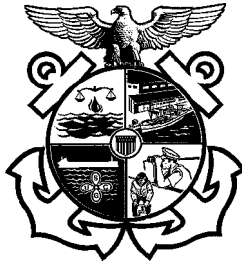


United States Coast Guard



**US DOMESTIC DEEPDRAFT LOW FLASHPOINT
FUEL ADDENDUM (LFFMI)
Job Aid**

Name of Vessel		
Official Number	Activity Number	
Date Completed	Class	
Location		
Vessel Built in Compliance with SOLAS:	60 74 74/78 NA	
Route		
<input type="checkbox"/> Oceans	<input type="checkbox"/> Limited Coastwise	<input type="checkbox"/> Lakes / Bays / Sounds
<input type="checkbox"/> Coastwise	<input type="checkbox"/> Great Lakes	<input type="checkbox"/> Rivers
Inspection Type		
<input type="checkbox"/> Inspection for Certification (COI)	<input type="checkbox"/> Annual	
<input type="checkbox"/> Periodic	<input type="checkbox"/> Drydocking	
Inspectors		
1. _____	3. _____	
2. _____	4. _____	

Performance and Qualification Standard

US DOMESTIC DEEPDRAFT LOW FLASHPOINT FUEL ADDENDUM (LFFMI)

This Job Aid is intended for use by qualified Coast Guard LFFMI Marine Inspectors for use on U.S. flagged vessels during an inspection on vessels regulated under Subchapters D, H and I.

The tasks contained within this Job Aid are not intended to limit the scope or depth of inspection. A checked box should be a running record of what has been inspected and does not imply that the entire system has been inspected or that all or any items are in full compliance. This Job Aid does not constitute part of the official inspection record.

This document does not establish or change federal laws or regulations and references given are only general guidance to the Marine Inspector. The Marine Inspector will need to refer to other publications such as the International Maritime Organization (IMO) resolutions, U.S. Codes of Federal Regulation (CFR), USCG Navigation and Vessel Inspection Circulars (NVIC) or locally produced guidance during the course of inspection for specific regulatory references. Not all items in this Job Aid are applicable to all vessels.

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Section 1: Administrative Items

Dates	Applicable IMO Gas Code	Applicable IMO Resolution	Document Issued
Keel laid date on or after 01 Jan 2017	IGF Code: MSC.391(95)		
Keel laid date before 01 Jan 2017		Interim Guidelines MSC.285(86)	

**Table 1: Monitoring of gas supply system to engines
(Source: IGF Code 2016)**

Parameter	Alarm	Automatic shutdown of tank valve ⁶⁾	Automatic shutdown of gas supply to machinery space containing gas-fueled engines
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-fueled engines at 20% LEL	X		
Gas detection on two detectors ¹⁾ in duct between tank and machinery space containing gas-fueled engines at 40% LEL	X	X ²⁾	
Parameter	Alarm	Automatic shutdown of tank valve ⁶⁾	Automatic shutdown of gas supply to machinery space containing gas-fueled engines
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-fueled engines at 30% LEL Note: If <u>double pipe fitted in machinery space containing gas-fueled engines</u>	X		
Gas detection on two detectors ¹⁾ in duct inside machinery space containing gas-fueled engines at 60% LEL Note: If <u>double pipe fitted in machinery space containing gas-fueled engines</u>	X		x ³⁾
Gas detection in ESD protected machinery space containing gas-fueled engines at 20% LEL	X		
Gas detection on two detectors ¹⁾ in ESD protected machinery space containing gas-fueled engines at 40% LEL Note: It shall also disconnect <u>non certified safe electrical equipment in machinery space containing gas-fueled engines</u>	X		X
Loss of ventilation in duct between tank and machinery space containing gas-fueled Engines	X		x ²⁾
Loss of ventilation in duct inside machinery space containing gas-fueled engines ⁵⁾ Note: If <u>double pipe fitted in machinery space containing gas-fueled engines</u>	X		x ³⁾

Loss of ventilation in ESD protected machinery space containing gas-fueled engines	X		X
Fire detection in machinery space containing gas-fueled engines	X		
Abnormal gas pressure in gas supply pipe	X		
Failure of valve control actuating medium Note: Time delayed as found necessary	X		X ⁴⁾
Automatic shutdown of engine (engine failure)	X		X ⁴⁾
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-fueled 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.

Section 2: Examination Items

Pre-Inspection

- 1. Research vessel details in the Marine Information for Safety and Law Enforcement (MISLE) database
 - Determine authority, jurisdiction & applicable references 46 CFR 30.15, 70.15 & 90.15
CG-OES Policy Ltr 01-15 & CG-ENG Policy Ltr 01-12 Ch-1
Design Basis Agreement Ltr
 - Review Design Basis Agreement Letter Design Basis Agreement Ltr
 - Review special notes pertaining to alternative design arrangements CG-ENG Policy Ltr 01-12 Ch-1
IGF Code 2.3
SOLAS 20 II-1/55
 - Review special notes pertaining to system configuration IGF Code 5.4.1
IGF Code 9.6
IGF Code 9.7
 - Review special notes pertaining to independent tanks IGF Code 2.2.23
IGF Code 6.4.15.1 & .2
IGF Code 6.4.15.3
 - Review special notes pertaining to membrane tanks IGF Code 2.2.31
IGF Code 6.4.15.4
 - Review special notes pertaining to secondary barrier IGF Code 6.4.3
IGF Code 6.4.4.4
IGF Code 2.2.37
 - Review Periodic Safety Test Procedures for gas fuel systems CG-ENG Policy Ltr 01-12 Ch-1,
15.3

- 2. Conduct safety meeting
 - Ensure team is aware of safety hazards associated with fuels MSM I/10.C.1.a
Tanker Safety Guide
 - Verify team is outfitted with appropriate PPE MSM I/10.D.5.a
MSM I/8.A.3

Certificates and Documents

- 3. Inspect crew training documentation
 - Verify basic training IGF Code 19.2
STCW V/3.4
CG-OES Policy Ltr 01-15 Encl. 3
 - Verify advanced training IGF Code 19.2
STCW V/3.7
CG-OES Policy Ltr 01-15 Encl. 3
 - Verify training for personnel conducting maintenance on electrical equipment in hazardous areas IGF Code 14.3.3; 18.3.3
IMO Res MSC.285(86) 8.3.4

- 4. Inspect LNG as fuel endorsements
 - Verify Classification document (if applicable) IGF Code 3.2.17
CG-ENG Policy Ltr 01-12 Ch-1 2.1
 - Verify Cargo Ship Safety Construction Certificate SOLAS 20 Appendix A
SOLAS 20 II/I 55.2.2.2
SOLAS 20 I/12(a)(vi)

Logs and Manuals

- 5. Inspect regulatory documents
 - Verify presence of IGF Code IGF Code 18.2.1
 - Verify presence of administration regulations incorporating IGF Code IGF Code 18.2.1
CG-ENG Policy Ltr, 01-12, Ch-1
CG-OES Policy Ltr 01-15

- 6. Inspect maintenance & repair procedures
 - Verify presence IGF Code 18.2.2
CG-OES Policy Ltr 01-15 Encl. 1
 - Review maintenance and repair procedures to include consideration of tank location and adjacent space IGF Code 18.3.1
IGF Code Chapter 5

- 7. Inspect operational procedures & fuel handling manual
 - Verify presence IGF Code 18.2.3
CG-ENG Policy Ltr 01-12 Ch-1
 - Verify contents IGF Code 18.4.2.1 & 18.6.2
IGF Code 6.3.12
CG-ENG Policy Ltr 01-12 Ch-1

- 8. Inspect emergency procedures
 - Verify presence IGF Code 18.2.4
CG-OES Policy Ltr 01-15 Encl. 1

- 9. Inspect bunker procedures
 - Verify presence IGF Code 18.4.1.1 & .2
CG-OES Policy Ltr 01-15 Encl. 1
 - Verify completion of safety checklist IGF Code 18.4.1.1.3
IGF Code 18.4.3
 - Verify PICs have signed copies of Delivery notes designation IGF Code 18.4.1.2
IGF Code 18 Annex 1
 - Verify storage tank fill limits IGF Code 6.8
CG-ENG Policy Ltr 01-12 Ch-1, 6.8.2
 - Verify portable tanks (if applicable) are addressed in procedures IGF Code 18.4.6.3
IGF Code 6.5
CG-ENG Policy Ltr 01-12 Ch-1, 6.8.2

- 10. Inspect electrical equipment maintenance manual
 - Verify presence IGF Code 18.3.1
CG-ENG Policy Ltr 01-12 Ch-1 14.3
 - Verify inspection & maintenance IAW standards IGF Code 18.3.3
CG-ENG Policy Ltr 01-12 Ch-1 14.3
CG-OES Policy Letter 01-15 Encl (1) c.

- 11. Inspect inspection/survey plan for LNG fuel containment system
 - Verify presence IGF Code 18.2.2
 - Verify approval IGF Code 6.4.1.8
 - Verify contents IGF Code 6.4.1.8
 - Verify required surveys, maintenance & testing completed IGF Code 18.3.2
IGF Code 6.4.1.9

- 12. Inspect training manual, drills & exercises
 - Verify emergency drills are performed IGF Code 17
CG-OES Policy Ltr 01-15 Encl. 3

General Health & Safety

- 13. Inspect airlocks
 - Verify presence IGF Code 5.11.1
IGF Code 5.11.2 & .4
 - Verify door self closing and no holding back IGF Code 5.12.1
IGF Code 5.12.3
 - Verify ventilation overpressure IGF Code 5.12.2
IGF Code 13.3.9 & .10
 - Verify free & easy passage IGF Code 5.12.4
 - Verify audible & visual alarms IGF Code 5.12.5 & .6
IGF Code 13.3.9 & .10
 - Verify continued operation of essential equipment IGF Code 5.12.7
 - Verify de-energization of non-certified electrical equipment with loss of overpressure IGF Code 14.3.9
 - Verify presence of gas detection IGF Code 15.8.1.7

- 14. Inspect personnel protection equipment (PPE)
 - Verify specific fuel properties and special equipment needed for the safe handling of the particular fuel IGF Code 18.4.6.2
CG-OES Policy Ltr 01-15 Encl. 1, p9
Fuel Handling Manual
 - Verify appropriate PPE per vessel's (during transfer operations only) IGF Code 18.4.6.2
Fuel Handling Manual

Firefighting Systems

15. Inspect water spray systems
- Verify installation IGF Code 11.5.1 & .2
CG-ENG Policy Ltr 01-12 Ch-1
11.5
IMO Res MSC.285(86) 3.3.2
 - Verify capacity of fire main pump if used to supply system to operate simultaneously IGF Code 11.5.3 & .5
CG-ENG Policy Ltr 01-12 Ch-1
11.5.6
IMO Res MSC.285(86) 3.3.2
 - Verify fire main connection IGF Code 11.5.6
IMO Res MSC.285(86) 3.3.1-2
 - Verify stop valves are properly fitted in main supply line IGF Code 11.5.4
 - Verify nozzles IGF Code 11.5.8
CG-ENG Policy Ltr 01-12 Ch-1
11.5.2 & .8
IMO Res MSC.285(86) 3.3.2.7
 - Verify remote operation of pumps and valves IGF Code 11.5.7
 - Witness operational test of system IGF Code 11.5.3
IGF Code 11.5.5
16. Inspect fixed dry chemical powder extinguishing system
- Verify installation IGF Code 11.6.1
CG-ENG Policy Ltr 01-12 Ch-1
11.6
IMO Res MSC.285(86)/3.3.3
 - Verify servicing IMO MSC.1/Circ. 1432
 - Verify capacity IGF Code 11.6.1
IMO Res MSC.285(86)/3.3.3
 - Verify location of manual release IGF Code 11.6.1
IMO Res MSC.285(86) 3.3.3

- 17. Inspect fire detection & alarm system
 - Verify presence of fuel system fire detection & alarm
 IGF Code 11.7.1, 15.9
CG-ENG Policy Ltr 01-12 Ch-1
11.7
IMO Res MSC.285(86)/3.4.1
 - Verify presence of machinery space fire detection & alarm
 IGF Code 11.7.1
FSS Code 2.3
 - Witness operational test of fire detection & alarm systems
 IGF Code 11.7
IGF Code 15.9

- 18. Inspect structural fire protection (SFP)
 - Verify SFP boundaries facing fuel tanks on open decks
 IGF Code 11.3.2
 - Verify SFP in space containing fuel containment system
 IGF Code 11.3.3
 - Verify SFP for bunker station boundaries
 IGF Code 11.3.6

Machinery Equipment

- 19. Inspect ventilation
 - Verify inlet and outlet locations
 IGF Code 6.7.2.8
IGF Code 13.3.5 & .6
 - Verify operation of machinery spaces ventilation
 IGF Code 13.5.1 & 2
IGF Code 13.6
IGF Code 15.10
 - Verify construction of ventilation in double duct piping
 IGF Code 13.8.1
IGF Code 13.8.2
IGF Code 13.8.4
 - Witness loss of ventilation alarms and shutdowns.
 IGF Code 15.2.2
IGF Code 15.10
 - Verify operation of ventilation for fuel preparation room
 IGF Code 13.6

- 20. Inspect Gas Compressors
 - Verify manual remote emergency stop locations IGF Code 15.11.4
 - Verify manual local emergency stop for gas compressor IGF Code 15.11.4
 - Witness operational test of emergency stops IGF Code 15.11.4
 - Witness operational test of gas compressor audible and visual alarms IGF Code 15.6.1
 - Witness operational test of shaft and bearings audible and visual alarms IGF Code 15.6.2

- 21. Inspect ESD Protected Machinery Space
 - Verify presence of redundant gas detection systems for ESD protected machinery spaces IGF Code 15.8.2
 - Verify operation of gas detection shutdowns and electrical equipment disconnects IGF Code 5.6.3.3
IGF Code 12.3.3.2
 - Verify arrangement of ventilation system IGF Code 5.6.7
IGF Code 13.5
 - Verify electrical equipment certification IGF Code 12.3.3

- 22. Inspect Gas consumers
 - Determine combustion installation(s) (Piston, Boilers, Turbines) IGF Code 10.3, 10.4 & 10.5
 - Determine engine installation (Dual Fuel, Gas Only, or multi-fueled) IGF Code 10.3.2, 10.3.3 & 10.3.4
 - Verify arrangement of combustion installation (Piston, Boilers, Turbines) IGF Code 10.3, 10.4 & 10.5
 - Verify arrangement engine installation (Dual Fuel, Gas Only, or multi-fueled) IGF Code 10.3.2, 10.3.3 & 10.3.4

- 23. Inspect Gas Safe Machinery Space
 - Verify presence of gas detection systems for Gas Safe Machinery Space IGF Code 15.8.1.3
IGF Code 5.5
 - Verify operation of ventilation IGF Code 13.5.1
 - Visually inspect condition of double wall piping IGF Code 9.6.1
CG-ENG Policy Ltr 01-12 Ch-1
 - Witness alarm test for loss of pressurization between double wall piping IGF Code 9.6.1.1
 - Witness alarm test for loss of ventilation between double wall piping IGF Code 9.6.1.2

- 24. Inspect bilge system
 - Identify segregated bilge system for location where fuel is present IGF Code 5.9.1
IMO Res MSC.285(86) 2.8.4.5
 - Witness operation of bilge well high level alarm IGF Code 15.3.2
IMO Res MSC.285(86) 5.1.3
 - Witness operation of bilge well low temperature alarm IGF Code 15.3.2
IMO Res MSC.285(86) 5.1.3

Fuel Transfer System

- 25. Inspect bunkering station
- Verify compliance with ventilation special consideration for other than open deck
 - IGF Code 8.3.1.1
 - IGF Code 13.7
 - IMO Res MSC.285(86) 2.9.1.1
 - Verify piping
 - IGF Code 8.3.1.2
 - IMO Res MSC.285(86) 2.9.1
 - Verify drip trays
 - IGF Code 8.3.1.3
 - IGF Code 5.10
 - IMO Res MSC.285(86) 2.9.1
 - Verify pressure relief/liquid removal capabilities
 - IGF Code 8.3.1.4
 - Witness testing of deck/hull shielding (water curtain)
 - IGF Code 8.3.1.5
 - IGF Code 8.3.1.6
 - Verify arrangement of bunkering valves
 - IGF Code 8.5.3
 - IMO Res MSC.285(86) 2.9.2
 - Verify manifold connections
 - IGF Code 8.4.1
 - CG-OES Policy Ltr 01-15 Encl. 1, p10
 - Verify fuel schematic/piping & instrumentation diagram (P&ID)
 - IGF Code 18.4.2.2
 - Verify manifold pressure indicator
 - IGF Code 15.4.7
 - Verify ship-shore link (SSL)
 - IGF Code 8.5.7
 - IGF Code 18.4.4.4
 - CG-OES Policy Ltr 01-15 Encl. 1, p10
 - Verify present of extinguisher
 - IGF Code 11.6.2
 - Witness operation of manifold shutdown valves within allowed time
 - IGF Code 8.5.3
 - IGF Code 16.7.3.7

- 26. Inspect bunkering control location
 - Verify location and operation of monitoring equipment
 IGF Code 15.5.1
IMO Res MSC.285(86) 2.9.1
 - Verify presence of tank temperature gauge(s)
 IGF Code 15.5.1
IGF Code 15.4.4 & .11
IMO Res MSC.285(86) 2.9.1
 - Verify presence of water spray system pump & valve control(s)
 IGF Code 15.5.1
IGF Code 11.5.7
 - Verify presence of manually and automatic remote shutdown valve(s) in series or combined manually operated and remote valve(s)
 IGF Code 15.5.1
IGF Code 8.5.3
 - Verify operation of bunkering line ventilation failure audible and visual alarms
 IGF Code 15.5.2
 - Verify presence of gas detection audible and visual alarms
 IGF Code 15.5.3
IMO Res MSC.285(86) 2.9.2
 - Verify fuel schematic/piping & instrumentation diagram (P&ID)
 IGF Code 18.4.2.2

- 27. Inspect fuel containment
 - Verify Maximum Allowable Relief Valve Setting (MARVS)
 IGF Code 6.3.1
IGF Code 6.6.2
 - Verify Maximum Allowable Working Pressure (MAWP)
 IGF Code 6.3.2
IGF Code 15.4.4
 - Verify drip trays
 IGF Code 6.3.10
IGF Code 5.10
 - Verify means for emptying tanks
 IGF Code 6.3.11
 - Verify tank emptying procedures
 IGF Code 6.3.12

- 28. Inspect fuel tank monitoring
 - Verify liquid level gauge(s) arrangement IGF Code 15.4.1
 - Witness operational test of high liquid level alarm IGF Code 15.4.2.1
IGF Code 15.4.2.3
IGF Code 15.4.2.4
 - Witness operational test of automatic overfill prevention shutoff within allowed time IGF Code 15.4.2.2 - .4
IGF Code 16.7.3.7
IMO Res MSC.285(86) 2.9.1-.2
 - Verify presence of direct vapour space reading gauge IGF Code 15.4.3 & .4
 - Witness operational test of high & low-pressure alarms IGF Code 15.4.5
 - Verify presence of fuel pump discharge pressure indicator IGF Code 15.4.4 & 15.4.6
IGF Code 15.4.8
IGF Code 15.4.9
 - Witness operational test of low liquid level audible and visual alarm IGF Code 15.4.10
 - Witness operational test of low-low liquid level shutdown & audible and visual alarm IGF Code 15.4.10
 - Verify temperature measurement devices IGF Code 15.4.11

- 29. Inspect pressure relief systems for LG fuel tanks
 - Verify pressure relief device on vacuum space of a vacuum insulated tank IGF Code 6.7.2.1
 - Verify a minimum of 2 pressure relief valves (PRVs) per fuel tank IGF Code 6.7.2.2
IGF Code 6.7.2.5
IGF Code 6.7.2.13
 - Verify interbarrier pressure relief devices IGF Code 6.7.2.3
 - Verify PRV settings IGF Code 6.7.2.4
 - Verify emergency isolation IGF Code 6.7.2.6
 - Verify venting system IGF Code 6.7.2.7
 - Verify other fuel gas vent outlet arrangements IGF Code 6.7.2.9
 - Verify means to drain liquid IGF Code 6.7.2.10
 - Verify vent screens IGF Code 6.7.2.11

- 30. Inspect means of maintaining fuel storage condition
 - Verify tank pressure & temperature control measures IGF Code 6.9.1
 - Verify operation of pressure and temperature control method(s) IGF Code 6.9.1
 - Verify secondary system availability IGF Code 6.9.6.1

- 31. Inspect fuel containment system atmospheric controls
 - Verify gas sampling points IGF Code 6.10.3

- 32. Inspect inert gas system
 - Verify continuous-reading oxygen content meter IGF Code 6.14.1
 - Verify set point of oxygen content by volume alarm IGF Code 6.14.1
 - Verify pressure controls & monitoring arrangements IGF Code 6.14.2
 - Verify nitrogen compartment ventilation IGF Code 6.14.3
 - Witness test of low oxygen in compartment alarm, if system is located outside the engine room IGF Code 6.14.3
 - Verify installation of backflow prevention IGF Code 6.13.1
 - Witness test of low oxygen on the nitrogen system oxygen content analyzer IGF Code 6.14.3
 - Verify nitrogen compartment ventilation & test low oxygen alarm IGF Code 6.14.3

- 33. Inspect fuel piping
 - Verify color markings IGF Code 7.3.1.1
ISO 14726
 - Verify electrical bonding IGF Code 7.3.1.2
IGF Code 18.4.5
 - Verify relief valves IGF Code 7.3.1.3
 - Verify thermal insulation IGF Code 7.3.1.4
 - Verify installation IGF Code 9.2.2
IGF Code 9.2.3
 - Verify purging arrangements IGF Code 7.2.1.3
 - Verify special consideration through Ro-Ro spaces IGF Code 11.3.5

- 34. Inspect safety functions of gas & fuel supply system
 - Verify automatic operation of storage tank valves IGF Code 9.4.1
IGF Code 16.7.3.6
 - Witness operation of master gas fuel valve IGF Code 9.4.2
IGF Code 9.4.3
IGF Code 9.4.7
 - Witness operation test of double block and bleed valves IGF Code 9.4.4
IGF Code 9.4.5
IGF Code 9.4.9
 - Verify operation of manual shutdown valve IGF Code 9.4.8
 - Verify rupture detection system & location/operation of shutoff valve IGF Code 9.4.10
 - Verify condition of secondary piping enclosure outside machinery space IGF Code 9.5
 - Verify condition of secondary piping enclosure in gas-safe machinery space IGF Code 9.6
 - Verify automatic shutdown signage IGF Code 15.11.1
 - Verify fuel supply shutdown signage IGF Code 15.11.2
 - Verify heavy lifting signage IGF Code 15.11.3

- 35. Inspect gas detection system
 - Verify gas detector installation(s)

	IGF Code 15.8.1
	IGF Code 15.8.3 & .8
	CG-ENG Policy Ltr 01-12 Ch-1, 15.8(b)
 - Verify equipment meets recognized standard

	CG-ENG Policy Ltr 01-12 Ch-1, 15.8(b)
	IEC 60079-29-1
 - Verify alarm set points

	IGF Code 15.8.6-.9
	CG-ENG Policy Ltr 01-12 Ch-1 15.8
 - Witness operational test of equipment

	IGF Code 15.8.5 & .9
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 - Verify operation of independent power sources for gas detection

	CG-ENG Policy Ltr 01-12 Ch-1, 15.8(e)(vi) (Encl. 1, p 9)
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- 36. Inspect system redundancy
 - Verify operation of redundant system for single fuel installation

	IGF Code 9.3.1
	IGF Code 9.3.2
 - Verify operation of redundant system for Type C tank installation

	IGF Code 9.3.3
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Electrical Systems

- 37. Inspect hazardous areas
 - Verify hazardous area classification(s)

	IGF Code 12.3, .5
	CG-ENG Policy Ltr 01-12 Ch-1
 - Verify conditions of electrical equipment installation

	IGF Code 12.3
	IGF Code 14.3.3

- 38. Inspect low - low liquid alarm & shutdown
 - Witness operation of motor shutdown

	IGF Code 14.3.7
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 - Witness operation of alarms and indicator(s)

	IGF Code 14.3.7
--	-----------------
 - Verify means of locking submerged pump circuit breaker

	CG-ENG Policy Ltr 01-12 Ch-1 Encl. 1, p 8
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Emergency Drills

- 39. Verify drills are conducted
 - Witness gas related ship specific drills IGF Code 17
CG-OES 01-15 (Chapter 5.3)

Follow Up Actions

- 40. Complete MISLE Activity
 - Ensure Propulsion System Type indicates Dual Fuel (Diesel & Liquefied Gas) MISLE User Guide
 - Enter alternative design into Special Notes MISLE User Guide
 - Enter system configuration into Special Notes MISLE User Guide
 - Enter tank type into Special Notes MISLE User Guide
- 41. Complete Deficiency Write-up
 - Enter deficiency into MISLE using MISLE Code 13101 or 13102 MISLE User Guide
Design Basis Agreement Letter
CG-ENG Policy Ltr 01-12 Ch-1

Section 3: Appendices

Confined Space Entry Checklist

Sources for Policy

- COMDTINST M5100.47, Chapter 6, change 11
- MSM Vol. 1, Chapter 10 & Appendix A, C, G to chap. 10
- 29 CFR 1915, Part B

A Confined Space for the purpose of this checklist is:

A space that possess all of the following three distinct characteristics –

1. Is large enough and so configured that an employee can bodily enter & perform assigned work;
2. Has limited or restricted means for entry or exit; and
3. Is not designed for continuous employee occupancy

Hazards associated with confined space entry

- Oxygen deficient or enriched atmosphere
- Flammable atmosphere
- Toxic atmosphere
- Extreme temperature (hot or cold)
- Engulfment hazard (such as grain, coal, sand, gypsum or similar material)
- Extreme noise
- Slick / wet surfaces & tripping hazards
- Falling objects
- Potential for rapidly changing atmosphere

USCG Confined Space Entry Requirement

A certified Marine Chemist **shall** conduct the initial inspection & certify all confined spaces on merchant vessels “Safe for Workers” before entry by USCG personnel.

In rare circumstances, if a Marine Chemist is not available, the OCMI may designate a USCG Competent Person to certify a confined space “Safe for Workers”

Examples (not limited to) of confined spaces on gas carriers:

<u>Confined Spaces</u>	<u>Hazard</u> ²⁾
Voids/Cofferdams ¹⁾	P- O; S- F,T
Sealed Compartments ¹⁾	P- O; S- F,T
Double Bottoms/Sides/Duct Keels ¹⁾	P- O; S- F,T
Spaces Coated with a Preservative ¹⁾	P- O; S- F,T
Engine Crankcases/Scavenging Spaces ¹⁾	P- O; S- F,T
Large Heat Exchangers ¹⁾	P- O; S- F,T
Fuel/Lube Oil/Sludge Tanks ¹⁾	P- F,T; S- O
Water tanks ¹⁾	P- O; S- F,T
Cargo/Slop Tanks ¹⁾	P- O; S- F,T
Pump Rooms (if provided) ³⁾	P- O; S- F,T

1) Port State Control Officers should not attempt to enter any of the above spaces during a standard PSC examination, other than pump rooms. There may be reason to enter one or more of these spaces during the exam if there are clear grounds to do so, but only enter these spaces after ensuring they are safe for entry. Review the safe work practices contained in MSM Vol. 1, chapter 10, Appendix A for entry into confined spaces other than pump rooms.

- 2) Hazards –**
- P (Primary);**
 - S (Secondary);**
 - O (Oxygen Deprivation);**
 - F (Flammability);**
 - T (Toxicity)**

Examples (not limited to) of non-confined spaces that may pose a hazard on gas carriers:

<u>Non-confined spaces that may pose a risk (All vessel types)</u>	<u>Possible Hazard(s)</u>	<u>Safe Work Practice</u>
CO ₂ Storage Room	O ₂ deprivation due to leaking CO ₂	Ensure proper ventilation, wear O ₂ meter
Machinery Spaces	Noise, Flammability, Toxicity; MSDs – H ₂ S	Hearing protection
Flammable Storage Lockers/Paint Rooms	Flammability, Toxicity	Ensure proper ventilation
Battery Room	Toxicity -	Ensure proper ventilation
Bosun Shop	O ₂ deprivation	Ensure proper ventilation
Workshops	Toxicity from welding fumes, Flammability, Noise	Ensure proper ventilation
Provisions/Non-Flammable Storage	O ₂ deprivation	Ensure proper ventilation
Compressor Rooms ¹⁾	O ₂ deprivation, Flammability	See Note 1
Re-Liquefaction Plant Room ¹⁾	O ₂ deprivation, Flammability	See Note 1
Re-Gasification Plant Room ¹⁾	O ₂ deprivation, Flammability	See Note 1
Open Cargo Deck	Flammability	Ensure use of intrinsically safe radios, flashlight, phone, etc.

1) Space is monitored every thirty minutes by gas detection system. Enter these spaces after ensuring these are safe for entry and after ensuring the gas detection system is calibrated and functioning properly and gas levels detected are safe for entry. A marine chemist certificate is not required prior to entry.

. IMMEDIATELY LEAVE ANY CONFINED SPACE IF:

- A personal monitor alarms;
- You feel dizzy or lightheaded;
- The forced air ventilation stops or is apparently ineffective; or
- If you sense any unexpected chemical through smell or dermal sensation that concerns you. This is a judgment call; however, you should depart any time there is a burning sensation in your lungs or you experience a shortness of breath. Any of these sensations may indicate a life-threatening situation and you must react promptly to avoid injury.

Note: Climbing (other than on ladders) shall be limited to 5ft.

Steps to Take After Entry for All Confined Spaces

- Immediately contact your chain of command if you left a confined space for any of the reasons noted above. Do not reenter any confined space until notification of appropriate senior personnel and direction from your supervisor is obtained.
- Report any inconsistencies in the marine chemist certificate or competent person log to your supervisor and follow-up with a letter to Commandant CG-1134 via your District (industrial hygienist).
- In the event of overexposure, personnel should be evacuated to appropriate medical facilities by the most expeditious means. Medical personnel should be provided with all known information on the suspected exposure, including concentration and duration of exposure. This should include the most probable route of exposure. Also provide the medical authority with the phone number to American Toxic Substance and Disease Registry (ATSDR).

IEC Interpretation Tables

Ex	ia	IIC	T4	Ga
Explosion Protected	Type of Protection	Gas Group	Temperature Class	Equipment Protection Level

Methods of Protection	Symbols	Symbols	Standards 60079-0 &
Intrinsic Safety	"i"	ia: Zone 0	IEC 60079-11
		ib: Zone 1	
		ic: Zone 2	
Flameproof	"d"	db: Zone 1	IEC 60079-01
		dc: Zone 2	
Increased Safety	"e"	eb: Zone 1	IEC 60079-07
		ec: Zone 2	
Purging and Pressurization	"p"	pbx: Zone 1	IEC 60079-02
		pby: Zone 1	
		pcz: Zone 2	
Non-sparking Sealed Devices	"n"	nA: Zone 2	IEC 60079-15
		nC: Zone 2	
		nR: Zone 2	
Restricted Breathing Encapsulation	"m"	ma: Zone 0	IEC 60079-18
		mb: Zone 1	
		mc: Zone 2	
Power Filled	"q"	q: Zone 1	IEC 60079-05
Oil Immersed	"o"	ob: Zone 1	IEC 60079-06
		oc: Zone 2	
Optical Radiation	"op"	op is: Zone 0,1,2	IEC 60079-28
		op pr: Zone 1,2	
		op sh: Zone 0,1,2	

a: Zone 0 or 1 or 2

b: Zone 1 or 2

c: Zone 2

Gas Groups	Is suitable for:	Representative Gas	
IIC	IIC, IIB, IIA	Acetylene	<i>Most ignitable</i>
IIB + H2	IIB+H2, IIB, IIA	Hydrogen	
IIB	IIB, IIA	Ethylene	
IIA	IIA	Propane Methane Ammonia	<i>Least ignitable</i>

T-Code	Degrees C	Degrees F	Representative Gas
T6	85	185	Carbon Disulfide
T5	100	212	
T4	135	275	Di-ethyl ether
T3	200	392	Gasoline Kerosene
T2	300	572	Methanol
T1	450	842	Methane Propane Ammonia

Max surface temperature under normal or fault condition.

EPL	ZONE	
Ga	0	Always Present
Gb	1	Likely
Gc	2	Not Likely

Ga - Most restrictive; can be installed in any Zone 0, 1, 2

Gb - Zones 1 or 2

Gc - Least restrictive; Zone 2 only.

* Gas Properties can be located in: IEC 60079-20-1

