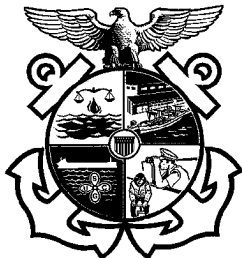


United States Coast Guard



FOREIGN GAS CARRIER Job Aid

Name of Vessel:	Flag: <input type="checkbox"/> No Change
IMO Number:	Activity Number:
Date Completed:	Priority:
Location:	
Certificate of Compliance: <input type="checkbox"/> Issued <input type="checkbox"/> Endorsed	
Vessel Built in Compliance with SOLAS: 60 74 74/78 NA	
Port State Control Officer & Examiners 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 Certificate of Compliance examinations of foreign-flagged liquefied or compressed gas tank vessels and cargo monitors. 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 SOLAS regulations from the 2020 Consolidated Edition (SOLAS 20). In some cases, the regulations in SOLAS 20 may not apply due to the keel laid date of the vessel. PSC personnel must pay close attention to the applicability dates of the SOLAS 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: *Additional information for procedures applicable to conducting foreign tank vessel examinations may be found in Marine Safety: Port State Control, COMDTINST 16000.73, Chapter D6: Procedures Applicable to Foreign Tank Vessels, and Marine Safety: Carriage of Hazardous Materials, COMDTISNT 16000.75. In addition to 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.*

Guide to Examinations:

Pre-inspection Items

- Review MISLE records
- Obtain copies of forms to be issued

Post-inspection Items

- Issue letters/certificates to vessel
 - Form A
 - Form B
 - COC
- Complete MISLE entries within 48 hours

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Section 1: Administrative Items

Dates	Applicable IMO Gas Code	Applicable IMO Resolution	Document Issued
*** Keel laid date of 01 Jul 16 and beyond	IGC Code Adopted 22 May 2014	MSC.370(93)	International Certificate of Fitness
Keel laid date <u>between</u> 01 Oct 94 and 30 Jun 16	IGC Code 93 Edition	MSC.30(61)	International Certificate of Fitness
Keel laid date <u>between</u> 01 Jul 86 and 30 Sep 94	IGC Code	MSC.5(48)	International Certificate of Fitness
Building contract date <u>after</u> 31 Oct 76 or Keel laid <u>after</u> 31 Dec 76 or Delivery <u>after</u> 30 Jun 80	GC Code	A.328(IX)	Certificate of Fitness
Delivery <u>before</u> 31 Oct 76 or Delivery <u>after</u> 31 Oct 76 but prior to GC Code applicability	**EGC Code	**A.329(IX)	Certificate of Fitness

** Ships built *prior* to the application of the GC Code are required to comply to the extent that they can do so. Provisions of the GC Code that are unable to be complied with must be identified on the COF.

***This publication does not incorporate differences between the IGC Code, and reference (m), Amendments to the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code), MSC.370 (93), 22 May 2014.

Section 2: Flammable Toxic Gas Properties Table

Cargo	Atmospheric boiling point (°C) (temperature when carried fully refrigerated)	Vapor Detection	Flammable Range (% Vol.)	Vapor Density Air = 1	IDLH (ppm)	30% LEL (% Vol.)	Liquid Density (Water = 1)
Acetaldehyde	20.2°C	F+T	4 - 57%	1.52	2,000	1.2% (1,200 ppm)	0.79
Ammonia	-33.4°C	T	14 - 28%	0.597	300	4.2% (42,000 ppm)	0.68
Butadiene	-5°C	F+T	1.1 - 12.5%	1.88	2,000	0.33% (3,300 ppm)	0.65
i - Butane	-11.7°C	F	1.8 – 9%	2.07		0.45%	0.61
n - Butane	-0.5°C	F	1.8 – 9%	2.09		0.45%	0.61
Butylenes	α: -6.1°C γ: -6.9°C	F	1.6 – 10%	1.94		0.48%	0.63
Carbon Dioxide	-57 °C	A	N/A	1.67	40,000	NA	1.56
Chlorine	-34°C	T	n/a	2.49	10	n/a	1.42
Diethyl Ether*	34.6°C	F+T	2.0 - 36.0%	1.9	1,900	0.6% (6,000 ppm)	0.71

Dimethyl Ether	-22.2°C	F+T	2.0% – 50%	1.617		0.6% (6,000 ppm)	1.97
Dimethylamine	6.8°C	F+T	2.8 – 14.4%	1.6	500	0.84% (8,400 ppm)	0.68
Ethane	-88.6°C	F	3.0 – 12.5%	1.048		0.9%	0.54
Ethylene	-103.9°C	F	3.0 – 34.0%	0.975		0.9%	0.57
Ethylene Oxide	10.7°C	F+T	3.0 – 100%	1.52	800	0.9% (9,000 ppm)	0.82
Isoprene*	34°C	F	1.5 – 9.7%	2.3		0.45%	0.68
Isopropylamine*	34°C	F+T	2.3 – 10.0%	2.0	750	0.69% (6,900 ppm)	0.69
Methane (LNG)	-162°C	F	5 - 15%	0.55		1.59%	0.42
Methyl Acetylene-Propadiene	-23.2°C	F	3.4 – 10.8%	1.48		1.02%	varies
Methyl Bromide	3.56°C	F+T	10.0 – 16.0%	3.27	250	3.0% (3,000 ppm)	1.72
Methyl Chloride	-24.2°C	F+T	8.1 – 17.2%	1.8	2,000	2.43% (2,430 ppm)	1.00
Mixed C4 (#s vary based on composition.	-12 to 1°C	F+T	1 – 12.5%	1.8-2	2,000	0.30% (3,000 ppm)	0.61

Monoethylamine*	170°C	F+T	3.5 – 14%	1.56	600	1.05% (1,050 ppm)	0.69
Pentanes (all isomers)*	36.1°C	F	1.5 – 7.8%	2.48		0.45%	0.63
Propane	-42.3°C	F	2.1 – 9.5%	1.55		0.63%	0.58
Propylene	-47.7°C	F	2.0 – 11.1%	1.48		0.6%	0.61
Propylene Oxide*	34.2°C	F+T	2.1 – 38.5%	2.00	400	0.63% (6,300 ppm)	0.86
Sulphur Dioxide		T	n/a	2.26	100	n/a	1.46
Vinyl Chloride	-13.8°C	F+T	4.0 – 33.0%	2.15	Carcinogen	1.2%	0.97
Vinyl Ethyl Ether*	35°C	F+T	1.7 – 28.0%	2.5		0.51%	0.76
Vinylidene Chloride*	31.6°C	F+T	7.3 – 16.0%	3.25	Carcinogen	2.19% (2,190 ppm)	1.21

Section 3: Inspection Items

Pre-Exam

- ☐ 1. Prepare Certificate of Compliance (COC) for issuance
 - Prepare certificate TTP Section A
 - Attach most recent Subchapter "O" Endorsement to certificate 46 CFR 154.1802(a)(1)
 - Forward COC with Subchapter "O" Endorsement to OCMI or designated representative for signature MS-73/D.6.E

- ☐ 2. Conduct safety meeting
 - Verify examination team is outfitted with appropriate PPE MSM I/10.D.5.a
MSM I/ 8.A.3
 - Verify examination team is outfitted with atmospheric monitors MSM I/10.D.5.b
 - Verify examination team is outfitted with Emergency Escape Breathing Device (EEBD) MSM I/10.D.5.d
 - Determine if a marine chemist is required to certify the cargo machinery space MS-73/D.6.C.1.f
CG-543 Safety Alert
 - Ensure examination team is aware of safety hazards associated with cargo(s) presence MSM I/10.C.1.a
Tanker Safety Guide

Certificates and Documents

- ☐ 3. Examine International Certificate of Fitness (COF) for the Carriage of Liquefied Gases in Bulk (IGC Code)
 - Verify validity IGC 1.4.4 & .6
 - Verify issued by administration or recognized organization IGC 1.4.4 & .5
 - Verify cargoes are authorized IGC 18.4.1
 - Verify that any alternative arrangements or equivalencies are identified IGC 1.3
IGC 2.6.2
IGC Appendix 2
 - Verify intermediate survey has been completed IGC 1.4.2.3
 - Verify annual survey has been completed IGC 1.4.2.4

- ☐ 4. Examine the Certificate of Fitness (COF) for the Carriage of Liquefied Gases in Bulk (GC Code)
- Verify validity GC Code Appendix
GC Code 1.6.5
 - Verify issued by administration or recognized organization GC Code 1.6.4
 - Verify cargoes are authorized GC Code 18.2.1
 - Verify any alternative arrangements or equivalencies are identified GC Code 1.5 & 1.6.3(a)
GC Code 2.7.2
GC Code Appendix
 - Verify intermediate survey has been completed GC Code 1.6.1(c)
 - Verify annual survey has been completed GC Code 1.6.1(d)
- ☐ 5. Examine Certificate of Fitness (COF) for the Carriage of Liquefied Gases in Bulk (EGC Code)
- Verify validity EGC Code 1.6.7, .9 & .10
EGC Appendix
IMO Res A.329(IX)
 - Verify issued by administration or recognized organization EGC Code 1.6.4
 - Verify cargoes are authorized EGC Code 18.2.1
 - Verify any alternative arrangements or equivalencies are identified EGC Code 1.5
EGC Code Appendix
 - Verify intermediate survey has been completed EGC Code 1.6.1(d)
 - Verify annual survey has been completed EGC Code 1.6.1(b)
 - Identify any aspects of vessel that do not comply with the EGC Code EGC 1.2.3(b)
MS-75/F.4.C

- ☐ 6. Examine Subchapter "O" Endorsement (SOE)
- Verify IMO International Gas Code COF matches current COF 46 CFR 154.1802(1)
MSC Guidelines C1-43
 - Verify cargo containment system(s) is identified on SOE 46 CFR 154.1802(1)
MSC Guidelines C1-43
 - Verify safety relief valves (MARVS) are set according to SOE 46 CFR 154.1802(1)
MSC Guidelines C1-43
CG-ENG Policy Ltr 04-12
 - Verify authorized cargo(s) are on International Gas Code COF 46 CFR 154.1802(1)
MSC Guidelines C1-43
 - Verify compliance with any special restrictions 46 CFR 154.1808
MSC Guidelines C1-43
- ☐ 7. Verify documentation of allowable loading limits and maximum loading reference temperatures for each product carried onboard
- Verify data is approved by administration IGC 15.6.1
 - Verify data includes Maximum Allowable Relief Valve Settings (MARVS) of pressure relief valves IGC 15.6.2
- ☐ 8. Examine documentation applicable to changing and setting of cargo tank pressure relief valves
- Examine documentation from administration attesting to proper settings of pressure relief valves IGC 8.2.6
 - Verify procedures for changing cargo tank set pressures are approved by the administration IGC 8.2.8
IGC 18.2.2.10
 - Verify changes to cargo tank set pressures are logged IGC 8.2.8
46 CFR 154.1846(b)
- ☐ 9. Examine crew training documentation
- Verify individuals with duties and responsibilities related to cargo or cargo equipment holds proper certificates STCW V/1-2.1
 - Verify individuals with immediate responsibility for cargo related operations holds proper certificate STCW V/1-2.3
 - Verify crew holds certificates of proficiency STCW V/1-2.5
STCW V/1-2.2
STCW V/1-2.4

☐ 10. Examine International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk

- Verify validity MARPOL II/5.3.2
MARPOL II/10
- Verify issued by administration or recognized organization MARPOL II/5.3.2
MARPOL II/9.2
- Verify NLS cargo being carried is authorized MARPOL II/5.3.2
MARPOL II/Appendix III
- Verify intermediate survey has been completed MARPOL II/5.3.2
MARPOL II/8.1.3
- Verify annual survey has been completed MARPOL II/5.3.2
MARPOL II/8.1.4

☐ 11. Examine Certificate of Inhibition

- Verify name of Inhibitor IGC 17.8.1
46 CFR 154.1818(b)(1)
- Verify amount of inhibitor added to the cargo(es) IGC 17.8.1
46 CFR 154.1818(b)(1)
- Verify date inhibitor was added IGC 17.8.2
46 CFR 154.1818(b)(2)
- Verify expected duration of inhibitor's effective lifetime IGC 17.8.2
46 CFR 154.1818(b)(3)
- Verify temperature limitations that impact inhibitor's effectiveness IGC 17.8.3
46 CFR 154.1818(b)(4)
- Verify procedures if voyage exceeds effective lifetime of inhibitor IGC 17.8.4
46 CFR 154.1818(b)(5)

Logs and Manuals

☐ 12. Examine Cargo Operations Manuals

- Verify presence IGC 18.2.1
46 CFR 154.1810(a)
- Verify cargo operations manual includes contents required in IGC Code 18.2.2 IGC 18.2.2
46 CFR 154.1810(a)

☐ 13. Examine Cargo Information

- Verify cargo physical and chemical properties IGC 18.3.1.1
46 CFR 154.1810(a)(5)
- Verify information regarding cargo reactivity IAW the Certificate of Fitness IGC 18.3.1.2

- Verify procedures for spills or leaks are fully described IGC 18.3.1.3
46 CFR 154.1810(a)(3)
- Verify counter measure procedures for personnel who come in contact with cargo(es) IGC 18.3.1.4
46 CFR 154.1810(a)(1)
- Verify fire fighting procedures and extinguishing media IGC 18.1.5
46 CFR 154.1810(a)(4)
- Verify procedures and special equipment needed for safe handling cargo(es) IGC 18.3.1.6
46 CFR 154.1810(a)(16)
- Verify emergency procedures IGC 18.3.1.7
46 CFR 154.1810(a)(15)

☐ 14. Examine loading and stability information booklet

- Verify service conditions including loading, unloading and ballasting IGC 2.2.5
46 CFR 154.1809(b)(1)
- Verify survival capabilities IGC 2.2.5
46 CFR 154.1809(b)(2)
- Verify vessel fitted with stability instrument IGC 2.2.6

☐ 15. Examine Procedures & Arrangement (P&A) Manual

- Verify approved MARPOL II/14.1
- Verify format MARPOL II/14.1
MARPOL II/Appendix IV

☐ 16. Examine Cargo Record Book (CRB)

- Verify presence MARPOL II/15.5
- Verify format MARPOL II/15.1
MARPOL II/Appendix II
- Verify entries are signed MARPOL II/15.4
- Verify pages are signed MARPOL II/15.4

☐ 17. Examine Shipboard Marine Pollution Emergency Plan (SMPEP) for Noxious Liquid Substances (NLS)

- Verify approved MARPOL II/17.1
- Verify emergency contacts are identified MARPOL II/17.2.2

General Health and Safety

- ☐ 18. Examine decontamination showers
 - Verify locations and marked IGC 14.4.3
 - Verify operation IGC 14.4.3
- ☐ 19. Examine eye wash stations
 - Verify locations and marked IGC 14.4.3
 - Verify operation IGC 14.4.3
- ☐ 20. Examine respiratory and eye protection
 - Verify presence IGC 14.4.2
 - Verify filter type respiratory protection are not being used IGC 14.4.2.1
 - Verify SCBAs service duration IGC 14.4.2.2
 - Verify equipment markings IGC 14.1.2
IGC 14.4.2.3
- ☐ 21. Examine personnel safety equipment
 - Verify presence IGC 14.3.1
 - Verify each set contains required equipment IGC 14.3.2
 - Verify adequate supply of compressed air IGC 14.3.3
 - Verify compressed air is inspected monthly IGC 14.1.3
46 CFR 154.1846(a)
 - Verify compressed air inspected is inspected and tested annually IGC 14.1.3
- ☐ 22. Examine first aid equipment
 - Verify stretcher(s) IGC 14.2.1
 - Verify presence of equipment IGC 14.2.2
Medical Guide
MFAG
 - Verify presence of oxygen resuscitation equipment IGC 14.2.2
Medical Guide
MFAG
 - Verify presence of medicines (when applicable) MFAG

☐ 23. Examine air locks

- Verify presence of air lock between hazardous area on the open weather deck and non-hazardous spaces IGC 3.6.1
- Verify doors are self-closing IGC 3.6.1
- Verify operation of audible alarm system IGC 3.6.3
- Verify operation of visual alarm IGC 3.6.3
- Verify no hold back arrangements for doors IGC 3.6.1

Lifesaving Equipment

☐ 24. Examine lifeboats

- Verify condition of self-contained air support system SOLAS 20 III/31.1.6
LSA Code 4.8
- Verify condition of air supply system pressure visual indicators SOLAS 20 III/31.1.6
LSA Code 4.8
- Verify presence and/or operation of fire-protection SOLAS 20 III/31.1.7
LSA Code 4.9

Firefighting Systems

☐ 25. Examine fire water main equipment

- Verify operation of fire main system IGC 11.2.1
- Verify fire hydrants locations IGC 11.2.2
- Verify variable nozzles IGC 11.2.4
- Verify condition of piping, valve nozzles IGC 11.2.5
- Verify remote operation of fire pump IGC 11.2.1
IGC 11.3.7

- ☐ 26. Examine deck water spray system
- Verify areas protected IGC 11.3.1
 - Witness operational test IGC 11.3.2.1 & 3.2.2
IGC 11.3.3
 - Verify local operation during carriage of Propylene Oxide and Ethylene Oxide IGC 17.18.30
 - Verify remote operation of pumps IGC 11.3.7
 - Verify capacity of fire pump if used to supply the system IGC 11.3.3
- ☐ 27. Examine dry chemical powder fire-extinguishing system
- Verify periodic system servicing is completed SOLAS 20 II-2/14.2.2
IMO MSC.1/Circ.1432
 - Verify condition of independent self-contained dry chemical powder units IGC 11.4.3
 - Verify condition of inert gas storage pressure vessels IGC 9.4.2
IGC 11.4.1
 - Verify condition of deck hoses and nozzles IGC 11.4.4
 - Verify arrangement of deck monitors IGC 11.4.3
 - Verify additional dry chemical powder units IGC 11.4.3
- ☐ 28. Examine cargo machinery room fixed fire-extinguishing system
- Verify periodic servicing is completed SOLAS 20 II-2/14.2.2
IMO MSC.1/Circ.1318 Rev/1
 - Verify condition of agent storage bottles SOLAS 20 II-2/14.2.1
 - Verify all openings into space are capable of being secured IGC 11.5.1
SOLAS 20 II-2/5.2
 - Verify system is properly marked IGC 11.5.1

- ☐ 29. Examine cargo motor room fixed fire-extinguishing system
- Verify periodic servicing is completed SOLAS 20 II-2/14.2.2
IMO MSC.1/Circ.1318
 - Verify condition of agent storage bottles SOLAS 20 II-2/14.2.1.2
 - Verify all openings into space are capable of being secured IGC 11.5.1
SOLAS 20 II-2/5.2
 - Verify system is marked IGC 11.5.1
- ☐ 30. Examine firemen's outfits
- Verify presence IGC 11.6.1
 - Verify condition of equipment SOLAS 20 II-2/10.10.1
FSS Code 3.2
 - Verify condition of outfits SOLAS 20 II-2/14.2.2.1
SOLAS 20 II-2/14.2.2.3.11
 - Verify stowage SOLAS 20 II-2/10.3

Electrical Systems

- ☐ 31. Examine electrical installations
- Verify condition of electrical installations IGC 10.2.1
IEC 60092-502
 - Verify electrical installations conform with recognized standards IGC 10.2.2
IEC 60092-502
 - Verify electrical equipment and wiring not installed in hazardous areas unless essential for operational purposes/safety enhancement IGC 10.2.3
IEC 60092-502
 - Verify electrical equipment installed in hazardous areas are certified for installed location. IGC 10.2.4
 - Verify lighting systems in hazardous areas are divided into at least two branch circuits IGC 10.2.7
 - Verify equipment not certified safe is de-energized upon loss of overpressure in space protected by an air lock. IGC 3.6.4

Instrumentation

- ☐ 32. Examine fixed gas detection system
- Verify testing/calibration IGC 13.6.18
Gas Detection Operator's Manual
 - Verify sampling points IGC 13.6.2
Cargo Operations Manual
 - Verify location of sampling points IGC 13.6.12
 - Verify integrity of sampling piping IGC 13.6.18
- ☐ 33. Examine portable gas detection equipment
- Witness testing/calibration IGC 13.6.9
Gas Detection Operator's Manual
 - Verify presence of two sets IGC 13.6.19
 - Verify suitable for cargo(es) being carried IGC 13.6.19
 - Verify presence & operation of instrument used for measuring oxygen levels in inert atmospheres IGC 13.6.20
- ☐ 34. Examine temperature indicating devices
- Verify presence IGC 13.5.1
 - Verify lowest temperature for cargo tank has been approved by Administration IGC 13.5.1
 - Verify devices are provided within the insulation or on the hull structure adjacent to cargo containment systems IGC 13.7.2.2
 - Verify low temperature alarm IGC 13.7.2.2

- ☐ 35. Examine pressure monitoring devices
- Verify cargo tank vapor space pressure gauge and indicator in control location IGC 13.4.1
 - Verify maximum/minimum allowable pressures are clearly indicated IGC 13.4.1
 - Verify operation of cargo tank vapor space high pressure alarm(s) IGC 13.4.2
 - Verify operation of cargo tank vapor space low pressure alarm(s) IGC 13.4.2
 - Verify each manifold cargo line is fitted with pressure gauge IGC 13.4.5
 - Verify hold/interbarrier spaces without open communication to atmosphere have pressure gauges IGC 13.4.6

- ☐ 36. Examine overflow control system
- Verify high level alarm audible warning IGC 13.3.1
 - Verify high level alarm visual warning IGC 13.3.1
 - Verify automatic shutoff valve installation IGC 13.3.2

Topside Equipment

- ☐ 37. Examine access to bow and emergency towing arrangements
- Verify safe access SOLAS 20 II-1/3-3.2
ICLL 25(4) & 26(2)
IMO Res MSC.62(67)
 - Verify emergency towing arrangements SOLAS 20 II-1/3-4.1
IMO Res MSC.35(63)

Cargo Systems

- ☐ 38. Examine Emergency Shutdown (ESD) system
 - Verify ESD locations IGC 18.10.3.1
 - Verify location of fusible elements IGC 18.10.3.2
 - Verify ESD valves fully close within 30 seconds IGC 18.10.2.1.3
 - Verify cargo pumps and compressors shutdown IGC 18.10.3.3

- ☐ 39. Examine cargo tank pressure relief valves
 - Verify cargo tanks, including deck tanks, fitted with at least two pressure relief valves IGC 8.2.1
 - Verify valves are sealed and approved by administration IGC 8.2.6
 - Verify valve setting changes are documented IGC 8.2.8
46 CFR 154.1846(c)(2)
 - Verify screens are fitted on vent IGC 8.2.15

- ☐ 40. Examine cargo piping
 - Verify low temperature piping is thermally isolated from hull IGC 5.7.2
 - Verify hull is protected from low temperature liquid cargoes IGC 5.7.2
 - Verify water curtain fitted under shore connections IGC 5.7.3
 - Verify all gasketed pipe joints are electrically bonded IGC 5.7.4
 - Verify relief valves IGC 5.5.6
 - Verify condition of piping IGC 1.4.3 & 5.2.1

- ☐ 41. Examine cargo system valves
- Verify MARVS not exceeding 0.7 bar gauge have manual shutoff valves on vapor/liquid lines IGC 5.5.2.1
 - Verify MARVS exceeding 0.7 bar gauge have manual shutoff valves on vapor/liquid lines IGC 5.5.2.1
 - Verify MARVS exceeding 0.7 bar gauge have remotely controlled emergency shutdown valve on vapor/liquid lines IGC 5.5.2.2
- ☐ 42. Examine cargo machinery room equipment
- Verify condition of cargo compressors IGC 1.4.3
MS-73/D.1.G.1.c(2)
 - Verify condition of cargo vaporizers IGC 1.4.3
MS-73/D.1.G.1.c(2)
 - Verify condition of gas tight seals on compressor shafts IGC 3.3.4 & 1.4.3
MS-73/D.1.G.1.c(2)
 - Verify condition of reliquefaction system IGC 1.4.3
MS-73/D.1.G.1.c(2)

Cargo Environmental Control

- ☐ 43. Examine Inert Gas System (IGS)
- Verify operational oxygen content meter IGC 9.5.1
 - Verify operation of oxygen content alarm IGC 9.5.1
 - Verify means to prevent the backflow of cargo gas IGC 9.4.4
- ☐ 44. Examine the Nitrogen Gas Generating System
- Verify operational oxygen content meter IGC 9.5.1
 - Verify operation of oxygen content alarm IGC 9.5.1
 - Verify means to prevent the backflow of cargo gas IGC 9.4.4

☐ 45. Examine Inert Gas/Nitrogen storage tanks

- Verify sufficient storage IGC 9.2.1
- Verify inert gas used for firefighting is carried in separate containers and not used for cargo services IGC 9.4.2

Cargo Area Ventilation System

☐ 46. Examine cargo motor room ventilation system

- Verify system can be controlled from outside of space IGC 12.1.1
- Verify motor room has a positive ventilation IGC 12.1.2
- Verify adjacent air locks have mechanical ventilation and are maintained at an overpressure IGC 12.1.4
- Verify ventilation duct openings have protection screens IGC 12.1.9
- Verify warning notice is posted outside of space IGC 12.1.1

☐ 47. Examine cargo machinery room ventilation system

- Verify system can be controlled from outside of space IGC 12.1.1
- Verify cargo machinery room has a negative ventilation system IGC 12.1.2
- Verify ventilation extraction points IGC 12.1.2
- Verify ventilation duct openings have protection screens IGC 12.1.9
- Verify warning notice is posted outside of space IGC 12.1.1

Gas Fuel Supply System

- ☐ 48. Examine master gas valve
 - Verify closing for loss of pressurization in double wall gas fuel piping IGC 16.4.3.1
 - Verify closing upon loss of ventilation in duct and other compartments containing single-walled gas piping IGC 16.4.3.2
 - Verify closing for leakage of gas detected IGC 16.4.8
 - Verify each individual space containing gas consumers or their gas valve unit is provided with an individual master gas valve IGC 16.4.6.1
 - Verify master gas valve is located in the cargo area IGC 16.4.6.1
 - Verify master gas valve can be closed manually and in at least one remote location IGC 16.4.6.2.2 & .4.6.3.2
- ☐ 49. Examine ventilation within the "gas" valve unit (GVU) room
 - Verify fuel supply piping is adequately protected IGC 16.4.3
 - Verify ventilating air is exhausted to a safe location IGC 16.4.3
- ☐ 50. Examine gas detection system used for protection of cargo fuel system
 - Verify operation of alarm IGC 16.4.8
 - Verify master gas valve closes IGC 16.4.8
- ☐ 51. Examine double block and bleed
 - Verify the supply piping has two valves in series IGC 16.4.5
 - Verify presence of bleed valve located between the two isolation (block) valves IGC 16.4.5

- ☐ 52. Examine gas fuel piping (double wall piping system)
 - Verify space between concentric pipes is pressurized IGC 16.4.3.1
 - Verify operation of alarms IGC 16.4.2
- ☐ 53. Examine gas fuel piping (ventilated pipe or duct system)
 - Verify operation of mechanical exhaust ventilation IGC 16.4.3.2
 - Verify operation of gas detection IGC 13.6.2.5
- ☐ 54. Examine the Gas Combustion Unit (GCU)
 - Verify operational condition IGC 7.4
 - Verify flame failure shutdown IGC 7.4.4.1
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 - Verify automatic purge of gas fuel piping to burners by means of inert gas IGC 7.4.4.3
 - Verify combustion chamber automatically purges prior to relighting after flame failure IGC 7.4.4.4
 - Verify combustion chamber can be manually purged IGC 7.4.4.5

Follow up Actions

- ☐ 55. Complete MISLE Activity
 - Ensure COC status is changed from "In Process" to "Valid" Work Instruction 5.e.1
 - Scan COC & SOE into MISLE documents for Initial and Renewal examinations Work Instruction 8
 - Change SOE status from "In Process" to "Valid" on the MSC issued certificate Work Instruction 5.e.1
 - Add Issue & Expiration dates to the scanned copy of the SOE Work Instruction 5.e.1

Section 4: Appendices

Conversions:

Distance and Energy				
Kilowatts (kW)	X	1.341	=	Horsepower (hp)
Feet (ft)	X	3.281	=	Meters (m)
Long Ton (LT)	X	.98421	=	Metric Ton (t)
Liquid (<i>NOTE: Values are approximate.</i>)				
Liquid	bbbl/LT	m ³ /t	bbbl/m ³	bbbl/t
Freshwater	6.40	1.00	6.29	6.29
Saltwater	6.24	.975	6.13	5.98
Heavy Oil	6.77	1.06	6.66	7.06
DFM	6.60	1.19	7.48	8.91
Lube Oil	7.66	1.20	7.54	9.05
Weight				
1 Long Ton	= 2240 lbs	1 Metric Ton	= 2204 lbs	
1 Short Ton	= 2000 lbs	1 Cubic Foot	= 7.48 gal	
1 Barrel (oil)	= 5.61 ft = 42 gal = 6.29 m ³	1 psi	= .06895 Bar = 2.3106 ft of water	
Temperature: Fahrenheit = Celsius ($^{\circ}\text{F} = 9/5\ ^{\circ}\text{C} + 32$ and $^{\circ}\text{C} = 5/9 (^{\circ}\text{F} - 32)$)				
0	= -17.8	80	= 26.7	200 = 93.3
32	= 0	90	= 32.2	250 = 121.1
40	= 4.4	100	= 37.8	300 = 148.9
50	= 10.0	110	= 43.3	400 = 204.4
60	= 15.6	120	= 48.9	500 = 260
70	= 21.1	150	= 65.6	1000 = 537.8
Pressure: Bars = Pounds per square inch				
1 Bar	= 14.5 psi	5 Bars	= 72.5 psi	9 Bars = 130.5 psi
2 bars	= 29.0 psi	6 Bars	= 87.0 psi	10 Bars = 145.0 psi
3 Bars	= 43.5 psi	7 Bars	= 101.5 psi	
4 Bars	= 58.0 psi	8 Bars	= 116.0 psi	