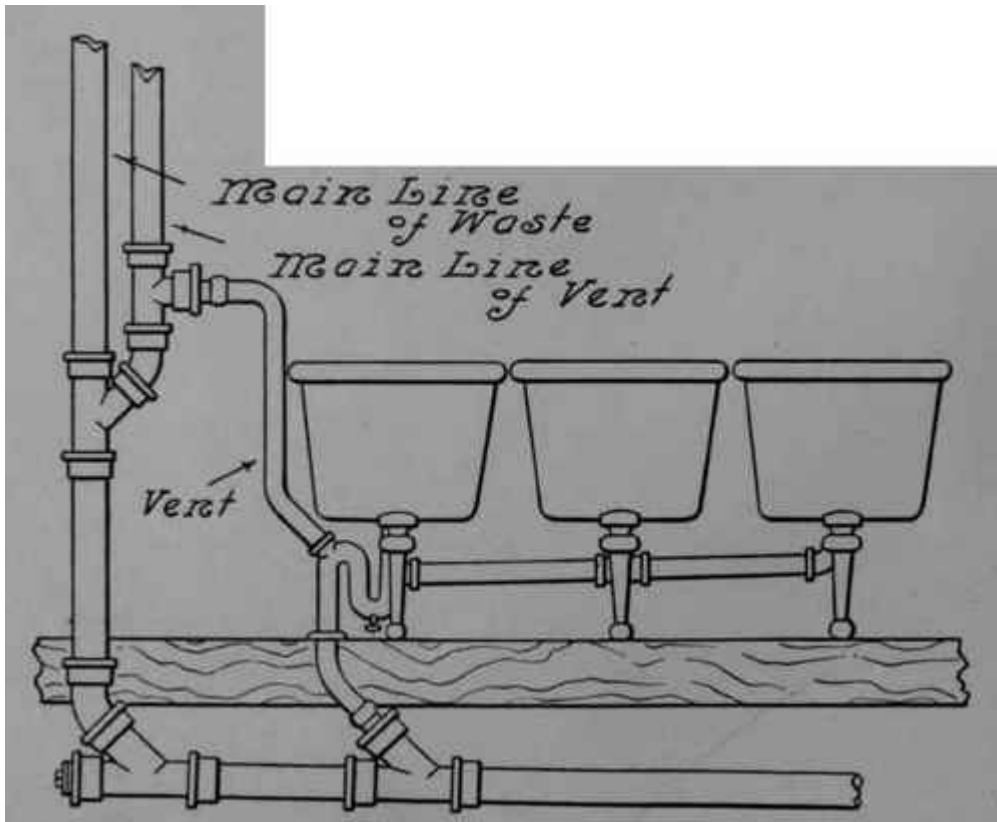
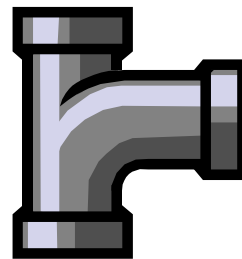
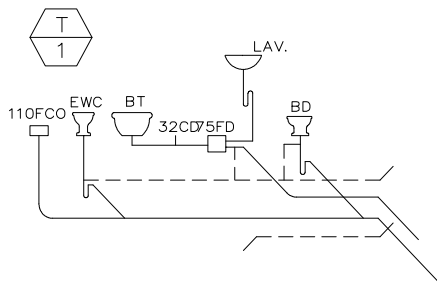
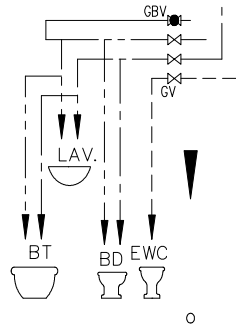


Plumbing Systems Design and Drafting per IPC / Fire Fighting - NFPA



Institute of Piping Engineering & Building Services

OVERVIEW – Plumbing/Fire Fighting Systems Design & Drafting

This is a fast-paced program designed to present all major topics relative to the design/drafting and operation of Plumbing systems / Fire Fighting Systems including Concept Theory, Water Supply & Drainage Systems design, Plumbing Calculations, Fire Water Sprinkler Systems and Detailing of Plumbing Piping Systems & Drafting.

WHAT YOU SHOULD BRING

Course participants should bring an open mind, a thirst for knowledge, a scientific calculator, pen and long book.

Description

This certificate program introduces the full range of Plumbing Systems topics from the definition Plumbing Fixtures, Codes & Standards, Design of Cold, Hot, Drainage, Vent, Gas, & Fire Sprinkler Piping Systems. Each topic is presented so as to demonstrate the "real world" impact of design decisions on resulting system performance.

Numerous examples of actual designs are presented. (See the "Course Outline" section for details of topics.)

What You Will Learn

Learn how Plumbing/Fire Fighting systems "work," how to design, install and maintain Plumbing Systems.

WHO SHOULD ATTEND

- Mechanical/Electrical/Civil Engineers and Students
- Technicians
- Draftsmen

Training Features

- Faculty with a decade of Gulf Experience & MEP certified Engineer from Saudi Aramco KSA.
- Excellent Material Provided (Plumbing/Fire Fighting Manual, Design Charts)
- Hundreds of Students placed in India, & Middle East.

COURSE OUTLINE

This certificate program introduces the participants to the following modules:

- I) Plumbing Systems Fundamentals**
- II) Piping Systems**
- III) Design of Hot Water Systems.**
- IV) Design of Cold Water Systems.**
- V) Design of Drainage System.**
- VI) Plumbing Systems Drafting**
- VII) Fire Protection Systems / Fire Water Sprinkler System**

I) Plumbing System Fundamentals

- Introduction to Plumbing System.
- Plumbing Codes & Standards.
 - UPC, IPC, SPC, BOCA & COBA.
- Plumbing Fixtures
 - Definitions, Symbols & Installation & Fixture Clearances
 - Bathroom & Toilet Fixtures.
 - Water Closets.
 - Lavatory
 - Bath Tub
 - Shower Head
 - Bidet
 - Floor Drain
 - Urinals
 - Flush Tank
 - Flush Valves
 - Kitchen Fixtures
 - Kitchen Sink
 - Dish Washer
 - Waste Food Grinder
 - General Fixtures
 - Drinking Fountain
 - Laundry Trays
 - Hose Bib (Water Tap)

II) Piping Systems

- Definition & Application of Pipe
- Pipe Designators – NPS , IPS , NB, Pipe Wall Thickness & Schedule, Pipe Weights, Lengths, Grades, Ends, Joining Methods, Methods of Manufacture, Pipe Ratings, Pipe Symbols, Codes & Standards

Pipe Fittings

- Types of Fittings – Butt Weld, Screwed & Socket Weld.
- Elbow – 90 degree (LR & SR), 45 degree, Reducing Ell. ,
- Pipe Bends – Miter Bends, 180 degree Return.
- Branch Connections – Weld Straight & Reducing Tee, Cross & Lateral.
- Fabricated Branch Connections – Stub In & Stub On, Welding Minimums for Stub In's
- Reducers – Concentric & Eccentric, Reducer Offsets.
- Types of Couplings, Weld Cap.
- Fitting Makeup – Dimensioning, Minimum Pipe Length Requirements,
- Placement of Dimensions.
- Screwed & Socket Weld Fittings – Union, Plug, Coupling, Types of Swages.
- Dimensioning Exercises
- Flanges & Gaskets

• Valves

- Definition, Valve Functions, Locations & End Connections.
- Valve Types – Gate, Globe, Ball, Check, Butterfly, Angle, PRV/PSV, & Plug etc.
- Control Valve Manifold. – Layout Representation & Requirements.
- Valve Operators.
- Valve Layout Considerations.
- Valve Selection
- Dimensioning Exercises.

• Piping / Plumbing Isometrics

- Definition
- Drawing Piping Isometrics
- Isometric Dimensions, Notes & Callouts.
- Isometric Offsets.
- Print Reading Exercises.
- Exercises on Creation of Isometrics from Piping Plans and Sections.

• Piping Supports types, Selection & spans

III) Design of Cold & Potable Water Systems

- Estimation of minimum number of Plumbing Fixtures for facilities (Residential, Hotels, Hospitals, Schools, Offices etc)
- Sizing & selection of Water Meters.(Displacement & Disk Type)
- Sizing & selection of Water Storage Tanks.
- Fixture Units (Water supply & Drainage Fixture units)
- Piping materials for Water distribution.(CIWP, Galvanized Wrought, Steel, Copper, Plastic etc)
- Sizing Plumbing Water Systems
 - Common Water supply systems
 - Up Feed Water supply systems
 - Down Feed Water supply systems
 - Steps for sizing water supply systems
 - Estimating Loading Units or Fixture Unit Count.
 - Supply Schemes & Schematics.
 - Estimation of Water Demand (Hot & Cold Water) using R.B Hunter Curves For Residential & Non- Residential applications.
 - Estimating Min Flow pressures & Flow rates for all plumbing fixtures.
 - Plumbing water pipe sizing method
 - Pressure Drop Limitation Method
 - Velocity Limitation Method
 - Pressure Drop & Velocity Limitation Method.
 - Sizing Plumbing Risers & Branches.
 - Min Pipe sizes for Fixture Supply pipes.
 - Determination of Basic Design Circuit (B.D.C)
 - Design of Multi-zone water supply systems for Tower buildings.
 - Sizing Water Supply Systems for High Rise Buildings
- **Portable Pump Sizing**
 - Pump types.
 - Booster Pump System.
 - Pressure drop calculations using Hazen-Williams, Darcy-Weisbach Equation
 - Pump Total Dynamic Head calculations.
 - Pump NPSHa (Net Positive Suction Head)
 - Pump Performance Curves.

IV) Design of Hot Water Plumbing System.

- Estimating Hot Water Demand.
- Hot Water Heater & Storage Tank Sizing.
- Types of Hot Water Recirculation System.
 - Up feed System
 - Down feed System.
 - Combination Up feed & Down feed System.
 - Inverted Up feed System
 - Inverted Down feed System
 - Combination Inverted Up feed & Inverted Down feed Systems.
 - Hot Water Supply for Large Buildings.

V) Design & Layout of Drainage System.

- Parts of Drainage System.
 - Traps
 - Vents
 - Drainage Pipes
 - Soil Pipe
 - Waste Pipe
 - Building Drain
 - Building Sewer
- Materials for Soil, Waste & Vent Pipes.
- Preparation of Drainage Layout & Riser Diagram
- Types of Vent Pipes.
 - Wet Vent
 - Circuit Vent
 - Loop Vent
 - Continuous Vent
 - Common Vent
 - Waste Stack Vent
- Drainage Fittings
 - Soil pipe Fittings (1/16, 1/8, 1/6, 1/4 Bends, Tee, Double Y, Double Tee Y etc.
 - Cleanouts
 - Traps & Sizing
 - Floor Drains, Interceptors.

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- Estimation of Drainage Fixture Units
- Sizing Drainage (Sanitary, Waste & Vent) Risers & Branches.
- Sizing Building Drains & Sewer's
- Design Storm Drainage Systems (Design of Roof & Yard Rain water drainage system)
 - Drainage area calculations
 - Sizing Vertical leaders & Horizontal Storm drains.
 - Sizing Gutters.
- Sizing Building Sewage Pumps & types.
- Suds Pressure Relief zone.

VI) Drafting of Plumbing Systems.

- Introduction to Drafting.
- Types of Drawings made in the industry.
- Study & Preparation of
 - Floor Drawings
 - Roof Drawings/Mechanical room Drawings
 - Pump Room Drawings
 - Sectional Drawings
 - Builders Work Drawings
 - Co-ordination Drawings
 - Riser Diagram.(Fire Water, Drainage & Water supply)
- Abbreviations & Symbols used.

Fire Fighting / Fire Sprinkler System Design & Drafting

VI) Fire Protection Systems.

- Introduction to Fire Protection System.
- Definition of Classes of Fire

VII) Codes & Standards of Fire Protection NFPA Codes

- NFPA 13- Standard for installation of Sprinkler System.
- NFPA 14- Standards for installation of Stand pipes, Private, Hydrant & Hose system.
- NFPA 20- Standard for installation of Fire Pumps.

VIII) Water based Fire Protection system. - Building occupancy Classification.

- Light Hazard
- Ordinary Hazard (Group I & II)
- Extra Hazard (Group I & II)
- Special occupancy Hazard
- Fire Water Demand

VIII) Fire Sprinkler System.

- Sprinkler density/ Area requirements.
- NFPA Standards for Fire Sprinkler & Stand pipe system.
- Sprinkler system types.
 - Wet pipe system
 - Dry pipe system
 - Preaction system
 - Deluge system.
 - Combined Dry pipe & Preaction System.
- Sprinkler system components.
- Stand pipe description & Classes (Riser sizes, Max Pressure).
- Sprinkler Head K-factor, Temperature Rating, Configurations & Types.
- Number of sprinkler allowed as per Pipe Size.
- Fire sprinkler pipe hanger sizes.
- Automatic Sprinkler

IX) System Design.

- Establishing Pipe sizes.
- Sprinkler Positioning.
- Sprinkler system layout.
- Drainage of Sprinkler System.
- Determining building Fire flow demand.
- Required fire flow duration of Supply.
- Design of fire Hydrant system.
- Working pressure of fire protection system.
- Materials & Wall thicknesses.
- Pipe joints.
- Piping layout & Design
- Maximum protection area per standard sprinkler.
- Arrangement of Dry & Wet riser.
- Water supply connection to Wet pipe sprinkler system
- Preparation of Sprinkler layout / Sprinkler Riser Drawings.

The training programs can also be arranged on-site, customized for your organization. For more details, please call us at 040 -30623249, 0091-9885946711, E-mail: info@ipebs.in

For Information on Other Training Programs/Courses, please call us at 040-30623249 or visit our website: **www.ipebs.in**