JUPITER PRIME

Consulting • Training • Advisory

جوبيتر برايم للاستشارات والتدريب

COURSE BROCHURE

# Advanced HVAC Design for Oil and Gas Facilities Training Course

17 – 28 October 2027
Manama

# Advanced HVAC Design for Oil and Gas Facilities Training Course

**Ref:** 1241_46692 **Date:** 17 – 28 October 2027 **Location:** Manama **Fees:** 8000 GBP

HVAC Design for Oil and Gas Facilities is a 2-week advanced training course for mechanical and building services engineers that ends with an HVAC Design Basis Report for one plant building, control room or substation. Process sites need air systems that keep people, electronics and hazardous areas safe in extreme heat, dust and gas exposure, while energy budgets keep tightening. Jupiter Prime Training approaches HVAC design for oil and gas facilities as safety-critical engineering, not comfort cooling alone.

## Why HVAC Design for Oil and Gas Facilities Matters Now

Three forces shape plant HVAC today: hotter ambient design conditions that strain cooling capacity, denser control and electrical equipment that rejects more heat into smaller rooms, and corporate targets that put HVAC energy under the same scrutiny as process energy. A facility whose control rooms stay pressurised, cool and gas-free keeps operators safe and avoids unplanned shutdowns. One that undersizes chillers or misjudges pressurisation can lose critical instruments during a release or a summer peak. The course rests on psychrometric analysis, heat balance methods, hazardous area classification principles and recognised duct and pipe sizing practice.

## Who Gains Most from HVAC Design for Oil and Gas Facilities

- Engineers who calculate cooling and heating loads for plant buildings
- Designers responsible for duct, fan and air distribution layouts
- Specialists who specify chillers, pumps and chilled water networks
- Engineers accountable for control room and substation pressurisation
- Maintenance and controls leads who tune and operate HVAC systems on site

Facilities engineering groups that send design and operations engineers together gain most, because systems are then designed with the maintenance realities of remote sites in mind.

## HVAC Design for Oil and Gas Facilities Capabilities

Participants turn room heat gains, outdoor design data and safety requirements into air and water systems sized for the hottest day and the worst release.

- Calculate sensible and latent cooling loads for plant rooms — equipment sizing decisions
- Apply psychrometric charts to coil, mixing and dehumidification processes — air handling unit specifications
- Design pressurisation and gas detection interlocks for control rooms — hazardous area safety reviews
- Size ducts, fans and terminals with balanced pressure drops — layout and space planning
-

Specify chilled water plant configuration and redundancy — reliability and capital budgets
- Assess energy recovery and control strategies for running cost — energy reduction targets

## Key HVAC Design for Oil and Gas Facilities Terms

- Psychrometrics — The study of moist air properties used to design cooling, heating and humidity control processes.
- Sensible heat ratio — The share of total cooling load that changes air temperature rather than moisture content.
- Room pressurisation — Keeping a room at higher pressure than outside so flammable or toxic gas cannot enter.
- Chilled water plant — Chillers, pumps, cooling towers or air-cooled condensers and pipework that produce and distribute cooled water.
- Energy recovery ventilation — Exchanging heat between exhaust and fresh air streams to cut the load of outdoor air.
- N+1 redundancy — Installing one more unit than needed so the system meets full load with any one unit out of service.

## HVAC Design for Oil and Gas Facilities Day by Day

### Day 1: HVAC in Process Plants

- Plant Building Types and HVAC Duties — System Scope Definition
- Hazardous Area Classification Basics — HVAC Equipment Location
- Outdoor Design Conditions for Hot, Dusty Sites — Capacity Margins
- Indoor Requirements for People and Electronics — Temperature and Humidity Limits
- HVAC Design Basis Contents — Data Collection Plan

### Day 2: Psychrometrics

- Moist Air Properties and the Psychrometric Chart — Process Plotting
- Cooling and Dehumidification Coil Processes — Coil Selection
- Mixing, Reheat and Bypass Processes — Supply Air Conditions
- Sensible Heat Ratio and Apparatus Dew Point — Unit Matching
- Evaporative Cooling Limits in Humid Coastal Sites — Technology Choice

### Day 3: Cooling and Heating Loads

- Solar and Conduction Gains Through Envelopes — Insulation Specifications
- Equipment Heat Dissipation in Switchrooms — Electrical Room Loads
- Occupancy, Lighting and Infiltration Loads — Load Summaries
- Fresh Air Load for Pressurised Rooms — Outdoor Air Quantities
- Load Calculation Software Checks — Result Verification

## Day 4: Air Distribution and Duct Design

- Equal Friction and Static Regain Methods — Duct Sizing
- Fan Selection and System Curves — Operating Point Stability
- Diffuser and Grille Selection — Air Throw and Noise
- Sand Trap Louvres and Filtration Stages — Dust Protection
- Duct Leakage and Balancing — Commissioning Readiness

## Day 5: Pressurisation and Hazardous Areas

- Control Room Pressurisation Design — Leakage Paths and Airlocks
- Gas Detection at Air Intakes — Damper Shutdown Interlocks
- Blast-Resistant Building HVAC Penetrations — Damper and Seal Choice
- Battery Room and Laboratory Exhaust — Hydrogen and Fume Removal
- Smoke Control and Fire Damper Logic — Fire Strategy Integration

## Day 6: Chilled Water Plant

- Air-Cooled Versus Water-Cooled Chillers — Site Water Constraints
- Primary-Secondary and Variable Primary Pumping — Pumping Energy
- Chilled Water Pipe Sizing and Insulation — Heat Gain Control
- Redundancy and N+1 Arrangements — Availability Targets
- Thermal Storage Options — Peak Demand Shaving

## Day 7: Packaged and Split Systems

- Packaged Units for Remote Buildings — Maintenance Access
- Precision Cooling for Instrument Rooms — Close Control Requirements
- Refrigerant Selection and Phase-Down Pressures — Equipment Life
- Corrosion Protection for Coastal and Sour Environments — Coil Coatings
- High-Ambient Rated Equipment — Derating Checks

## Day 8: Energy Efficiency and Recovery

- Heat Recovery Wheels and Plate Exchangers — Fresh Air Load Reduction
- Variable Speed Drives on Fans and Pumps — Part-Load Savings
- Free Cooling and Economiser Opportunities — Climate Suitability
- Energy Modelling of HVAC Options — Life Cycle Cost Comparison
- Building Envelope Upgrades — Load Avoidance

## Day 9: Controls and Operation

- Building Management System Architecture — Monitoring Points
- Control Loops for Temperature and Pressure — Tuning Practice
- Integration with Plant Fire and Gas Systems — Shutdown Sequences
- Testing, Adjusting and Balancing — Handover Records
- Preventive Maintenance Plans for Remote Sites — Spares Strategy

## Day 10: Practising the HVAC Design Basis Report

- Load Calculation for a Case Control Room — Applying Heat Gain Methods
- Air Handling and Duct Layout — Applying Psychrometric and Sizing Tools
- Pressurisation and Gas Interlock Scheme — Applying Hazardous Area Rules
- Chilled Water and Energy Recovery Options — Applying Life Cycle Comparison
- HVAC Design Basis Report — Recommended Scheme for Design Review

## Applying HVAC Design for Oil and Gas Facilities After the Course

- Recheck the cooling load and pressurisation airflow of one existing control room against current equipment heat loads and leakage tests.
- Compare two energy recovery or variable speed options for a plant building using a simple life cycle cost model and present the result to the facilities lead.

## HVAC Design for Oil and Gas Facilities Questions FAQ

### What is HVAC design for oil and gas facilities, and why does it matter now?

It is the design of heating, ventilation and air conditioning for plant buildings, control rooms and hazardous areas. It matters now because hotter climates, denser electronics and energy targets make undersized or unsafe systems a direct risk to operations.

### Which roles gain most from HVAC design for oil and gas facilities skills?

Mechanical and building services engineers gain most. Controls and maintenance leads also benefit, because pressurisation, gas interlocks and chilled water redundancy must work as designed for many years on remote sites.

### How does an HVAC design for oil and gas facilities course differ from a commercial building HVAC course?

It adds the safety and site conditions of process plants. You design for pressurisation, gas detection, blast-resistant buildings and extreme ambient conditions, while a commercial course centres on comfort cooling in offices and public buildings.

### What do you bring back from HVAC design for oil and gas facilities training?

You bring back a design basis report for a case building. It sets loads, air handling, ducts, pressurisation, chilled water and energy options in one recommended scheme ready for review.

## HVAC Design for Oil and Gas Facilities: The Way Forward

The HVAC Design Basis Report gives facility engineers one reference for loads, pressurisation, plant and controls. Its first use is often the equipment selection or chiller configuration decision, read by project engineers and operations leads. Revisit it whenever electrical equipment is added to a room, because heat loads in control buildings rarely stay at their original design value.