CNG and LNG Fuelling Stations: Design, Construction, Commissioning and Inspection

21 – 25 June 2027
Dubai - Five-star CBD venue



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Introduction:

CNG and LNG fuelling stations for buses, trucks, taxis and delivery fleets combine gas at 200 to 250 bar with cryogenic liquid, so a poorly sited compressor, an undersized cascade or an untested shutdown chain can halt a fleet or cause a gas release beside public traffic. This Core Concept course equips station developers, engineers, inspectors and operators to plan, build, commission and inspect CNG, LNG and L-CNG stations. Each participant produces a station concept layout with a safety review and a periodic inspection checklist.

Course Objectives:

- Select the station type, online, mother-daughter, LNG or L-CNG, that fits a natural gas vehicle fleet's duty cycle and gas supply
- Size gas metering, compressors, gas dryers and cascade storage to meet fast-fill and time-fill demand profiles
- Specify LNG storage tanks, cryogenic pumps, vaporisers and dispensers so that vehicles fill within cylinder and tank limits
- Lay out a station using separation distances, hazardous area zones, emergency shutdown logic and fire and gas detection coverage
- Plan construction, pressure testing, commissioning and periodic inspection of station equipment against NFPA 52 style codes
- Run daily operations, planned maintenance and emergency response routines and test the station business case

Target Audience:

- Station developers who choose sites, station types and equipment packages for natural gas fleets
- Mechanical, process and electrical engineers who design or review compression, storage and dispensing systems
- Inspectors who witness pressure tests, commissioning and periodic examinations of gas fuelling equipment
- Forecourt operations staff who run CNG or LNG dispensing, deliveries and shift handovers
- Maintenance technicians who service compressors, dryers, cryogenic pumps and dispensers
- HSE staff who review station layouts, detection systems and emergency plans

Course Outline:

Day 1: Natural Gas Vehicles, Fleet Demand and Station Type Selection

- Natural Gas Vehicle Types: Dedicated, Bi-Fuel and Dual-Fuel Engines
- Fleet Fuelling Demand Profile: Daily Kilograms, Peak Hour and Fill Windows
- Online, Mother and Daughter CNG Station Configurations Compared
- LNG and L-CNG Station Concepts for Heavy Trucks and Mixed Fleets
- Gas Supply Assessment: Pipeline Pressure, Gas Quality and Trailer Delivery

Day 2: CNG Compression, Drying, Cascade Storage and Dispensing

- Inlet Metering Skid, Pressure Regulation and Gas Quality Checks
- Reciprocating Compressor Staging, Cooling and Capacity Sizing
- Gas Dryer Selection: Low-Pressure Versus High-Pressure Moisture Removal
- Cascade Storage Banks and Priority Panel Sequencing for Fast-Fill
- CNG Dispensers, ISO 14469 Nozzles and ISO 11439 Vehicle Cylinders at Overview

Day 3: LNG and L-CNG Equipment, Station Layout and Separation Distances

- LNG Vacuum-Insulated Storage Tanks, Trailer Unloading and Boil-Off Control
- Cryogenic Pumps and Ambient Vaporisers for L-CNG Production
- LNG Dispenser Operation and Vehicle Tank Venting Controls
- Station Plot Plan: Traffic Flow, Canopy, Equipment Enclosures and Access
- NFPA 52 Style Separation Distances and ISO 15500 Component Requirements

Day 4: Hazardous Areas, Shutdown Systems, Commissioning and Inspection

- Hazardous Area Zone Drawing Around Compressors, Dispensers and Vents
- Emergency Shutdown Cause and Effect Matrix and Breakaway Coupling Checks
- Fire and Gas Detector Placement: Methane Sensors, Flame Detection and Alarms
- Pressure Testing, Leak Testing and Commissioning Sequence for a New Station
- Periodic Inspection Regime: Relief Valves, Hoses, Storage Vessels and Records

Day 5: Station Walkthrough, Economics and the Concept Layout Package

- Inspection Walkthrough: CNG Compression and Cascade Area Findings Log
- Inspection Walkthrough: LNG Tank, Pump Skid and Dispenser Island Findings Log
- Operations, Maintenance Planning and Emergency Response Drill Scenario
- Station Economics Model: Capital Cost, Gas Price Spread and Throughput
- Station Concept Layout, Safety Review and Inspection Checklist Presentation

Skills You Will Gain:

- Station Type Selection
- Compressor and Storage Sizing
- Cryogenic Equipment Specification
- Station Plot Planning
- Hazardous Area Zoning
- Shutdown Logic Verification
- Pressure Equipment Inspection
- Fuelling Station Business Case

Why Attend This Course:

- Return with a station concept layout, safety review and inspection checklist built for a site or fleet you know
- Challenge vendor equipment packages on compressor capacity, storage size and dispenser count using fleet demand data
- Find layout, detection and shutdown weaknesses during inspection walkthroughs before a station opens to vehicles
- Compare CNG, LNG and L-CNG practice with peers from bus, logistics, gas utility and fuel retail organisations

Conclusion:

A reliable natural gas fuelling station depends on matching the station type to the fleet, sizing compression and storage to real demand, and proving every shutdown, detector and relief device before and after opening. The course moves from vehicles and station types through compression, drying, cascade storage and dispensing, to LNG and L-CNG equipment, layout and separation, then hazardous areas, commissioning and inspection. The final day uses walkthroughs and an economics model to produce a station concept layout with safety review and inspection checklist.