United States Coast Guard

FOREIGN PASSENGER VESSEL INITIAL CERTIFICATE OF COMPLIANCE EXAM PROCESS GUIDE

DIRECTIONS FOR USE

This booklet:

-Is designed to assist qualified Foreign Passenger Vessel Examiners (FPVEs) with completing the Initial Certificate of Compliance (Initial COC) examination in a comprehensive manner.

-Contains an extensive list of systems and equipment that may be examined during an Initial COC exam. It is a memory jogger and should not be construed as an exhaustive check list of examination procedures.

-Does not establish or change Federal laws or regulations. Refer to IMO publications, CFRs, the Port State Control Job Aid, NVICs, MMS work instructions, and any locally produced guides for specific regulatory references.

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Foreign Passenger Vessel Exam Policy

All foreign-flagged passenger vessels that embark passengers, or make port calls, in the United States with U.S. citizens as passengers are required to hold Certificates of Compliance (COC). Additionally, existing vessels that return to service in the U.S. more than one year after the annual COC expired, and more than 5 years since the last Marine Safety Center (MSC) plan review, are subject to complete an Initial COC exam.

As per 46 USC 3505, the Coast Guard will prevent a foreign vessel carrying a citizen of the U.S. as a passenger or embarking passengers from a U.S. port from departing that U.S. port if the Secretary finds that the vessel does not comply with the standards stated in the International Convention for the Safety of Life at Sea (SOLAS) to which the United States is currently a party.

Exceptions: The Coast Guard will not require foreign passenger vessels calling at U.S. ports, which do not embark passengers and do not carry U.S. citizens as passengers, to participate in the Initial COC process. The Coast Guard will target and examine such a vessel for PSC, security boarding, and/or a MTSA/ISPS examination to verify compliance with U.S. laws and international treaties.

The Initial COC Process: The Initial COC process consists of the following steps, listed in the order that they should occur:

- Plan review for the final "as built" condition of the vessel;
- SFP examination (this step may be part of an Initial Certificate of Compliance and is not limited to new vessels and major conversions);
- Assessment for the Initial COC; and
- The Initial COC:
    - Shipyard component
    - First port component

Waste Streams: Major components of each waste stream as identified in NVIC 4-04, Environmental Inspection Checklist, shall be examined.

Drills: Drills shall be evaluated in accordance with the ship's established onboard training and instructions. Review the procedures to determine what to expect in terms of crew duties and actions during the drill.

References:

- NVIC 4-04 Environmental Inspection Checklist
- Initial Foreign Passenger Vessel Examiners Tactics, Techniques, and Procedures (TTP) – CGTTP 3-72.5A (March 2019)
- Initial ICOC Work Instruction: Guide For Conducting Initial Certificate Of Compliance Examinations On Foreign Passenger Vessels

Foreign Passenger Vessel Data for MISLE

Vessel Name		IMO Number	
Classification Society		Flag State	
ISM Issuer:			
Outstanding conditions of class or non-conformities Y □ N □			
Special Notes in MISLE Y □ N □		Operational Controls Placed on Vessel Y □ N □	
Call Sign		Length of Vessel	
Net Tons	Deadweight	Gross Tons	
Keel Laid Date	Delivery Date	Last Conversion Date	
Propulsion		Horsepower	
Steering Type		Number of shafts / Pods	
Emergency Contact Information			
Bilge Pump Number		Capacity	Units
Fire Pump Number		Capacity	Units
Lifeboats	Rescue Boats	Tenders	Life rafts
Life Raft Davits	MES	WTDs	Semi-WTD
Total Passengers	Total Crew	Total Onboard	

INITIAL COC Exam Components

Concept Review

All concept review is completed by the Marine Safety Center (MSC). It is typically conducted during the design phase for novel ship arrangements or unique designs incorporating design features that involve interpretations of SOLAS rendered by the vessel's classification society or flag Administration, equivalencies, or exemptions from existing regulations. MSC provides this review to address specific design concepts or ideas that could create delays if discovered later during the normal course of plan review. Concept review does not result in approval of the conceptual drawings, but results in acceptance of specific conceptual details.

Plan Review

Plans are submitted to MSC for review of compliance with SOLAS convention to which the vessel is built. The plans reflect the "as-built" condition of the vessel. The plans should provide supporting information for any special considerations approved by the flag Administration such as equivalencies or exemptions. Vessel's returning to service in the U.S. need only provide plans for areas of the vessel which have been altered since the last plan review. The submitter should submit at least three sets of final drawings and documentation bearing the approval stamp of the flag Administration or Recognized Organization (RO) to MSC for review.

Structural Fire Protection Exam (SFPE)

Vessels under construction or with extensive modifications, typically undergo an SFPE after plan review, several months before the ICOC exam. For vessels already in operation, the Coast Guard may complete a modified SFPE during the ICOC exam. Items verified during the SFPE include:

- Fire Insulation
- Enclosed escape stairways
- Escape routes
- Fire boundary penetrations
- Fire and smoke dampers and ventilation arrangements
- Draft stops

- Space categorization
- Smoke detector and sprinkler arrangements

Assessment Examination

This examination is conducted to evaluate the vessels' readiness for the ICOC exam. If the examiner determines the vessel will not pass the exam, then they should recommend the ICOC exam be postponed. If the designer made significant changes to the vessel, they should submit revised plans of the areas affected to MSC. Items to consider during the assessment:

- Plan review completed by MSC
- Plans onboard for Initial COC exam: Structural fire protection plans of bulkheads and decks, means of escape diagrams, and Fire Control Plans.
- SFP exam completed
- Determine if any changes have been made since plan review
- Major systems inspected / tested by Administration or RO
- Any outstanding plan review comments
- Administration or RO ready to issue PSSC

Initial COC

The overseas portion of the exam will typically last 3 to 4 days. The team is typically comprised of 4 to 6 members from the Cruise Ship NCOE, Activities Europe, MSC and, for LNG fueled vessels, first in class or first time for the yard, the Liquefied Natural Gas NCOE. Representatives from the Administration, or RO, and the owner are typically present. Deficiencies noted by CG examiners are captured as work list items to be corrected prior to the issuance of the COC. This is the only time a work list is used.

The first U.S. port portion of the exam will typically take one day. The ICOC completion exam involves a comprehensive walkthrough of the vessel, clearing remaining worklist items, evaluation of fire & abandon ship drills, waste stream exam, and CVSSA verification. At this point, all items on the work list which have not been cleared, along with any items discovered during the first port exam, will be turned into deficiencies that will be documented on Coast Guard Port State Control Report of Inspection Form B (CG-5437B).

ICOC: SHIPYARD COMPONENT

During this exam, the team is typically comprised of personnel from Activities Europe (ICOC Coordinator), CSNCOE, and Marine Safety Center (MSC).

TEAM ONE: Team Lead (ICOC Coordinator)

- Vessel documents & manuals
- Navigation equipment & emergency conning position
- Safe Return to Port (vessels built after July 2010):
  - Safety Center verification on bridge as per SOLAS II-2/23.6
  - Test PA, communications, and verify ship's heading from Emergency Conning Position
- Main propulsion emergency shut down & EOT (pilot house)
- Steering gear test (pilot house & local control, alarms)
- Spaces: saunas, cabin & balconies, hospital, theater, paint lockers, category 14 spaces, main laundries & launderettes
  - Proper space categorization
  - Means of Escape/Escape Signage/ Low Location Lighting
- CVSSA compliance (cabin security latches, peep holes, rail height)
- Accommodation space high pressure water mist system section valves (flow alarms, tamper alarms)
- Lifeboats & Fast Rescue Boats (condition and equipment)
- Marine Evacuation System (MES) (operating instructions)
- Liferaft & davit systems (hydrostatic release, storage, marking)
- Ring buoys & life jackets (condition, signage, storage)
- Muster stations & embarkation areas (lighting, signage & instructions)
- Smoke extraction system test (automation test and function test)
- Transitional power test (E/lighting, PA, general alarm function, egress)

- Fire Control Plan
- Fire load calculations & material certificates
- Damage Control Plan (damage stability, counter flooding measures)
- Outstanding plan review items
- Technical lockers & fire stations (fireman's outfit, stowage)
- Fire alarms, manual call points & smoke/heat detectors (operation, addressable, audible alarm if equipped).
- Galley fire suppression equipment & hood firefighting systems (operation, rolling shutters and alarms)
- Fire dampers in galley ventilation systems
- Main laundry & launderettes
- Fire doors (local control, bridge indication panel)
- Accommodation spaces remote ventilation shutdowns & fire damper closure
- Emergency exits (properly marked & not blocked, EEBDs)
- Signage is clearly visible and pointing in direction of egress throughout
- Proper space categorization through area
- Means of Escape/Escape Signage/ Low Location Lighting
- Smoke extraction system (automation test and function test)
- Transitional power test (E/lighting, PA, general alarm, egress)

- Steering gear test (pilot house & local control, alarms)
- Main propulsion remote shut down & Engine Order Telegraph
- Drencher system (operation, activation valve location & instructions)
- Water tight doors & semi-water tight. Test local & remote operation.
- Fixed local application (local release, remote release & automatic release through 2 detectors)
- Fire pumps (main & emergency) and topping pump
- Fixed gaseous fire extinguishing systems (instructions & alarms)
- High pressure water mist system: test automatic start of pump motors, verify cross connection to fire main is locked, pressure on nitrogen stored energy & automatic solenoid.
- Emergency diesel generator (secondary means of starting, emergency air compressor). Batteries & Battery Room.
- Machinery space remote ventilation shutdowns & fire damper closure
- Remote shut downs: fuel valves, transfer pumps & fuel oil purifiers
- Bilge systems (alarms & pumps)
- Flooding detection system alarms
- International shore connection
- Pollution prevention equipment: Oil Pollution Placards, Oily Water Separator (OWS), Marine Sanitation Device (MSD), Non-hazardous & Hazardous Waste management
- Bunker Stations
- Incinerator (verify emergency shutdown & required safety devices)
- Emergency exits (properly marked & not blocked, EEBDs)
- Signage is clearly visible and pointing in direction of egress
- Proper space categorization throughout area
- Smoke extraction system (automation test & function test)
- Low Flashpoint Fuel System if applicable (see LFF Addendum)
- Transitional power test (E/ lighting, PA, general alarm, egress)

Automation test

1. Verify the fans are placed in automatic operation.
2. Activate a smoke detector(s) located within the boundaries of the atrium. Determine how the system is configured for automatic operation and then test in accordance with the system's design.
3. Verify the fans start automatically & are extracting air from the space.
4. Verify the doors in the atrium's fire boundaries automatically close if designed to do so.
5. Secure the test.

Function test

1. Verify the smoke extraction system is in manual, or otherwise temporarily disable the system so the atrium fills with smoke from a smoke-generating machine.
2. Manually close all fire doors to the atrium and post personnel on the outside of each door to ensure only authorized personnel enter the atrium during the test.
3. Fill the space with smoke using smoke generating machines or equivalent. Verify the smoke spreads to all levels of the space, and visibility is reduced to approximately 1 meter (3.28 feet).
4. Once the atrium completely fills with smoke to the required amount, manually start the smoke extraction fans.
5. Once you hear the fans begin operating, start the timer and continue to run the extraction fans for a period of 10 minutes or until the space is sufficiently clear of smoke, whichever happens first.
6. During the 10-minute test period the atrium doors are to remain closed. After the smoke clears, ensure all escape doors, especially doors that open outwards, function properly while the fans are operating and verify the system is capable of maintaining a negative pressure in relation to the surrounding spaces.
7. MSC/Circ. 1034 states that the test is successful when an escape sign adjacent to the exit is visible from an equidistant spot within the space. As this is an imperfect test, in an uncontrolled environment, with numerous variables, the USCG considers the test satisfactory if, within 10 minutes, the smoke has sufficiently cleared to allow a person positioned equidistant from all exit doors, on each level, the ability to follow ***any*** of the escape signs to an exit.
8. Secure the test.
9. Restore the smoke extraction system to automatic mode.

TRANSITIONAL POWER TEST

1. Clear the vessel of all nonessential personnel.
2. Open all WTDs, SWTDs and fire screen doors.
3. Divide vessel up ensuring all decks, including embarkation decks, are covered (teams equipped with communications and keys to all locked spaces).
4. Secure all main power sources. Verify emergency generator starts and comes on-line automatically.
5. Confirm elevators have moved to programmed location.
6. Verify operation of emergency fire, bilge and steering pumps.
7. Verify operation of navigation lights (emergency lighting).
8. Secure emergency generators, vessel is now on transitional power.
9. Bridge closes all watertight doors. Upon verification of closure, return door control to “LOCAL MODE”.
10. Bridge closes all fire screen doors and semi-watertight doors.
11. Continuously sound music via the PA system. Sound the general alarm every 5 minutes.
12. Tour all spaces throughout vessel to ensure general alarm, PA system; LLL and emergency lights are operating and adequate.
13. During the tour of the vessel, fully open and close watertight doors completing the required three cycles using stored energy. Operate a random number of sliding fire screen doors 10 times under stored energy. Identify any fire screen doors that are not fully closed. Note: this may be completed by a separate team designated by the shipyard.
14. Test fire alarms, manual operated call points & sprinkler section valves.
15. After thirty minutes, take a battery reading and start emergency generator. More than a 12 percent drop from nominal voltage constitutes a failed test. Continue with tour of vessel under emergency generator until entire vessel is examined.

Ensure battery readings are not being taken from a constant source supplier. Readings should be taken from a location in the battery space or equivalent.

1. Verify with the Chief Engineer and the Chief Electrician if it is possible to switch the transitional power system from automatic to manual operation.
2. Establish how and where voltage readings shall be taken during the 30 minute test. Voltage reading should not be taken from a constant voltage output source. Readings should be taken at the start of the test and every five minutes until the test is over. At the completion of 30 minutes, a final reading should be taken.
3. Identify systems to be checked during the test. These shall include embarkation lights, low location lighting, lighting at muster stations, public address system, a spot check of fire detection systems, and a spot check of sliding FSDs (testing a few to ensure they can be cycled 10 times), and a spot check of WTDS (testing a few for 3 movements including close-open-close). *Note- FSDs and WTDs may have to be electrically secured locally to test. If the bridge navigation and radio equipment utilize a separate transitional battery bank, arrangements should be made to test these batteries as well.
4. The systems identified above shall be isolated from the main switchboard to ensure they are fed from the transitional batteries.
5. After 30 minutes, gather the voltage readings report and verify the voltage drop. If the voltage drop is less than 12% of the nominal battery voltage, the test passed.

Ensure battery readings are not being taken from a constant source supplier. Readings should be taken from a location in the battery space or equivalent.

ICOC: FIRST PORT COMPONENT

During this exam, the team is typically comprised of personnel from the local Coast Guard unit at first port & a CSNCOE member who participated in the overseas portion of the ICOC.

TEAM ONE: Bridge

- Clear worklist items assigned to Team One
- Lifeboats: lower boats not lowered during ICOC at shipyard
- Life raft deployment
- Comprehensive walkthrough:
    - Navigation bridge
    - Marine Evacuation System (MES) (operating instructions)
    - Lifesaving equipment (ring buoys, life jackets)
    - Muster /embarkation areas (lighting, signage, instructions)
    - Proper space categorization through areas
    - Signage clearly visible & pointing in direction of egress
    - Emergency exits (properly marked & not blocked)

- Clear worklist items assigned to Team Two
- CVSSA accommodation spaces (embassy contact information, cabin security latches peep holes & rail height).
- Safe Return to Port (vessels built after July 2010):
    - Verify stability computers
- Comprehensive walkthrough:
    - Proper space categorization through areas
    - Signage clearly visible & pointing in direction of egress
    - Emergency exits (properly marked & not blocked)
    - Technical lockers & fire stations (fireman's outfit, stowage).
    - Galleys
    - Saunas
    - Cabin balconies
    - Paint lockers, Cat 14 spaces
    - Laundry spaces
    - Fire doors

TEAM THREE: Midway & below decks (up to bulkhead deck)

- Clear worklist items assigned to Team Three.
- Safe Return to Port: Alternate space for medical care (or portable medical kits) available.
- CVSSA hospital spaces (sexual assault response kits, anti-retroviral medications, staff credentials, access to free means of communication & logs).
- Comprehensive walkthrough:
    - Proper space categorization through areas
    - Signage clearly visible & pointing in direction of egress
    - Emergency exits (properly marked and not blocked)
    - Paint Lockers, Cat 14 spaces, Storerooms
    - Laundry spaces
    - Cabins and cabin balconies
    - Hospital space (ILO 147)
    - Galleys
    - Fire doors

TEAM FOUR: Bulkhead deck & below / Machinery spaces

- Clear worklist items assigned to Team Four.
- Complete waste stream exam per NVIC 4-04, Environmental Inspection Checklist.
  - Verify Safe Return to Port operational manual or computer program (vessels built after July 2010).
- Comprehensive walkthrough:
    - Proper space categorization through areas
    - Signage clearly visible & pointing in direction of egress
    - Emergency exits (properly marked and not blocked)
    - Paint Lockers, Cat 14 spaces, Storerooms
    - Laundry spaces
    - Fire doors
    - Engine Control Room
    - Spaces containing main & emergency fire pumps
    - Spaces containing pollution prevention equipment (OWS, MSD, garbage room, incinerator)
    - Bunker stations
    - Steering gear room
    - Emergency generator room
    - Battery room
    - Watertight & Semi-watertight doors

Drills

Coordinate the timing of drills with the Master and/or Ship's Safety Officer. They should determine the drill location and progression. Determine which tools/ equipment, such as smoke, charged hoses, dummy, are used by the crew.

Review the ship's written procedures to determine what to expect in terms of crew duties and actions to include crowd control, crisis management scenario(s) and evacuation contingencies. Evaluate drills (fire and abandon ship) according to these procedures.

***Note*: If crew appears unfamiliar with their duties or incapable of safely responding, request the drill be stopped. Notify the Master that the drill was unsuccessful and that additional training and/or additional exercises are necessary. Provide the crew with at least one additional opportunity to demonstrate competency before detaining the vessel.**

Type of drill:

_____

Drill Location:

_____

How was the drill initiated?

_____

Did the ship's general alarm sound throughout vessel?
□ Yes □ No

Was liferaft the same size as those utilized on the vessel?
□ Yes □ No

Debrief with Master and Ship's Officers
□ Yes □ No

TEAM ONE

FIRE DRILL: Bridge

- Communications between bridge and emergency teams.
- Were Fire Control plans available and used?
- Was the Decision Support System utilized?
- Was a log being kept?
- Were messages sent?
- Was there an assigned GMDSS Operator and did he/she have other duties?
- Was the fire drill LFF related? (Held in the bunker station or handling area)
    - Consider safety equipment and LFF procedures

PASSENGER EVACUATION: Bridge

- Were orders given for each step of evacuation?
- Was loss of muster area by fire considered (if applicable)?
- Was positive control kept even after abandon ship order given?

ABANDON SHIP: Inboard side lifeboats

- Question of lifeboat & life raft davit crew for competency
- Was there positive control of the deck?
- Witness deployment of life raft (if applicable)
- Question MES crew for competency (if applicable)
- Keep note of time it takes to abandon ship (30 minutes maximum)

TEAM TWO

FIRE DRILL: Forward & upper boundaries, staging areas, medical teams

- Were fire boundaries surrounding the affected area set?
- Was equipment for cooling boundaries laid out and used?
- Were fire doors throughout area closed?
- Adjacent spaces in the affected area evacuated and marked?
- Was the power secured in the affected areas? Ventilation?
- Was the PA heard throughout area, even after power secured?
- Did the staging area have proper command & control?
- Was the staging area located in safe area?
- Were medical teams available?
- Did medical teams have necessary equipment available, and did they utilize the appropriate route of egress?

PASSENGER EVACUATION: Forward stairway & muster stations

- Are stairway guides in place?
- Are they properly identified?
- Are muster stations clearly marked?
- Are life jackets available along evacuation route?
- Is someone in charge of muster area?
- Was a second PIC assigned?

ABANDON SHIP: Inboard side lifeboats / tenders

- Question of lifeboat & life raft davit crew for competency
- Was there positive control of the deck?
- Witness deployment of life raft (if applicable)
- Question MES crew for competency (if applicable)
- Keep note of time it takes to abandon ship (30 minutes maximum)

TEAM THREE

FIRE DRILL: Aft and below boundaries and staging area

- Were fire boundaries aft and below of the affected area set?
- Was equipment for cooling boundaries laid out and used?
- Were fire doors throughout area closed?
- Were adjacent spaces in the affected area evacuated and marked?
- Were the power and ventilation secured in the affected areas?
- Was the PA heard throughout area, even after power secured?
- Did staging area have proper command and control?
- Was the staging area located in safe area?

PASSENGER EVACUATION: Aft stairway and muster stations.

- Were stairway guides in place?
- Were they properly identified?
- Were muster stations clearly marked?
- Were life jackets available along evacuation route?
- Was someone in charge of muster area?
- Was a second PIC assigned?

ABANDON SHIP: Outboard side lifeboats

- Question of lifeboat & life raft davit crew for competency
- Was there positive control of the deck?
- Witness deployment of life raft (if applicable)
- Question MES crew for competency (if applicable)
- Keep note of time it takes to abandon ship (30 minutes maximum)

TEAM FOUR

FIRE DRILL: **On scene, and fire party organization**

- Was there positive control of the team by the leader?
- Was the equipment kept clear of the fire doors and fire parties?
- Was smoke control a factor?
- Were hoses properly laid out and handled?
- Was the power secured in the affected areas? Ventilation?
- PA heard throughout area, even after power secured?
- Firefighter's outfits properly donned and include all gear?

PASSENGER EVACUATION: Amidships stairway & muster stations

- Are stairway guides in place?
- Are they properly identified?
- Are muster stations clearly marked?
- Are life jackets available along evacuation route?
- Is someone in charge of muster area? Second PIC assigned?

ABANDON SHIP: Outboard side & outboard lifeboats

- Question lifeboat & liferaft crew for competency
- Witness deployment of liferaft (if applicable)
- Was there positive control of the deck?
- Question MES crew for competency (if applicable)
- Keep note of time it takes to abandon ship (30 minutes maximum)

Ro-Ro Addendum

Escape Requirements

- Escape routes from the machinery spaces.
- Two means of escape from ro-ro spaces (fore and aft).
- Simple “mimic” plans showing “you are here” position and escape routes marked by arrows are prominently displayed in each cabin and public spaces.
- Handrails or handholds provided in corridors along entire escape route.

Electrical Requirements

- All public spaces and alleyways are provided with supplementary electric lighting.
- A portable rechargeable battery operated lamp is provided in every crew space alleyway, recreational space and every working space is normally occupied unless supplementary emergency lighting is provided.

Stability Management

- Vehicle ramp openings are weathertight and have alarms and indicators that sound at the navigation bridge.
- Television surveillance and water leakage detection installed.
- Special category and ro-ro spaces are continuously patrolled or monitored by effective means (i.e. television surveillance).
- Posted operating procedures for closing and securing all shell doors, loading doors and other closing appliances.

Special Requirements

- Special category and ro-ro spaces contain a power ventilation system separate from other ventilation systems.
- Means provided on navigation bridge loss of required ventilation.
- Arrangements provided a rapid shutdown and effective closure of the ventilation system from outside the space.

- Vehicle spaces and ro–ro spaces which are not special category spaces and are capable of being sealed from a location outside of the cargo spaces are fitted with a fixed gas fire-extinguishing system.
- Ro-ro and vehicle spaces not capable of being sealed and special category spaces are fitted with an approved fixed pressure water-spraying system for manual operation which can protect all parts of any deck and vehicle platform.
- Spaces above the bulkhead deck, scuppers are fitted to ensure water is rapidly discharged directly overboard when fixed pressure-spraying fire extinguishing systems are provided.
- Portable fire extinguishers are provided at each deck level in each hold or compartment where vehicles are carried and spaced no more than 20 m apart on both sides of the space.
- Three water-fog applicators.
- One portable foam applicator unit.

Lifesaving Requirements

- At least on rescue boat is a fast rescue boat approved by the administration.
- At least two crews are trained and drilled regularly.
- Every liferaft is provided with float-free stowage arrangements.
- Every liferaft is fitted with a boarding ramp.
- Every liferaft is either automatically self-righting or be a canopied reversible liferaft.
- Liferafts are fitted with a radar responder in the ratio of on transponder for every four liferafts. Containers of liferafts fitted with transponders are clearly marked.
- A means of rapidly recovering survivors from the water and transferring from rescue units or survival craft to the ship.
- Sufficient numbers of lifejackets stowed in the vicinity of the muster stations.
- Each lifejacket is fitted with a light complying with the requirements of the Code.

Preparation

- Verify machinery concept, system configuration & any alternative design arrangements.
- Safety briefing with vessel & shipyard personnel, crew (if available), & USCG examiners to discuss: exam scope, proper PPE, atmospheric monitors, confined spaces certified “safe for entry” & safety hazards.
    - Verify if tanks are filled & fuel system is commissioned.

Documentation & Manuals

- Fuel System Endorsement (on PSSC)
- Operational Procedures
- Dual Fuel Switch Over Procedures
- Fuel Handling Manual
- Bunkering Procedures
- Emergency Procedures
- Electrical Equipment Maintenance Manual
- Risk Assessment Analysis
- Verify copy of IGF onboard
- Discuss ISPS security protocol / drills log - records

Ship Design & Arrangement

- Examine fuel containment tanks
- Examine fuel lines to consumer
- Examine evaporators & heaters; including alarms
- Examine vaporizers
- Examine Gas Valve Unit
- Tank Connection Space: 30 air changes/hr

Bunkering system

- Verify manually operated stop valve
- Verify means for draining any fuel from bunkering pipes
- Verify Ship-shore link (SSL) for ESD / manual to bunker source fitted

- LNG Steel Shielding for compressed gas bunker stations
- Verify manually operated stop valve / remote shutdown

Bunker Control Location

- Bunker control location situated remotely from bunkering station.
- Ensure tank pressure, temperature & level can be monitored from bunker control location.
- Remote control valves for water spray system & bunker stop valves are operable from bunker control station
- Verify overfill alarm & automatic shutdown indications are present
- Verify an audible & visual alarm for failure of ventilation
- Verify audible & visual alarm /emergency shutdown for gas detected in ducting around bunkering lines
- Piping & instrumentation (P & ID) diagram is permanently mounted

Control, Monitoring & Safety Systems

- Gas safety system alarms & shutdowns are listed in Table 1 of the IGF Code. *Note: not all of these alarms/shutdowns will be tested.
- ESD machinery space shutdown fitted (upon loss of ventilation, or 40% LEL concentration detected by 2 detectors)
- Suitable instrumentation devices fitted for local/remote reading (fuel tank level, gas sampling)
- Gas detection for ESD Protected-machinery space
- Bilge well tank connection: level indicator & temp sensor
- Overfill level alarms
- ESD Protected Machinery Space separated by A-60 class division
- LNG Placarding
- Fuel storage hold spaces: no pen connection to atmosphere; fitted with pressure indicator
- High pressure alarm / Low pressure alarm indication on bridge
- Examine emergency shutdown valves
- Examine double wall fuel piping pressure test
- Verify LNG tank MAWP & MARVS to ensure correct settings

Fuel Containment System

- Fuel containment system & piping located so released gas is led to safe open-air location
- Fuel containment located below deck
- Piping between tank & first valve is equivalent safety to C type tank
- If piping is connected below the liquid level of the tank it has to be protected by a secondary barrier up to the first valve
- Verify safety actions of gas leakage does not induce loss of power
- Examine drip trays fitted where leak may occur
- All tank connections, fittings, flanges & tank valves enclosed in gas tight tank connection spaces, unless on open deck
- Verify installed pressure relief system (each gas fuel tank fitted with a minimum of 2 pressure relief valves)
- Verify stand by heat exchanger (not required if the capacity of the heat exchanger is in excess of 25% of the largest required capacity for pressure control)
- Verify gas sampling points (provided for each fuel tank)
- Examine backflow prevention
- Verify inert gas oxygen alarm at 5% content by volume
- Verify nitrogen generator at 6 air changes per hour
- Verify piping color markings
- Examine location master gas valve
- Examine gas consumer / double block and bleed valve IGF
- Examine fail to close, for both valves/ ventilation valve fail to open
- Examine manually operated shutdown valve
- Verify rupture detection in main gas supply line

Electrical Installations

- Lighting system in hazardous areas divided between 2 branch circuits
- Verify gas explosion in machinery space is minimized
- Identify transitional power/ blackout impact to LNG fuel system
- Examine location of hazardous area zone 0,1,2
- Examine electrical equipment/wiring in hazardous areas & ESD protected machinery spaces
- Verify electrical area classification

- Verify electrical compliance in accordance with IGF 18.3.3 IEC 60079-17 section 4

Fire Safety Systems

- Verify Fire Main capacity / pressure requirements
- Fixed fire detection & alarm system in fuel storage hold spaces and ventilation trunk to tank connection space
- Verify A-60 class divisions for accommodation spaces, services spaces, control spaces escape routes and machinery spaces facing fuel tanks on open deck, are shielded by A-60 class divisions.
- Space with fuel containment system is separated from machinery spaces of category A or other rooms with high fire risk. Separation by cofferdam of at least 900mm with insulation of A-60 class division.
- Bunker station must be separated by A-60 class division towards machinery spaces of category “A”, accommodation, control stations, and high fire risk spaces.
- Verify water spray system is installed, unless fuel tank is 10 meters or more from boundaries (covering exposed parts of fuel storage tanks located on open decks, boundaries of superstructure, compressor rooms, pump-rooms, cargo control room, bunker station, bunker control station).
- Ensure stop valves are fitted within the water spray application main lines (intervals not exceeding 40 meters)
- Connection to the ship’s fire main via a stop valve, if water spray is not part of the fire main system.
- Verify remote start of pumps and any normally closed valves supplying the water spray system.
- Verify a permanently installed dry chemical powder fire-extinguishing system is installed in the bunkering station area.
- Verify manual release of dry chemical powder system is available at a safe location outside the protected space.
- One portable dry powder extinguisher (5 kg) near bunkering station.

Ventilation Systems & Airlocks

- Hazardous area ducting separate from non-hazardous area ducting
- Verify ventilation systems required to avoid gas accumulation consist of independent fans, each of sufficient capacity.
- Air outlets from non-hazardous spaces located outside hazardous area.

- Verify independent ventilation system in machinery space for gas fueled consumers.
- Verify fuel preparation room complies with 30 air changes/hr.
- Verify electric motors for ventilation fans are not located in ventilation ducts for hazardous spaces unless the motors are certified for the same hazard zone as space served.
- Verify required capacity of the ventilation plant.
- Airlock installed between gas safe space & gas dangerous space.
    - Verify doors are 1.5 meters to 2.5 meters apart
    - Door sill greater than 300mm (12 inches) in height
    - Verify operation of required alarms
    - Verify gas detector is present within airlock space

Fuel Supply to Consumer

- Verify barrier system failure prevention piping
- Verify fuel storage tank inlets / outlets w/ valves close to tank
- Verify installation stop Valve & Master Gas Valve
- Examine double block and bleed for each gas consumer
- Examine fail to close type valves; fail to open for ventilation
- Examine one manually operated shutdown in gas supply upstream of double block & bleed valves to ensure isolation
- Rapid detection of rupture in gas line ESD protected space
- Verify 30 air changes/hr for secondary ventilated enclosure
- Verify double piping in gas safe machinery space

Power Generation / Propulsion

- Verify propulsion & fuel supply system designed so safety actions after gas leakage do not lead to an unacceptable loss of power
- Verify means to monitor & detect poor combustion or misfiring
- Verify auto shut-off requirement if combustion not detected

Material Pipe / Design

- Verify piping is capable of absorbing thermal expansion or contraction
- Verify electrical bonding of piping to ships structure
- Verify color marked in accordance with EN ISO 14726
- Examine flanges, valves, fittings to acceptable standards
- Examine emergency shut-down valves fully close w/in 30s

List of items to go over during the Safety Meeting

This list serves as a guide. It is not a script or comprehensive list.

1) Who is the certified safety person?
2) Review PPE requirement protocol
3) Discuss required PPE for team members & ensure everyone is fitted with appropriate equipment to include gas detectors
4) Discuss any release of gas, vapor, mist, liquid
5) Review enclosed space entry protocol - records
6) Review portable gas detectors: calibration / certification records
7) Discuss LNG staff STCW training - records
8) Discuss conditions of Class/Flag, IMO documents, SMS: status
9) Review risk analysis report
10) Review copy of Emergency Procedures
11) Discuss LNG system equipment arrangement/installation
12) Discuss monitoring & control of LNG system (ECR/Bridge)
13) Discuss fitted cryogenic tank: location, dimensions, capacity, alarms
14) Discuss tank connection space: access, monitoring, alarms
15) Discuss shipboard LNG fuel containment system
16) Discuss Ventilation System, Inert Gas System, Piping, Bunkering, Fuel Containment, Tank Connection Spaces, Fuel Preparation System, Gas Valve Units, and Machinery Space.
17) Review machinery space concept: gas safe or ESD protected
18) Review dual fuel supply system to consumers
19) Discuss dual fuel switch-over procedures for powerplant
20) Review dual fuel powerplant / alarms
21) Review master gas valve access / location
22) Discuss shut off valves close to tank IGF code 9.4.1.
23) Discuss loss of power impact/ black out to LNG system
24) Discuss IGF code table 1 alarms & ship testing procedures
25) Discuss ventilation system
26) Discuss shipboard Airlocks: number & location
27) Discuss explosion prevention procedures
28) Discuss location of hazardous area zones
29) Discuss electrical installations & IEC training requirement
30) Discuss Bunkering OPS - pre / during / post ops, manifold arrangement, SSL, inerting / purging procedures, & alarms
31) Discuss fire detection & suppression system: passive / active
32) Discuss ESD systems

Table 1 Monitoring of gas supply system to engines

(IGF Code, 2016 Edition, Part A-1, 15. Control, Monitoring and Safety Systems)

Table 1: Monitoring of gas supply system to engines

Parameter	Alarm	Automatic shutdown of tank valve[6)]	Automatic shutdown of gas supply to machinery space containing gas-fuelled engines	Comments
Gas detection in tank connection space at 20% LEL	X			
Gas detection on two detectors[1)] in tank connection space at 40% LEL	X	X		
Fire detection in fuel storage hold space	X			
Fire detection in ventilation trunk for fuel containment system below deck	X			
Bilge well high level in tank connection space	X			
Bilge well low temperature in tank connection space	X	X		
Gas detection in duct between tank and machinery space containing gas-fuelled engines at 20% LEL	X			
Gas detection on two detectors[1)] in duct between tank and machinery space containing gas-fuelled engines at 40% LEL	X	X[2)]		
Gas detection in fuel preparation room at 20% LEL	X			
Gas detection on two detectors[1)] in fuel preparation room at 40% LEL	X	X[2)]		
Gas detection in duct inside machinery space containing gas-fuelled engines at 30% LEL	X			If double pipe fitted in machinery space containing gas-fuelled engines

Parameter	Alarm	Automatic shutdown of tank valve[6]	Automatic shutdown of gas supply to machinery space containing gas-fuelled engines	Comments
Gas detection on two detectors[1] in duct inside machinery space containing gas-fuelled engines at 60% LEL	X		X[3]	If double pipe fitted in machinery space containing gas-fuelled engines
Gas detection in ESD protected machinery space containing gas-fuelled engines at 20% LEL	X			
Gas detection on two detectors[1] in ESD protected machinery space containing gas-fuelled engines at 40% LEL	X		X	It shall also disconnect non certified safe electrical equipment in machinery space containing gas-fuelled engines
Loss of ventilation in duct between tank and machinery space containing gas-fuelled engines	X		X[2]	
Loss of ventilation in duct inside machinery space containing gas-fuelled engines[5]	X		X[3]	If double pipe fitted in machinery space containing gas-fuelled engines
Loss of ventilation in ESD protected machinery space containing gas-fuelled engines	X		X	
Fire detection in machinery space containing gas-fuelled engines	X			
Abnormal gas pressure in gas supply pipe	X			
Failure of valve control actuating medium	X		X[4]	Time delayed as found necessary
Automatic shutdown of engine (engine failure)	X		X[4]	

Parameter	Alarm	Automatic shutdown of tank valve[6)]	Automatic shutdown of gas supply to machinery space containing gas-fuelled engines	Comments
Manually activated emergency shutdown of engine	X		X	

1) Two independent gas detectors located close to each other are required for redundancy reasons. If the gas detector is of self-monitoring type the installation of a single gas detector can be permitted.

2) If the tank is supplying gas to more than one engine and the different supply pipes are completely separated and fitted in separate ducts and with the master valves fitted outside of the duct, only the master valve on the supply pipe leading into the duct where gas or loss of ventilation is detected shall close.

3) If the gas is supplied to more than one engine and the different supply pipes are completely separated and fitted in separate ducts and with the master valves fitted outside of the duct and outside of the machinery space containing gas-fuelled engines, only the master valve on the supply pipe leading into the duct where gas or loss of ventilation is detected shall close.

4) Only double block and bleed valves to close.

5) If the duct is protected by inert gas (see 9.6.1.1) then loss of inert gas overpressure shall lead to the same actions as given in this table.

6) Valves referred to in 9.4.1.

- Verify Training Manual Drills
- Verify STCW requirements
- Verify PPE/Confined space protocol
- Inspection/survey plan for fuel containment system
- Bunker Stations: verify procedures for purging fuel lines with inert gas
- Verify instructions to empty, purge storage tanks for fuel containment system
- Verify LNG Fire Response Teams / STCW training

Table 9.1 Bulkheads not bounding either main vertical zones or horizontal zones

Spaces		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Control Stations	(1)	B-0a	A-0	A-0	A-0	A-0	A-60	A-60	A-60	A-0	A-0	A-60	A-60	A-60	A-60
Stairways	(2)		A-0a	A-0	A-0	A-0	A-0	A-15	A-15	A-0c	A-0	A-15	A-30	A-15	A-30
Corridors	(3)			B-15	A-60	A-0	B-15	B-15	B-15	B-15	A-0	A-15	A-30	A-0	A-30
Evacuation stations and external escape routes	(4)					A-0	A-60b,d	A-60b,d	A-60b,d	A-0d	A-0	A-60b	A-60b	A-60b	A-60b
Open deck spaces	(5)						A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Accommodation spaces of minor fire risk	(6)						B-0	B-0	B-0	C	A-0	A-0	A-30	A-0	A-30
Accommodation spaces of moderate fire risk	(7)							B-0	B-0	C	A-0	A-15	A-60	A-15	A-60
Accommodation spaces of greater fire risk	(8)								B-0	C	A-0	A-30	A-60	A-15	A-60
Sanitary and similar spaces	(9)									C	A-0a	A-0	A-0	A-0	A-0
Tanks, voids and auxiliary machinery spaces having little or no fire risk	(10)											A-0	A-0	A-0	A-0
Auxiliary machinery spaces, cargo spaces, cargo and other oil tanks and other similar spaces of moderate fire risk	(11)											A-0a	A-0	A-0	A-15
Machinery spaces and main galleys	(12)												A-0a	A-0	A-60
Store-rooms, workshops, pantries, etc.	(13)													A-0a	A-0
Other spaces in which flammable liquids are stowed	(14)														A-30

Table 9.2 Decks not forming steps in main vertical zones nor bounding horizontal zones

Spaces below ↓ Spaces above →		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Control Stations	(1)	A-30	A-30	A-15	A-0	A-0	A-0	A-15	A-30	A-0	A-0	A-0	A-60	A-0	A-60
Stairways	(2)	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-30	A-0	A-30
Corridors	(3)	A-15	A-0	A-0a	A-60	A-0	A-0	A-15	A-15	A-0	A-0	A-0	A-30	A-0	A-30
Evacuation stations and external escape routes	(4)	A-0	A-0	A-0	A-0		A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Open deck spaces	(5)	A-0	A-0	A-0	A-0		A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Accommodation spaces of minor fire risk	(6)	A-60	A-15	A-0	A-60	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Accommodation spaces of moderate fire risk	(7)	A-60	A-15	A-15	A-60	A-0	A-0	A-15	A-15	A-0	A-0	A-0	A-0	A-0	A-0
Accommodation spaces of greater fire risk	(8)	A-60	A-15	A-15	A-60	A-0	A-15	A-15	A-30	A-0	A-0	A-0	A-0	A-0	A-0
Sanitary and similar spaces	(9)	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Tanks, voids and auxiliary machinery spaces having little or no fire risk	(10)	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0a	A-0	A-0	A-0	A-0
Auxiliary machinery spaces, cargo spaces, cargo and other oil tanks and other similar spaces of moderate fire risk	(11)	A-60	A-60	A-60	A-60	A-0	A-0	A-15	A-30	A-0	A-0	A-0a	A-0	A-0	A-30
Machinery spaces and main galleys	(12)	A-60	A-60	A-60	A-60	A-0	A-60	A-60	A-60	A-0	A-0	A-30	A-30a	A-0	A-60
Store-rooms, workshops, pantries, etc.	(13)	A-60	A-30	A-15	A-60	A-0	A-15	A-30	A-30	A-0	A-0	A-0	A-0	A-0	A-0
Other spaces in which flammable liquids are stowed	(14)	A-60	A-60	A-60	A-60	A-0	A-30	A-60	A-60	A-0	A-0	A-0	A-0	A-0	A-0

Notes: To be applied to tables 9.1 and 9.2 as appropriate.

a. Where adjacent spaces are in the same numerical category and superscript "a" appears, a bulkhead or deck between such spaces need not be fitted if deemed unnecessary by the Administration. For example, in category (12) a bulkhead need not be required between a galley and its annexed pantries provided the pantry bulkhead and decks maintain the integrity of the galley boundaries. A bulkhead is, however, required between a galley and machinery space even though both spaces are in category (12).

b. The ship's side, to the waterline in the lightest seagoing condition, superstructure and deckhouse sides situated below and adjacent to liferafts and evacuation slides may be reduced to "A-30".

c. Where public toilets are installed completely within the stairway enclosure, the public toilet bulkhead within the stairway enclosure can be of "B" class integrity.

d. Where spaces of categories (6), (7), (8) and (9) are located completely within the outer perimeter of the assembly station, the bulkheads of these spaces are allowed to be of "B-0" class integrity. Control positions for audio, video and light installations may be considered as part of the assembly station.

(1) Control stations
Spaces containing emergency sources of power and lighting, the ship's radio equipment, centralized fire alarm equipment, centralized emergency public address system stations and equipment, Wheelhouse and chartroom, Fire control stations, Control room for propulsion machinery when located outside the propulsion machinery space.

(2) Stairways
Interior stairways, lifts, totally enclosed emergency escape trunks, and escalators (other than those wholly contained within the machinery spaces) for passengers and crew and enclosures thereto. In this connection, a stairway which is enclosed at only one level shall be regarded as part of the space from which it is not separated by a fire door.

(3) Corridors
Passenger and crew corridors and lobbies.

(4) Evacuation stations and external escape routes
Survival craft stowage area, Open deck spaces and enclosed promenades forming lifeboat and liferaft embarkation and lowering stations, Assembly stations, internal and external. External stairs and open decks used for escape routes. The ship's side to the waterline in the lightest seagoing condition, superstructure and deckhouse sides situated below and adjacent to the liferaft and evacuation slide embarkation areas.

(5) Open deck spaces
Open deck spaces and enclosed promenades clear of lifeboat and liferaft embarkation and lowering stations. To be considered in this category, enclosed promenades shall have no significant fire risk, meaning that furnishings shall be restricted to deck furniture. In addition, such spaces shall be naturally ventilated by permanent openings. Air spaces (the space outside superstructures and deckhouses).

(6) Accommodation spaces of minor fire risk
Cabins, offices and dispensaries containing furniture and furnishings of restricted fire risk, Public spaces containing furniture and furnishings of restricted fire risk and having a deck area of less than 50 m2.

(7) Accommodation spaces of moderate fire risk
Spaces as in category (6) above but containing furniture and furnishings of other than restricted fire risk, Public spaces containing furniture and furnishings of restricted fire risk and having a deck area of 50 m2 or more, Isolated lockers and small store-rooms in accommodation spaces having areas less than 4 m2 (in which flammable liquids are not stowed), Motion picture projection and film stowage rooms, Diet kitchens (containing no open flame), Cleaning gear lockers and Laboratories (in which flammable liquids are not stowed), Pharmacies, Small drying rooms (having a deck area of 4 m2 or less), Specie rooms and Operating rooms.

(8) Accommodation spaces of greater fire risk
Public spaces containing furniture and furnishings of other than restricted fire risk and having a deck area of 50 m2 or more, Sale shops, Barber and beauty parlors, Saunas.

(9) Sanitary and similar spaces
Communal sanitary facilities, showers, baths, water closets, etc., Small laundry rooms, Indoor swimming pool area, Isolated pantries containing no cooking appliances in accommodation spaces, Private sanitary facilities shall be considered a portion of the space in which they are located.

(10) Tanks, voids and auxiliary machinery spaces having little or no fire risk.
Water tanks forming part of the ship's structure, Voids and cofferdams, Auxiliary machinery spaces which do not contain machinery having a pressure lubrication system and where storage of combustibles is prohibited, such as: ventilation and air-conditioning rooms; windlass room; steering gear room; stabilizer equipment room; electrical propulsion motor room; rooms containing section switchboards and purely electrical equipment other than oil-filled electrical transformers (above 10 kVA); shaft alleys and pipe tunnels; and spaces for pumps and refrigeration machinery (not handling or using flammable liquids). Closed trunks serving the spaces listed above, other closed trunks such as pipe and cable trunks.

(11) Auxiliary machinery spaces, cargo spaces, cargo and other oil tanks and other similar spaces of moderate fire risk
Cargo oil tanks. Cargo holds, trunkways and hatchways. Refrigerated chambers. Oil fuel tanks (where installed in a separate space with no machinery). Shaft alleys and pipe tunnels allowing storage of combustibles. Auxiliary machinery spaces as in category (10) which contain machinery having a pressure lubrication system or where storage of combustibles is permitted. Oil fuel filling stations. Spaces containing oil-filled electrical transformers (above 10 kVA). Spaces containing turbine and reciprocating steam engine driven auxiliary generators and small internal combustion engines of power output up to 110 kW driving generators, sprinkler, drencher or fire pumps, bilge pumps, etc. Closed trunks serving the spaces listed above.

(12) Machinery spaces and main galleys
Main propulsion machinery rooms (other than electric propulsion motor rooms) and boiler rooms. Auxiliary machinery spaces other than those in categories (10) and (11) which contain internal combustion machinery or other oil-burning, heating or pumping units.
Main galleys and annexes Trunks and casings to the spaces listed above.

(13) Store-rooms, workshops, pantries, etc.
Main pantries not annexed to galleys. Main laundry. Large drying rooms (having a deck area of more than 4 m2). Miscellaneous stores. Mail and baggage rooms. Garbage rooms. Workshops (not part of machinery spaces, galleys, etc.). Lockers and store-rooms having areas greater than 4 m2, other than those spaces that have provisions for the storage of flammable liquids.

(14) **Other spaces in which flammable liquids are stowed**
Paint lockers. Store-rooms containing flammable liquids (including dyes, medicines, etc.). Laboratories (in which flammable liquids are stowed).