



Energizing Engineering - Empowering Engineers



ISO 9001 : 2008

# Institute of Piping Engineering & Building Services

P. G. DIPLOMA CERTIFICATE - ONLINE TRAINING COURSE



## FIRE PROTECTION SYSTEMS DESIGN ENGINEERING - NFPA

**Course Co-Ordinator:**

Mr. Mohammed Kaleemullah  
MEP Head  
International Course Speaker

**IPEBS**

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## **ABOUT IPEBS**

**IPEBS** was established with a vision to offer proactive training & consulting services for design, construction, Inspection, Operation & Maintenance of Process Plants & Building Services including

- a) Process Plant Engineering: Plant 3d-Modelling, Process Equipment, Piping Engineering, Pipeline Engineering, Valves, Rotating Equipment's, Piping QA/QC & Inspection.
- b) Electro-Mechanical Building Services (MEP 3d Modeling, HVAC, Plumbing, Fire Protection & Electrical Systems)

## **IPEBS - CONSULTING**

**IPEBS** team comprises of engineers and designers having extensive real time experience in the design, construction, inspection, Operation & Maintenance of Process Plant Engineering and Building Services.

## **IPEBS - TRAINING**

Thousands of Engineers, Designers, Draftsman and Technicians have attended **IPEBS** training programs. On a national basis, **IPEBS** is now unquestionably the number one professional Plant Engineering, Piping Engineering & MEP course provider.

## **ABOUT TRAINING PROGRAM**

This course aims to provide, in a structured manner, an organized and comprehensive framework for fire safety and building fire protection design. The course particularly aims to help those who have recently been given responsibility in fire safety and those who seek structured and comprehensive guidance on the fundamentals of fire safety design methods and approved practices. On completion of the course the participants should be in a position to make a significant contribution in the design of appropriate fire safety systems for a fairly complex building.

## **PROGRAM FEATURES**

- ✓ In-depth course content for easy understanding.
- ✓ Blended Learning: Online contact with faculty.
- ✓ Accessibility to Course Faculty & Counseling Services.
- ✓ Job oriented training program.
- ✓ Student will be job ready, after the course.
- ✓ Student will acquire skills and knowledge similar to working professional.

## **WHO SHOULD ATTEND**

- **Graduating College Students in the following disciplines**

- ✓ Mechanical Engineers
- ✓ Electrical Engineers
- ✓ Civil Engineers
- ✓ Diploma / ITI

- **Working Professionals**

- ✓ Fire Fighting Engineers
- ✓ Plumbing Systems Design Engineers
- ✓ Fire Protection Engineers
- ✓ MEP Engineers
- ✓ MEP Co-Ordinator
- ✓ Design & Project Engineers
- ✓ HVAC Engineers
- ✓ HVAC Site Engineers
- ✓ HVAC QA / QC Engineers
- ✓ HVAC Draftsman
- ✓ MEP Draftsman
- ✓ Plumbing Technicians

- **Corporate / Organizations**

- ✓ Fire Protection Consulting Companies
- ✓ Fire Fighting Designing Consultancies
- ✓ Fire Fighting Contracting Companies
- ✓ MEP Consultants
- ✓ MEP Contracting Companies
- ✓ HVAC Consulting Companies
- ✓ HVAC Contracting Companies

## **COURSE MODULES:**

### **I) Fire Protection Systems**

- ✓ **Fire Safety Systems**
- ✓ **Fire Detection & Alarm Systems**
- ✓ **Fire Suppression Systems**
- ✓ **Foam-Based Fire Systems – Hi, Med, Low Expansion.**
- ✓ **Chemical Based Fire Systems- Dry Powder, Wet Chemical.**
- ✓ **Gaseous Based Fire Systems- CO<sub>2</sub>, FM-200, NAFS-III.**
- ✓ **Passive Fire Protection**

### **II) Water- Based Fire Fighting Systems**

- ✓ **Introduction**
- ✓ **Fire Dynamics**
- ✓ **Fire Sprinkler Systems - NFPA 13**
- ✓ **Design & Layout**
- ✓ **Fire Sprinkler Hydraulics-NFPA 20**
- ✓ **Standpipe Systems-NFPA 14**
- ✓ **Private Hydrant and Hose Systems-NFPA 14**

## **Detailed Course Content:**

### **I) Fire Protection Systems**

#### **Fire Safety Systems**

- Introduction
- Requirement
- Absolute Safety
- Protection Against Hazards
- Reasons for Fire
- Building Services Modernization
- Classification of Fire Safety Systems
- Passive Fire Safety
- Active Fire Safety
- Fire Detection & Alarm System
- Fire Suppression System
- Codes & Standards
- Organizations
- Design and steps for protection
- Fire Dynamics
- Fire Tetrahedron
- Fire Extinguishing Methods
- Fire Extinguishing Agents
- Fire Classes
- Comparison of Classes
- Fire Class & Extinguishing Agent

#### **Fire Detection & Alarm Systems**

##### **A. Introduction**

- Role
- System
- Architecture
- Interfacing

- System & Products (Codes & Standards)
- System Components

##### **B. Alarm Devices**

- Purpose
- Types

##### **I. Manual Detection**

- Break Glass
- Types
- Location
- Mounting Height
- Distance

##### **II. Automatic Detection**

- Fire Signatures
- Fire Development
- Smoke Detectors
- Ionization
- Photoelectric
- Heat Detectors
- Fixed
- RoR (Rate of Rise)
- Flame Detectors
- Fire-Gas Detectors

##### **III. Special Applications**

- Air Sampling Detector
- Duct Detector
- Beam Detector
- Aspirating systems

### **C. System Design**

- Search distance
- Mounting Height
- Obstruction
- Placement
- Coverage Areas
- Spacing
- Corridors
- Distance from Obstructions
- Flat/Apex ceilings
- Beams/Partitions
- Voids
- Lift Shafts/Stairs
- Zoning

### **D. Wiring**

- Wires
- Clamping
- Detector Base
- Wiring Classes
- Class a/Class b
- Tapping
- Wireless Systems

### **E. Fire Alarm Control Panel**

- Functions
- Types - Conventional/Addressable
- Conventional
- Functioning
- Control Panel
- Schematic
- Application Example
- Addressable
- Functioning
- Control Panel

- Schematic
- Application Example
- Repeater Panel
- Isolator Module
- Monitor Module
- Control Module
- Lift Interface
- Door Control
- Fire Phone Auto Dialer
- Gate Barriers

### **F. Networking**

- Master/Slave
- Application Example
- Networking Cable

## **Fire Suppression Systems**

### **A. Portable Fire Extinguishers**

- Standard
- Purpose
- Location
- Mounting Height
- Search Distance
- Number
- Ratings
- Method of Operation

### **B. Foam-Based Fire Suppression**

- Introduction
- Standard
- Working Components
- Types
- Chemical Foam
- Protein based Mechanical Foam

- Low expansion
- Medium expansion
- High expansion
- Special foam
- Synthetic Detergent foam
- Limitations

### **C. Gaseous-Based Fire Suppression**

- Introduction
- Types

#### **I. Carbon Dioxide Systems**

- Standard
- Properties
- Drawbacks
- Extinguishing Mechanism
- Method of Application
- Total Flooding System
- Local Application System
- Typical Applications
- System Configuration
- Storage
- Method of Actuation
- Automatic
- Manual
- Discharge Requirement
- Total Flooding Agent Quantity
- Detection & Control Operation

#### **II. Halon Systems**

- Types
- Standards
- Characteristics

- Drawbacks
- Physical Properties
- Extinguishing Mechanism
- Typical Applications
- System Configuration
- Method of Actuation
- Discharge Requirement

### **III. Clean Agent Systems**

- Standards
- Definition
- Types
- Chemical
- Inerting
- Properties
- Selection Criteria
- Uses
- Typical Applications
- Limitations
- System Configuration
- Method of Actuation
- Discharge Requirement
- Design Concentration
- Discharge Requirement
- Total Flooding Agent Quantity
- Key steps in Designing
- Hazards
- General precautions

### **D. Chemical-Based Fire Suppression**

- Introduction
- Standards
- Types

## **I. Dry Chemical System**

- Types
- Comparison
- Characteristics
- Drawbacks
- Physical Properties
- Extinguishing Mechanism
- Typical Applications
- System Configuration
- Method of Actuation
- Method of Actuation

## **II. Wet Chemical System**

- Introduction
- Types
- Extinguishing Mechanism
- System Configuration
- Method of Actuation
- Kitchen Equipment Fire Suppression

## **E. Water-Based Fire Suppression**

- Introduction
- Fire Extinguishing Properties
- Disadvantages
- Building Occupancy Classification
- NFPA Standards Related to Fire

## **I. Sprinkler system**

- Fire Sprinkler Systems
- Sprinkler Head Construction
- Sprinkler Temperature Ratings
- Sprinkler Head Configurations
- Sprinkler Head Types
- Types

- Components
- Sprinkler System Description
- Riser, Feed Main, Cross Main, Branch Line
- Typical Piping Layouts – Grid, Loop, Tree
- Hazard Classification- Light, Ordinary, Extra, Special
- Floor Area Limitation
- Protection Area of Sprinkler
- Spacing
- Location
- Sprinkler Pipe Sizing – Pipe Schedule Method
- Sprinkler Piping pressure
- Piping Material, Piping Joints, Pipe Fitting Material
- Pipe Wall thickness
- Sprinkler Head K-Factor
- Basic Design Circuit, Remote Sprinkler
- Sprinkler Density Requirement
- Hydraulic Analysis
- Design Density
- Area/Density Curves
- Flow Adjustments
- Riser Detail
- Hazen-Williams Formula for Friction Loss
- Sprinkler System Water Supplies

## **II. Stand Pipe & Private Hydrant systems**

- Introduction
- Description
- Hose Connection
- Hose Valve
- Hose Nozzle
- Hose Storage Devices
- Hose Station
- Combined Standpipe and Sprinkler System
- Standpipe Classes – Class I, Class II, Class III

- Fire Department Connection
- Standpipe Classification – Automatic, Semi-Automatic, Manual
- Standpipe Types – Dry, Wet
- Requirements
- Pressure Types
- System Zoning
- System Demand
- System Design – Location, Number, Interconnection, Minimum Size
- Pressure Limitation, Supply and Flow Rates
- Fire Tank Sizing
- Hydraulic Calculation Procedure
- Drains and Test Riser
- Introduction to Private Hydrant Systems
- Fire Hydrant
- Wall Hydrant
- Wet Barrel Hydrant
- Frost-proof Hydrant
- Monitor Nozzle Hydrant
- Hose House
- System Design - Hydrant Number, Size, Arrangement, Location, Flow Indicators, Body Color.

#### **Module - 4) Passive Fire Protection**

- Types of Construction
- Separation between Buildings
- Building Height Limitations
- Compartmentalization
- Endothermic
- Intumescent
- Fire-Proofing
- Fire-Stop

- Fire Door
- Fire-Stop Pillow
- Fire-Resistance Rating
- Flame Spread Rating
- Smoke-Developed Rating
- Interior Finish
- Combustible/Non-Combustible Materials
- Emergency Action Plan
- Egress and Safety to Life

#### **II) Water Based Fire Fighting Systems**

##### **Introduction**

- Requirement, Absolute Safety
- Classification of Fire Safety Systems
- Passive Fire Safety, Active Fire Safety
- Fire Detection & Alarm System
- Fire Suppression System
- Foam, Chemical, Gaseous Systems
- Water-Based Systems
- Codes & Standards, Organizations
- Design and steps for protection

##### **Fire Dynamics**

- Fire Dynamics, Fire Tetrahedron
- Fire Extinguishing Methods, Fire Extinguishing Agents
- Fire Classes, Comparison of Classes
- Fire Class & Extinguishing Agent
- Types of Extinguishing Agents



### **Fire Sprinkler Systems - NFPA 13**

- Introduction
- Water Based Fire Suppression Systems
- Fire Extinguishing Properties, Disadvantages
- Building Occupancy Classification
- NFPA Standards Related to Fire
- Sprinkler Head Construction, Temperature Ratings, Configurations, Types
- Sprinkler System Description, Types, Components

### **Design & Layout**

- Description, Riser, Feed Main, Cross Main, Branch Line
- Typical Piping Layouts – Grid, Loop, Tree
- Hazard Classification- Light, Ordinary, Extra, Special
- Floor Area Limitation
- Protection Area of Sprinkler
- Spacing, Location
- Sprinkler Pipe Sizing – Pipe Schedule Method

### **Fire Sprinkler Hydraulics-NFPA 20**

- Sprinkler Piping pressure, Material, Piping Joints, Wall thickness
- Sprinkler Head K-Factor
- Basic Design Circuit
- Sprinkler Density Requirement
- Hydraulic Analysis, Design Density
- Area/Density Curves, Flow Adjustments
- Riser Detail
- Hazen-Williams Formula for Friction Loss
- Sprinkler System Water Supplies

### **Standpipe Systems-NFPA 14**

- Introduction- Hose Connection, Valve, Nozzle
- Hose Storage Devices, Hose Station
- Combined Standpipe and Sprinkler System
- Standpipe Classes – Class I, Class II, Class III
- Fire Department Connection
- Standpipe Classification – Automatic, Semi-Automatic, Manual
- Standpipe Types – Dry, Wet
- Requirements, System Zoning, System Demand
- System Design – Location, Number, Interconnection, Minimum Size
- Pressure Limitation, Supply and Flow Rates
- Fire Tank Sizing
- Hydraulic Calculation Procedure
- Drains and Test Riser

### **Private Hydrant and Hose Systems-NFPA 14**

- Introduction
- Types – Wall, Wet Barrel, Frost-proof, Monitor Nozzle Hydrant
- System Design - Number, Size, Arrangement, Location
- Flow Indicators, Body Color

**IPEBS Corporate Training Clients:**

<b>Company Name</b>	<b>Location</b>	<b>Company Name</b>	<b>Location</b>
Intergraph Consultants	India	SPPC	Sudan
Port of Sohar	Oman	CFPE Technology Solutions	Malaysia
Uhambiso Consultant	South Africa	Qatar Petroleum Technical Center	Qatar
Newtech Consulting Group	Sudan	Petro Vietnam Marine Shipyard	Vietnam
Yashada Consultant	India	Locus Technologies	India
Telstar Life Science Pvt Ltd	India	RasGas	Qatar
BHEL	India	ICB Technimont	India & Italy
IDC Training House SDN BHD	Malaysia	LG-Digitech	Sudan
Sakhlain Energy	Russia	Infotech Enterprises	India
Aveon Offshore	Nigeria	Petroleum Operating Company	Sudan
BPCL	Bhutan	Dr. Reddy's Labs	India
Saitech Engineers	India	Vasavi Power Services	India
Riyan Architects	Maldives	Siddhi Consulting	India
Oryx GTL	Qatar	Qatar Petroleum	Qatar
WNPOC	Sudan	Centroid Technical Services	Sudan
GNPOC	Sudan	MG – Vowgas Group	Nigeria
Fleming gulf	UAE	DAL Group	Sudan

### Course Fee Details

Course Title	Fee for Indian Participants	Fee for International Participants
<b>Fire Protection Systems Design Engineering - NFPA – Online Training Course</b>	<b>INR 15,000/-</b> <b>(Spl Offer: INR 13,500/-)</b>	<b>USD 400/-</b> <b>(Spl Offer: USD 350/-)</b>

For making e – payment for the course fee please find **IPEBS** Bank account details below.

Account Name	<b>IPEBS</b>
Account Number	<b>03182020005287</b>
Bank Name	<b>HDFC</b>
Branch	<b>ABIDS</b>
RTGS / NEFT / IFSC Code	<b>HDFC0004125</b>
SWIFT Code	<b>HDFCINBB</b>

### Terms & conditions:

**CANCELLATIONS: IPEBS** does not provide refunds for cancellations done after registration & fee payment. However, credit maybe granted to a later program. This credit will be available for up to one year from the date of issuance.

**COURSE MATERIAL AGREEMENT:** It is the intention of **IPEBS** that the course text and materials supplied to participants at **IPEBS** courses are prepared and issued for the participants' sole use. Codes and standards constantly change and interpretations are issued by the publishing societies. Information contained in **IPEBS** course materials is based on the best available data obtained by **IPEBS** at the time of publication. **IPEBS** is in no way responsible for subsequent use regardless of intention.

**PROGRAM CHANGE POLICY:** Please note that instructors and topics were confirmed at the time of publishing this document; however, circumstances beyond the control of the training organizers may necessitate substitutions, alterations or cancellations

of the instructors and/or topics. As such, **IPEBS** reserves the right to alter or modify the instructors and/or topics if necessary. Any substitutions or alterations will be updated on our web site.

**COURSE CANCELLATION BY IPEBS:** **IPEBS** reserves the right to cancel any course due to circumstances beyond our control. All tuition fees will be refunded in the event of cancellation. **IPEBS** liability is limited to only those tuition fees paid in advance.

**FORCE MAJEURE:** Except for the obligations to make money payments as outlined hereunder, neither party shall be responsible to the other for delay or failure to perform any of the terms and conditions, or other activities, of this agreement if such delay or failure is caused by strike, war, act of God, or force majeure.

## **Frequently Asked Questions – FAQ's**

### **Duration of the course?**

**Ans:** Course duration is 30 Days.

### **Daily Class Duration?**

**Ans:** Daily class will be for up to 02 Hours.

### **Requirement for the course?**

**Ans:** Computer / laptop with good internet connection, camera and Mic.

### **Support from IPEBS?**

**Ans:** Faculty assigned to all registered participant of the course. Faculty not only helps to clear the participant's queries while doing the course but also monitors the progress of the participant to help in successful completion of the course.

### **Mode of Payment?**

**Ans:** You can make the payment through electronic transfer or at IPEBS office.

### **Issue of Certificate?**

E - Certificate will be issued by **IPEBS** only on successful completion of the course & will be sent via email to the participant.

## **Training Methodology?**

**Ans:** Online Streaming of lectures, contact with faculty by email or chat groups.

## **Training Material?**

**Ans:** Printed Material – Course / Class handouts will be provided in printed format and shipped (within India) to the participants.

Soft Copy Material - Data tables, charts, nomographs, drawings, concept theory, design calculations and practice exercise's will be provided in soft copy.

Demonstration software's and excel spread sheets will be provided.

**\*\*** International Shipping charges of printed material - course / class handouts to be borne by participants.