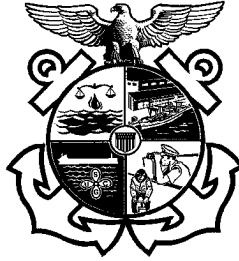


# United States Coast Guard



## LOW FLASHPOINT FUEL

### Job Aid

<b>Name of Vessel:</b>	<b>Flag:</b> <input type="checkbox"/> No Change
<b>IMO Number:</b>	<b>Activity Number:</b>
<b>Date Completed:</b>	<b>Priority:</b>
<b>Location:</b>	
<b>Vessel Built in Compliance with SOLAS: 60 74 74/78 NA</b>	
<b>Port State Control Officer &amp; Examiners</b>	
1. _____	3. _____
2. _____	4. _____

## Use of Foreign Gas Carrier Job Aid

This examination book is intended to be used as a job aid by Coast Guard Port State Control Officers (PSCOs) during an examination of a vessel with a low flashpoint fuel propulsion. This book contains an extensive list of possible examination items. It is not, however, the Coast Guard's intention to "examine" all items listed. As a port state responsibility, PSCOs must verify that the vessels and their crews are in substantial compliance with international conventions and applicable U.S. laws. The depth and scope of the examination must be determined by the PSCOs based on the condition of the ship, operation of its systems and the competency of the ship's crew.

This Job Aid cites the 2016 International Code of Safety for Ships using Gases or other Low-flashpoint (IGF). In some cases, the regulations in IGF Code 16 may **NOT** apply due to the keel laid date of the vessel. PSC personnel must pay close attention to the applicability dates of the IGF Code chapters and regulations when conducting PSC exams.

This Job Aid does not establish or change Federal laws or regulations. References given are only general guides. Refer to IMO publications, CFR's, the Port State Control Job Aid or NVIC's for specific regulatory references.

*Note: Review the CG Confined Space Entry Policy COMDTINST 5100.47, change 11, Gas Dangerous Spaces as defined in 46 CFR 154.47 and applicable IGC Code, represent additional workplace hazards.*

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## Section 1: Administrative Items

Dates	Applicable IMO Gas Code	Applicable IMO Resolution	Document Issued
<b>Keel laid date</b> on or after 01 Jan 2017	, IGF Code: MSC.391(95)		
<b>Keel laid date</b> 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 <sup>6)</sup>	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 <sup>1)</sup> 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		
as detection on two detectors <sup>1)</sup> in duct between tank and machinery space containing gas-fueled engines at 40% LEL	X	X <sup>2)</sup>	
Parameter	Alarm	Automatic shutdown of tank valve <sup>6)</sup>	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 <sup>1)</sup> in fuel preparation room at 40% LEL	X	x <sup>2)</sup>	
Gas detection in duct inside machinery space containing gas-fueled engines at 30% LEL <b>Note: If <u>double pipe fitted in machinery space containing gas-fueled engines</u></b>	X		
Gas detection on two detectors <sup>1)</sup> in duct inside machinery space containing gas-fueled engines at 60% LEL <b>Note: If <u>double pipe fitted in machinery space containing gas-fueled engines</u></b>	X		x <sup>3)</sup>
Gas detection in ESD protected machinery space containing gas-fueled engines at 20% LEL	X		
Gas detection on two detectors <sup>1)</sup> in ESD protected machinery space containing gas-fueled engines at 40% LEL <b>Note: It shall also disconnect <u>non certified safe electrical equipment in machinery space containing gas-fueled engines</u></b>	X		X
Loss of ventilation in duct between tank and machinery space containing gas-fueled Engines	X		x <sup>2)</sup>
Loss of ventilation in duct inside machinery space containing gas-fueled engines <sup>5)</sup> <b>Note: If <u>double pipe fitted in machinery space containing gas-fueled engines</u></b>	X		x <sup>3)</sup>

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 <b>Note: Time delayed as found necessary</b>	X		X <sup>4)</sup>
Automatic shutdown of engine (engine failure)	X		X <sup>4)</sup>
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 foreign authority, jurisdiction & applicable references SOLAS 20 II-1/56 & 57  
IGF Code  
IMO Res MSC.285(86)
  - Review special notes pertaining to alternative design arrangements SOLAS 20 II-1/55  
IGF Code 2.3  
MSM I/12.G.5
  - 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 2.2.37  
IGF Code 6.4.3  
IGF Code 6.4.4.4
  
- 2. Conduct safety meeting
  - Verify team is outfitted with appropriate PPE MSM I/10.D.5.a  
MSM I/8.A.3
  - Verify team is outfitted with atmospheric monitors MSM I/10.D.5.b
  - Ensure team is aware of safety hazards associated with fuels MSM I/10.C.1.a  
Tanker Safety Guide
  - Determine if exam scope will require a Marine Chemist certification for space entry 29 CFR 1915, Part B  
MSM II/D.6.C.1.f
  - Verify Marine Chemist has been scheduled for the exam (when applicable) MSM I/10 App. A



## Certificates and Documents

- 3. Examine crew training documentation
  - Review basic training IGF Code 19.2  
STCW 10 V/3.4, 11 & 12
  - Review advanced training IGF Code 19.2  
STCW 10 V/3.7, 11 & 12
  - Review training for responsible personnel & personnel conducting inspection and maintenance on electrical equipment in hazardous areas IGF Code 14.3.3, IEC 60092-502  
Clause 9  
IGF Code 18.3.3, IEC 60079-17
  
- 4. Examine LNG as fuel endorsements & risk assessment
  - Verify endorsement on Passenger Ship Safety Certificate SOLAS 20 I/12(a)(I)
  - Verify endorsement on Cargo Ship Safety Construction Certificate SOLAS 20 I/12(a)(vi)
  
- 5. Examine required regulations
  - Verify presence of IGF Code IGF Code 18.2.1
  - Verify presence of administration regulations incorporating IGF Code IGF Code 18.2.1

## Logs and Manuals

- 6. Examine maintenance & repair procedures
  - Verify presence IGF Code 18.2.2
  - Verify maintenance and repair procedures include consideration of tank location and adjacent space. IGF Code 18.3.1  
IGF Code Chapter 5
  - Verify in-service survey, maintenance and testing on fuel containment system per Administration approved plans IGF Code 18.3.2  
IGF Code 6.4.1.8
  - Verify inspection/maintenance of electrical equipment in hazardous locations IGF Code 18.3.3  
IEC 60079 parts 17 & 19
  
- 7. Examine operational procedures & fuel handling manual
  - Verify presence IGF Code 18.2.3
  - Verify contents IGF Code 18.4.2.1  
IGF Code 18.6.2  
IGF Code 6.3.12
  
- 8. Examine emergency procedures
  - Verify presence IGF Code 18.2.4
  
- 9. Examine bunker procedures
  - Verify presence IGF Code 18.4.1.1 & .2
  - 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 IGF Code 18.4.1.2  
IGF Code 18 Annex 1
  - Verify storage tank fill limity IGF Code 6.8
  - Verify portable tanks (if used) be in procedures IGF Code 18.4.6.3

## General Health & Safety

- 10. Examine bunker procedures
  - Verify presence IGF Code 18.4.1.1 & .2
  - 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 IGF Code 18.4.1.2  
IGF Code 18 Annex 1
  - Verify storage tank fill capacity IGF Code 6.8
  - Verify portable tanks (if used) be in procedures IGF Code 18.4.6.3
  
- 11. Examine airlocks
  - Verify presence IGF Code 5.11.1, .2 & .4
  - Verify door self closing and no holding back IGF Code 5.12.1
  - Verify ventilation overpressure IGF Code 5.12.2
  - 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 essential equipment IGF Code 5.12.7  
IGF Code 14.3.9
  - Verify presence of gas detection IGF Code 15.8.1.7
  
- 12. Examine personnel protection equipment (PPE)
  - Verify specific fuel properties and special equipment needed for the safe handling of the particular fuel within fuel handling manual. IGF Code 18.4.2.1.6
  - Verify appropriate PPE per vessel's fuel handling manual (only required during transfer operation). IGF Code 18.4.6.2

# Firefighting Systems

- 13. Examine water spray systems
  - Verify installation IGF Code 11.5.1 & 2  
IGF Code 11.4.1
  - Witness operational test of system IGF Code 11.5.3  
IGF Code 11.5.5
  - Verify capacity of fire main fire pump if used to supply the system to operate simultaneously if water spray system is part of the fire main IGF Code 11.5.3  
IGF Code 11.5.5  
IGF Code 11.4.1
  - Verify stop valves are properly fitted in main supply line IGF Code 11.5.4
  - Verify fire main connection IGF Code 11.5.6
  - Verify remote operation of pumps and valves IGF Code 11.5.7
  - Verify nozzle(s) type IGF Code 11.5.8
  
- 14. Examine fixed dry chemical powder extinguishing system
  - Verify installation IGF Code 11.6.1
  - Verify servicing IMO MSC.1/Circ. 1432
  - Verify capacity IGF Code 11.6.1
  - Verify presence of manual release IGF Code 11.6.1
  
- 15. Examine fire detection & alarm system
  - Verify fuel system fire detection & alarm IGF Code 11.7.1
  - Verify machinery space fire detection & alarm IGF Code 15.9
  - Witness operational test of fire detection & alarm systems IGF Code 11.7  
IGF Code 15.9

# Machinery Equipment

- 16. Examine ventilation
  - Verify location of inlets/outlets IGF Code 13.3.5 & 6  
IGF Code 6.7.2.8
  - Verify operation of loss ventilation capacity alarm IGF Code 15.10.1
  - Verify safety system activation upon loss of ventilation IGF Code 15.10.2
  
- 17. Examine emergency stops
  - Verify manual remote emergency stop locations IGF Code 15.11.4
  - Verify manual local emergency stop for gas compressor IGF Code 15.11.4
  
- 18. Examine 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

## Fuel Transfer System

19. Examine bunkering station
- Verify location of natural ventilation IGF Code 8.3.1.1
  - Verify piping arrangement IGF Code 8.3.1.2
  - Verify presence and conditions of drip trays IGF Code 8.3.1.3  
IGF Code 5.10
  - Verify pressure relief/liquid removal capabilities IGF Code 8.3.1.4  
IGF Code 8.5.5
  - Verify deck/hull shielding IGF Code 8.3.1.5 & .6
  - Verify presence of manual & remote shutdown valve(s) in series or combined manually operated and remote valve(s) IGF Code 8.5.3
  - Verify manifold connections IGF Code 8.4.1
  - Verify presence of fuel schematic/piping & instrumentation diagram (P&ID) IGF Code 18.4.2.2
  - Verify presence and marking on manifold pressure indicator IGF Code 15.4.4 & .7
  - Verify presence ship-shore link (SSL) IGF Code 8.5.7
  - Verify extinguisher at bunkering station IGF Code 11.6.2

20. Examine bunkering control location
- Verify location and operation of monitoring equipment IGF Code 15.5.1
  - Verify presence of tank temperature gauge(s) IGF Code 15.5.1  
IGF Code 15.4.11
  - 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 IGF Code 15.5.2
  - alarms
  - Verify presence of gas detection audible and visual alarms IGF Code 15.5.3
  - Verify presence of fuel schematic/piping & instrumentation diagram IGF Code 18.4.2.2
  - (P&ID)
21. Examine fuel storage
- 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 condition of gas tight seal on tank connection space (if accessible) IGF Code 6.3.4
  - Verify pipe connections IGF Code 6.3.5  
IGF Code 6.3.9
  - Verify presence and condition of drip trays IGF Code 6.3.10
  - Verify means for emptying tanks IGF Code 6.3.11

22. Examine fuel tank monitoring
- Verify liquid level gauge(s) arrangement IGF Code 15.4.1
  - Verify high liquid level alarm operation IGF Code 15.4.2.1, .3 & .4
  - Verify operation of automatic overflow prevention shutoff(s) IGF Code 15.4.2.2, .3 & .4
  - Verify presence of direct vapour space reading gauge IGF Code 15.4.3 & .4
  - Verify operation of high & low-pressure alarms IGF Code 15.4.5
  - Verify presence of fuel pump discharge pressure indicator IGF Code 15.4.6, .8 & .9
  - Verify operation of low liquid shutdown & alarm IGF Code 15.4.10
  - Verify temperature measurement devices IGF Code 15.4.11
23. Examine pressure relief systems for LG fuel tanks
- Verify presence of pressure relief device IGF Code 6.7.2.1
  - Verify minimum number of pressure relief valves (PRVs) IGF Code 6.7.2.2, .5 & .13
  - Verify interbarrier spaces are fitted with a pressure relief valve IGF Code 6.7.2.3
  - Verify PRV settings IGF Code 6.7.2.4
  - Verify means of emergency isolation IGF Code 6.7.2.6
  - Verify connection to venting system IGF Code 6.7.2.7
  - Verify location of PRV vent outlets IGF Code 6.7.2, .8 & .9
  - Verify means to drain liquid IGF Code 6.7.2.10
  - Verify vent screens IGF Code 6.7.2.11
24. Examine means of maintaining fuel storage condition
- Verify tank pressure & temperature control IGF Code 6.9.1.1 & .2
  - Verify refrigerant compatibility IGF Code 6.9.5.1
  - Verify system availability IGF Code 6.9.6.1
  - Verify standby heat exchanger(s) IGF Code 6.9.6.2
  - Verify thermal oxidation system IGF Code 6.9.4.1



- 25. Examine fuel containment system atmospheric controls
  - Verify gas sampling points IGF Code 6.10.3
  
- 26. Examine 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
  - Verify 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
  
- 27. Examine fuel piping
  - Verify markings IGF Code 7.3.1.1  
ISO 14726
  - Verify bonding IGF Code 7.3.1.2
  - Verify relief valves IGF Code 7.3.1.3
  - Verify insulation IGF Code 7.3.1.4
  - Verify installation IGF Code 9.2
  - Verify fire protection requirements for piping going through RO-RO spaces IGF Code 11.3.5

- 28. Examine safety functions of gas & fuel supply system
  - Verify location and operation of fuel storage valves IGF Code 9.4.1
  - Verify operation of master gas valve IGF Code 9.4.2, .3 & .7
  - Verify double block and bleed valve arrangement and operation IGF Code 9.4.4, .5 & .9
  - Verify presence of manual shutdown valve for each engine IGF Code 9.4.8
  - Verify presence of rupture detection system and location of shutoff valve IGF Code 9.4.10
  - Verify secondary piping enclosure outside machinery space IGF Code 9.5
  - Verify 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
  
- 29. Examine gas detection system
  - Verify gas detector installation(s) IGF Code 15.8.1, .3 & .8
  - Verify equipment meets recognized standard IGF Code 15.8.5
  - Verify alarm set points IGF Code 15.8.6, .7 & .8
  - Witness operational test of equipment IGF Code 15.8.5 & .9

## Electrical Systems

- 30. Examine hazardous areas
  - Verify hazardous area classification(s) IGF Code 12.3 & .5
  - Verify condition and types of electrical equipment installed IGF Code 12.3  
IGF Code 14.3.3
- 31. Examine low - low liquid alarm & shutdown
  - Verify operation of motor shutdown IGF Code 14.3.7
  - Verify operation of alarms and indicator(s) IGF Code 14.3.7

## Emergency Drills

- 32. Examine drills & exercises
  - Verify gas related ship specific drills & exercises are conducted IGF Code 17

## Follow Up

- 33. Complete MISLE Activity
  - Ensure Propulsion System Type indicates Dual Fuel (Diesel & Liquefied Gas) MISLE Guide
  - Enter alternative design into Special Notes MISLE Guide
  - Enter system configuration into Special Notes MISLE Guide
  - Enter tank type into Special Notes MISLE Guide

## 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:**

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

**3) Follow steps on page 30 for entry into pump rooms**

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

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

<b>Ex</b>	<b>ia</b>	<b>IIC</b>	<b>T4</b>	<b>Ga</b>
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	"n"	nA: Zone 2	IEC 60079-15
Sealed Devices		nC: Zone 2	
Restricted Breathing		nR: Zone 2	
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

