sets, hot water, stacks, vents, roof outlets and interceptors. Stormwater and water network courses size street sewers, ponds, mains and supply zones for whole districts, which this course only touches where the building connects.

Why does building plumbing and drainage design use fixture units instead of adding fixture flows?

Fixtures rarely run at the same moment, so adding full flows oversizes pipes and pumps. Fixture units weight each fixture by flow, duration and frequency of use, and code tables convert the total into a probable peak flow for sizing.

What do participants take back from the building plumbing and drainage design course?

Participants take back a Plumbing and Drainage Design Package for a case building, with fixture unit and storage sheets, booster and hot water recirculation workbooks, a drainage and vent riser schematic and a site defect checklist they can adapt to their own projects.
