LNG Bunkering and LNG as Marine Fuel: Fuel Gas Systems, Transfer Operations and Safety Zones

23 – 27 November 2026
Paris - Right Bank business hotel



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Ref: 276_11930 **Date:** 23 – 27 November 2026 **Location:** Paris - Right Bank business hotel **Fees:** 23500 SAR

Introduction:

LNG bunkering brings a cryogenic, flammable fuel alongside a ship that may be carrying passengers, cargo or other operations at the same time, so a weak transfer plan, an unclear safety zone or an untested emergency release can quickly turn a routine fuelling into a gas release. This Core Concept course prepares ship and bunker supplier staff to handle LNG as marine fuel, from fuel tank and fuel gas supply system behaviour through truck-to-ship, ship-to-ship and shore-to-ship transfers to bunker delivery records and methane slip. Participants produce an LNG Bunkering Operations Plan for a vessel or bunkering location of their own.

Course Objectives:

- Explain why operators choose LNG as marine fuel and relate sulphur, NOx, EEDI and CII drivers to fuel system selection on their own vessels
- Operate and monitor ship fuel gas supply systems, Type C and membrane fuel tanks and boil-off gas handling within the limits set by the IGF Code
- Plan and run truck-to-ship, ship-to-ship and shore-to-ship LNG bunker transfers using agreed checklists, communication and transfer rates
- Set out safety and security zones, control simultaneous operations and apply emergency release couplings and ship-shore ESD links during a bunker transfer
- Verify delivered LNG quantity and quality and complete the bunker delivery note with supporting measurement records
- Compile an LNG Bunkering Operations Plan covering crew competence, approvals, emergency response and methane slip control

Target Audience:

- Deck and engine staff responsible for fuel handling on LNG-fuelled ships
- Bunker vessel and bunker truck crews who connect, transfer and disconnect LNG
- Technical staff who supervise fuel gas systems, fuel tanks and maintenance on gas-fuelled fleets
- Marine operations staff who coordinate bunker scheduling, berth allocation and simultaneous cargo or passenger activity
- HSE staff responsible for gas release, cryogenic and fire risk during fuelling

Course Outline:

Day 1: LNG as Marine Fuel: Drivers, Fuel Properties and Fleet Baseline

- MARPOL Sulphur Cap, NOx Limits and the Shift from Heavy Fuel Oil to Gas
- EEDI and CII Rating Effects of LNG-Fuelled Propulsion
- Dual-Fuel Two-Stroke, Four-Stroke and Gas-Only Engine Configurations
- Cryogenic Burn, Brittle Fracture of Deck Steel and Rapid Phase Transition on Water
- Fleet Gas-Fuel Readiness Baseline Checklist

Day 2: IGF Code Framework, Fuel Containment and Fuel Gas Supply Systems

- IGF Code Goal-Based Structure: Functional Requirements for Gas-Fuelled Ships
- IMO Type C Pressure Tanks Versus Membrane Fuel Tanks: Pressure Build-Up and Holding Time
- Tank Connection Space, Double-Walled Gas Piping and Gas Valve Unit Layout
- Fuel Gas Supply System: Vaporiser, Pressure Build-Up Unit and Low- and High-Pressure Feed
- Boil-Off Gas Handling on the Fuelled Ship: Consumption, Gas Combustion Unit and Venting Limits

Day 3: Bunkering Methods, Procedures and Transfer Checklists

- Truck-to-Ship Bunkering: Road Tanker Positioning, Hose Handling and Rate Limits
- Ship-to-Ship Bunkering: Bunker Vessel Mooring, Fenders and Transfer Sequence
- Shore-to-Ship and Pipeline Bunkering from Terminal or Storage Tank
- SGMF Bunker Safety Checklists: Pre-Bunkering, Pre-Transfer and Post-Bunkering
- Line Cool-Down, Top-Filling Versus Bottom-Filling and Vapour Return Management

Day 4: Safety Zones, SIMOPS, Emergency Release and Methane Slip

- Hazardous Area Safety Zone and Wider Security Zone Definition Around the Bunker Manifold
- Simultaneous Operations Risk Assessment During Cargo Work and Passenger Embarkation
- Emergency Release Coupling, Dry-Break Coupler and Ship-Shore ESD Link Testing
- Bunker Quantity and Quality Measurement: Mass Flow Meter, Tank Gauging, Sampling and the Bunker Delivery Note
- Methane Slip Sources: Engine Combustion, Venting and Purging with Mitigation Options

Day 5: Bunkering Simulation and LNG Bunkering Operations Plan

- Timed Simulation: Hose Leak and ESD Trip During Ship-to-Ship Transfer
- Timed Simulation: Truck-to-Ship Transfer Interrupted by a SIMOPS Conflict
- Crew Competence Matrix for IGF Code Training and Bunker Team Roles
- Port Approval Request Pack at Overview: Operator Qualification, Risk Assessment and Notifications
- LNG Bunkering Operations Plan Drafting and Peer Review

Skills You Will Gain:

- Gas-Fuelled Ship Operation
- Fuel Tank Pressure Management
- Bunker Transfer Planning
- Bunkering Checklist Application
- Safety Zone Setting
- Emergency Release Testing
- Bunker Quantity Verification
- Methane Slip Control

Why Attend This Course:

- Return with an LNG Bunkering Operations Plan prepared for a vessel or bunkering location you work with
- Rehearse ESD trips, hose leaks and SIMOPS conflicts in timed simulations before facing them alongside a live bunker vessel or truck
- Agree zones, rates, stop signals and records with bunker suppliers, terminals and port staff in the same terms
- Compare fuelling practice with crews and technical staff from ferry, container, tanker, cruise and offshore support fleets

Conclusion:

Safe LNG bunkering depends on the ship, the supplier and the port working to one plan, with fuel system behaviour understood and emergency controls tested before the first hose is connected. The course moves from the drivers for LNG as marine fuel and its hazards, through the IGF Code, fuel tanks and fuel gas supply systems, to bunkering methods and checklists, then to safety zones, SIMOPS, emergency release, bunker measurement and methane slip. The final day applies timed simulations and produces an LNG Bunkering Operations Plan.