Use of Foreign Gas Carrier Examiner Training Aid:
This is a condensed version of the FGC Examiner Performance and Qualification Standard (PQS) workbook. This Training Aid is intended to be used by Coast Guard Foreign Gas Carrier Examiner trainees during examinations of foreign flagged vessels subject to Port State Control. This Training Aid provides a quick reference for all the steps necessary to complete specific examination tasks listed in the FGCE Job Aid.

This Training Aid cites SOLAS regulations from the 2014 Consolidated Edition (SOLAS 14). In some cases, the regulations in SOLAS 14 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.

FGCE-GF02 - Examine ventilation within the ventilation hood or casing
.01 Verify ventilation flow across Gas Utilization Unit(s) IGC 16.3.4
.02 Verify ventilating air is exhausted at top IGC 16.3.4
GC 16.5

FGCE-GF03 - Examine gas detection system used for protection of cargo fuel system
.01 Verify operation of alarm IGC 16.3.10
GC 16.10
.02 Verify master gas valve closes IGC 16.3.4 & 16.3.10
GC 16.5 & 16.10

FGCE-GF04 - Examine gas utilization unit(s)
.01 Verify each has two valves in series IGC 16.3.6
GC 16.6
.02 Verify each has one valve located between the two valves IGC 16.3.6
GC 16.6

FGCE-GF05 - Examine gas fuel piping (double wall piping system)
.01 Verify space between concentric pipes is pressurized IGC 16.3.1.1
GC 16.2(a)
.02 Verify operation of alarms IGC 16.3.1.1
GC 16.2(a)

FGCE-GF06 - Examine gas fuel piping (ventilated pipe or duct system)
.01 Verify operation of mechanical exhaust ventilation IGC 16.3.1.2
GC 16.2(b)
.02 Verify operation of gas detection IGC 16.3.1.2
GC 16.2(b)

FGCE-GF07 - Examine the Gas Combustion Unit (GCU)
.01 Verify operational condition IGC 16.6
IGC 1.5.3
IGC 7.1.1.2
.02 Verify operation of alarms IGC 16.6 & 1.5.3
IGC 7.1.1.2
Operations Manual

Follow Up Actions (FU)

FGCE-FU01 - Complete MISLE Activity
.01 Ensure COC status is changed from "In Process" to "Valid" Work Instruction 5.e.1
.02 Scan COC into MISLE documents for Initial and Renewal examinations Work Instruction 8
.03 Change SOE status from "In Process" to "Valid" on the MSC issued certificate Work Instruction 5.e.1
.04 Modify SOE Issued and Expiration dates to reflect the latest examination Work Instruction 5.e.1
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FGCE-CE02 - Examine the Nitrogen Gas Generating System
.01 Verify operational oxygen content meter IGC 9.5.1
   GC 9.5.1
.02 Verify operation of oxygen content alarm IGC 9.5.1
   GC 9.5.1
.03 Verify means to prevent the backflow of cargo gas IGC 9.5.2
   GC 9.5.2

FGCE-CE03 - Examine Inert Gas/Nitrogen storage tanks
.01 Verify sufficient storage IGC 9.2.1 & 9.2.2.1
   GC 9.2.1 & 9.2.2(a)
.02 Verify cargo stored gas is not used for firefighting IGC 9.4.2
   GC 9.4.2

Cargo Area Ventilation System Examination (CV)

FGCE-CV01 - Examine cargo machinery motor room ventilation system
.01 Verify system can be controlled from outside of space IGC 12.1.1
   GC 12.1.1
.02 Verify motor room has a positive ventilation IGC 12.1.4
   GC 12.1.4
.03 Verify adjacent air locks have mechanical ventilation and are overpressured IGC 3.6.5
   GC 3.6.5
.04 Verify ventilation duct openings have protection screens IGC 12.1.11
   GC 12.1.11
.05 Verify warning notice is posted outside of space IGC 12.1.1
   GC 12.1.1

FGCE-CV02 - Examine cargo machinery room ventilation system
.01 Verify system can be controlled from outside of space IGC 12.1.1
   GC 12.1.1
.02 Verify cargo machinery room has a negative ventilation system IGC 12.1.5
   GC 12.1.5
.03 Verify ventilation extraction points IGC 12.1.3
   GC 12.1.3
.04 Verify ventilation duct openings have protection screens IGC 12.1.11
   GC 12.1.11
.05 Verify warning notice is posted outside of space IGC 12.1.1
   GC 12.1.1

Gas Fuel Supply System Examination (GF)

FGCE-GF01 - Examine master gas valve
.01 Verify closing for loss of pressurization in double wall gas fuel piping IGC 16.3.7
   GC 16.7
.02 Verify closing for loss of ventilation for duct and casing (vent hood) IGC 16.3.7
   GC 16.7
.03 Verify closing for leakage of gas detected IGC 16.3.7
   GC 16.7
Pre-Exam (PE)

FGCE-PE01 - Prepare Certificate of Compliance (COC) for issuance
.01 Prepare certificate MPS-PR-SEC-04
.02 Attach most recent Subchapter "O" 46 CFR 154.1802(a)(1)
Endorsement to certificate
.03 Forward COC with Subchapter "O" MSM II/D.6.E
Endorsement to OCMI or designated representative for signature

FGCE-PE02 - Conduct safety meeting
.01 Verify examination team is outfitted with appropriate PPE MSM I/10.D.5.A
.02 Verify examination team is outfitted with Atmospheric Monitors MSM I/10.D.3.B
.03 Verify examination team is outfitted with Emergency Escape Breathing Device (EEBD) MSM I/10.C.1.a
.04 Determine if a marine chemist is required to certify the cargo machinery space CG-543 Safety Alert
.05 Ensure examination team is aware of safety hazards associated with cargo(s) presence

Certificates and Documents (CD)

FGCE-CD01 - Examine International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk
.01 Verify validity MARPOL II/5.3.2
.02 Verify issued by administration or recognized organization MARPOL II/10
.03 Verify NLS cargo being carried is authorized MARPOL II/5.3.2
.04 Verify intermediate survey has been completed MARPOL II/5.3.2
.05 Verify annual survey has been completed MARPOL II/5.3.2

FGCE-CD02 - Examine International Certificate of Fitness (COF) for the Carriage of Liquefied Gases in Bulk (IGC Code)
.01 Verify validity IGC 1.5.1
.02 Verify issued by administration or recognized organization IGC 1.5.6
.03 Verify cargoes are authorized IGC 18.2.1
.04 Verify that any alternative arrangements or equivalencies are identified IGC 1.4 & 1.5.4.2
.05 Verify intermediate survey has been completed IGC Appendix
.06 Verify annual survey has been completed IGC 1.5.2.1.3

FGCE-CS03 - Examine cargo piping
.01 Verify low temperature piping is thermally isolated from hull IGC 5.2.1.3
.02 Verify hull is protected from low temperature liquid cargoes GC 5.2.2
.03 Verify all gasketed pipe joints are electrically bonded IGC 5.2.1.4
.04 Verify relief valves IGC 5.2.1.6
.05 Verify condition of piping IGC 5.2.4.2 & 1.5.3

FGCE-CS04 - Examine cargo system valves
.01 Verify MARVS not exceeding 0.7 bar gauge have manual shutoff valves on vapor/liquid lines IGC 5.6.1.1
.02 Verify MARVS exceeding 0.7 bar gauge have manually operated stop valve on vapor/liquid lines IGC 5.6.1.2
.03 Verify MARVS exceeding 0.7 bar gauge have remotely controlled emergency shutdown valve on vapor/liquid lines IGC 5.6.1.2

FGCE-CS05 - Examine cargo machinery room equipment
.01 Verify condition of cargo compressors IGC 3.3 & 1.5.3
.02 Verify condition of cargo vaporizers IGC 3.3 & 1.5.3
.03 Verify condition of gas tight seals on compressor shafts IGC 3.3.2 & 1.5.3
.04 Verify condition of reliquefaction system IGC 7.2 & 1.5.3

Cargo Environmental Control Examination (CE)

FGCE-CE01 - Examine Inert Gas System (IGS)
.01 Verify operational oxygen content meter IGC 9.5.1
.02 Verify operation of oxygen content alarm IGC 9.5.1
.03 Verify means to prevent the backflow of cargo gas IGC 9.5.2
**FGCE-IE04 - Examine pressure monitoring devices**

.01 Verify cargo tank vapor space pressure gauge and indicator in control location IGC 13.4.1

.02 Verify maximum/minimum allowable pressure is marked on cargo tank pressure gauge indicators IGC 13.4.1

.03 Verify operation of cargo tank vapor space high pressure alarm(s) IGC 13.4.1

.04 Verify operation of cargo tank vapor space low pressure alarm(s) IGC 13.4.1

.05 Verify each manifold cargo line is fitted with pressure gauge IGC 13.4.2

.06 Verify hold/interbarrier spaces without open communication to atmosphere have pressure gauges IGC 13.4.4

**FGCE-IE05 - Examine overflow control system**

.01 Verify high level alarm audible warning IGC 13.3.1

.02 Verify high level alarm visual warning IGC 13.3.1

.03 Verify automatic shutoff valve installation IGC 13.3.1

**Cargo Systems Examination (CS)**

**FGCE-CS01 - Examine Emergency Shutdown (ESD) system**

.01 Verify ESD locations IGC 5.6.4

.02 Verify location of fusible elements IGC 5.6.4

.03 Verify fusible elements are not painted IGC 5.6.4

.04 Verify ESD valves fully close within 30 seconds IGC 5.6.4

.05 Verify cargo pumps and compressors shutdown IGC 5.6.1.3

**FGCE-CS02 - Examine cargo tank pressure relief valves**

.01 Verify volume exceeding 20 m³ are fitted with two valves IGC 8.2.1

.02 Verify valves are sealed and approved by administration IGC 8.2.5

.03 Verify valve setting changes are documented GC 8.2.7

.04 Verify screens are fitted on vent IGC 8.2.14

**FGCE-CD03 - Examine the Certificate of Fitness (COF) for the Carriage of Liquefied Gases in Bulk (GC Code)**

.01 Verify validity GC Appendix

.02 Verify issued by administration or recognized organization GC 1.6.4

.03 Verify cargoes are authorized GC 18.2.1

.04 Verify any alternative arrangements or equivalencies are identified GC 2.7.2

.05 Verify intermediate survey has been completed GC 1.6.1(c)

.06 Verify annual survey has been completed GC 1.6.1(d)

**FGCE-CD04 - Examine Certificate of Fitness (COF) for the Carriage of Liquefied Gases in Bulk (EGC Code)**

.01 Verify validity GC 1.6.3(a)

.02 Verify issued by administration or recognized organization GC 1.6.4

.03 Verify cargoes are authorized GC 18.2.1

.04 Verify any alternative arrangements or equivalencies are identified GC 2.7.2

.05 Verify intermediate survey has been completed GC 1.6.1(c)

.06 Verify annual survey has been completed GC 1.6.1(d)

.07 Identify any aspects of vessel that do not comply with the EGC Code MSM II/F.4.4

**FGCE-CD05 - Verify documentation of allowable loading limits and maximum loading reference temperatures for each product carried onboard**

.01 Verify data is approved by administration IGC 15.2

.02 Verify data includes Maximum Allowable Relief Valve Settings (MARVS) of pressure relief valves GC 15.2

**FGCE-CD06 - Examine documentation applicable to changing and setting of cargo tank pressure relief valves**

.01 Examine documentation from administration attesting to proper settings of pressure relief valves IGC 8.2.5

.02 Verify procedures for changing cargo tank pressure relief valves are approved by the administration (LPG only) GC 8.2.7

.03 Verify changes to cargo tank pressure relief valves are logged (LPG only) GC 8.2.7

46 CFR 154.1846(b)
FGCE-CD07 - Examine crew training documentation

.01 Verify individuals with duties and responsibilities related to cargo or cargo equipment holds proper certificates
   STCW V/1-2.1

.02 Verify individuals with immediate responsibility for cargo related operations holds proper certificate
   STCW V/1-2.3

.03 Verify crew holds certificates of proficiency
   STCW V/1-2.5
   STCW V/1-2.2
   STCW V/1-2.4

FGCE-CD08 - Examine Subchapter “O” Endorsement (SOE)

.01 Verify IMO International Gas Code COF matches current COF
   46 CFR 154.1802(1)
   MSC Guidelines C1-43

.02 Verify cargo containment system(s) is identified on SOE
   46 CFR 154.1802(1)
   MSC Guidelines C1-43

.03 Verify safety relief valves (MARVS) are set according to SOE
   46 CFR 154.1802(1)
   MSC Guidelines C1-43

.04 Verify authorized cargo(s) are on International Gas Code COF
   CG-ENG Policy Ltr 04-12

.05 Verify compliance with any special restrictions
   46 CFR 154.1808
   MSC Guidelines C1-43

FGCE-CD09 - Examine Certificate of Inhibition

.01 Verify name of Inhibitor
   IGC 17.8.1
   GC 17.10 (a)
   46 CFR 154.1818(b)(1)
   IGC 17.8.1
   GC 17.10 (a)

.02 Verify amount of inhibitor added to the cargo(es)
   46 CFR 154.1818(b)(1)
   IGC 17.8.1
   GC 17.10 (a)

.03 Verify date inhibitor was added
   46 CFR 154.1818(b)(1)
   IGC 17.8.2
   GC 17.10 (b)

.04 Verify expected duration of inhibitor's effective lifetime
   46 CFR 154.1818(b)(2)
   IGC 17.8.2
   GC 17.10 (b)

.05 Verify temperature limitations that impact inhibitor's effectiveness
   46 CFR 154.1818(b)(3)
   IGC 17.8
   GC 17.10 (c)

.06 Verify procedures if voyage exceeds effective lifetime of inhibitor
   46 CFR 154.1818(b)(4)
   IGC 17.8
   GC 17.10 (d)

Logs and Manuals Examination (LM)

FGCE-LM01 - Examine Cargo Record Book (CRB)

.01 Verify presence
   MARPOL II/15.5

.02 Verify format
   MARPOL II/15.1
   MARPOL II/Appendix II

.03 Verify entries are signed
   MARPOL II/15.4

.04 Verify pages are signed
   MARPOL II/15.4

FGCE-ES02 - Examine electrical Installations in gas dangerous zones other than cargo machinery spaces

.01 Verify presence of certified safe type equipment
   IGC 10.2.5.1.1
   GC 10.2.6(a)

.02 Verify presence of through runs of cables
   IGC 10.2.5.1.2 & 10.2.5.2.2
   GC 10.2.6(b) & 10.2.7(b)

.03 Verify lighting fixtures are pressurized or flameproof
   IGC 10.2.5.2.1
   GC10.2.7(a)

.04 Verify equipment not certified safe is deenergized upon loss of overpressure in space (air locks)
   IGC 10.2.5.4 & 3.6.4
   GC 10.2.9 & 3.6.4

.05 Verify wiring is in good condition
   IGC 10.1.2 & 1.5.3.1
   GC 10.1.2 & 1.6.2(a)

Instrumentation Examination (IE)

FGCE-IE01 - Examine fixed gas detection system

.01 Verify calibration
   IGC 13.6.10
   GC 13.6.10

.02 Verify sampling points
   IGC 13.6.7
   Cargo Operations Manual

.03 Verify location of sampling points
   IGC 13.6.2
   GC 13.6.2

.04 Verify integrity of sampling piping
   IGC 13.6.8
   GC 13.6.8

FGCE-IE02 - Examine portable gas detection equipment

.01 Witness calibration
   IGC 13.6.13
   GC 13.6.13

.02 Verify presence of two sets
   IGC 13.6.13
   GC 13.6.13

.03 Verify suitable for cargo(es) being carried
   IGC 13.6.13
   GC 13.6.13

FGCE-IE03 - Examine temperature indicating devices

.01 Verify presence
   IGC 13.5.1 & 13.5.4
   GC 13.5.1 & 13.5.4

.02 Verify lowest temperature for cargo tank has been approved by Administration
   IGC 13.5.1 & 13.5.4
   GC 13.5.1 & 13.5.4

.03 Verify devices are within insulation or in a secondary barrier if cargo is carried at less than -55C,
   IGC 13.5.2, 13.5.4
   GC 13.5.2 & 13.5.4
  .01 Verify approved MARPOL II/14.1
  .02 Verify format MARPOL II/14.1
  .03 Verify all openings into space are capable of being secured IGC 11.5.1
  .04 Verify system is properly marked IGC 11.5.1

FGCE-LM03 - Examine Shipboard Marine Pollution Emergency Plan (SMPEP) for Noxious Liquid Substances (NLS)
  .01 Verify approved MARPOL II/17.1
  .02 Verify emergency contacts are identified MARPOL II/17.2.2

FGCE-LM04 - Examine Cargo Operations Manual
  .01 Verify cargo physical and chemical properties GC 18.1(a)
  .02 Verify procedures for spills or leaks are fully described GC 18.1(b)
  .03 Verify counter measure procedures for personnel who come in contact with cargo(es) GC 18.1(c)
  .04 Verify fire fighting procedures and extinguishing media GC 18.1(d)
  .05 Verify procedures for cargo transfer, gas freeing, ballasting, tank cleaning and changing cargoes GC 18.1(e)
  .06 Verify procedures and special equipment needed for safe handling cargo(es) GC 18.1(f)
  .07 Verify minimum allowable inner hull steel temperatures GC 18.1(g)
  .08 Verify emergency procedures GC 18.1(h)

FGCE-LM05 - Examine loading and stability information booklet
  .01 Verify service conditions including loading, unloading and ballasting GC 2.2.3
  .02 Verify survival capabilities IGC 14.4.3

FGCE-RH01 - Examine decontamination showers
  .01 Verify locations and marked IGC 14.4.3
  .02 Verify operation IGC 14.4.3
Lifesaving Equipment Examination (LS)

FGCE-LS01 - Examine lifeboats

.01 Verify condition of self contained air support system
  SOLAS 14 III/31.1.6
  LSA Code 4.8

.02 Verify condition of air supply system pressure visual indicators
  SOLAS 14 III/31.1.6
  LSA Code 4.8

.03 Verify operation of water spray protection system
  SOLAS 14 III/31.1.7
  LSA Code 4.8

FGCE-LS02 - Examine lifeboats

.01 Verify condition of self contained air support system
  SOLAS 14 III/31.1.6
  LSA Code 4.8

.02 Verify condition of air supply system pressure visual indicators
  SOLAS 14 III/31.1.6
  LSA Code 4.8

.03 Verify operation of water spray protection system
  SOLAS 14 III/31.1.7
  LSA Code 4.8

Firefighting Systems Examination (FF)

FGCE-FF01 - Examine fire water main equipment

.01 Verify operation of fire main system
  IGC 11.2.1
  GC 11.2.1

.02 Verify fire hydrants locations
  IGC 11.2.2
  GC 11.2.2

.03 Verify variable nozzles
  IGC 11.2.4
  GC 11.2.4

.04 Verify condition of piping, valve nozzles
  IGC 11.2.4
  GC 11.2.4

.05 Verify remote operation of fire pump
  IGC 11.2.5
  GC 11.2.5

FGCE-FF02 - Examine deck water spray system

.01 Verify areas protected
  IGC 11.3.1
  GC 11.3.1

.02 Witness operational test
  IGC 11.3.2
  GC 11.3.2

.03 Verify local operation during carriage of Propylene Oxide and Ethylene Oxide
  IGC 17.20.17
  GC 17.12.8(r)

.04 Verify remote operation of pumps
  IGC 11.3.6
  GC 11.3.6

.05 Verify capacity of fire pump if used to supply the system
  IGC 11.3.3
  GC 11.3.3

FGCE-FF03 - Examine chemical powder fire-extinguishing system

.01 Verify periodic system servicing is completed
  SOLAS 14 II-2/14.2.2
  IMO MSC.1/Circ.1432

.02 Verify condition of independent self-contained dry chemical powder units
  IGC 11.4.3
  CG 11.4.3

.03 Verify condition of inert gas storage pressure vessels
  IGC 11.4.2
  GC 11.4.2

.04 Verify condition of deck hoses and nozzles
  IGC 11.4.5
  GC 11.4.5

.05 Verify arrangement of deck monitors
  IGC 11.4.2
  GC 11.4.2

.06 Verify additional dry chemical powder units
  IGC 11.4.7
  CG 11.4.7

FGCE-GH02 - Examine eye wash stations

.01 Verify locations and marked
  IGC 14.4.3

.02 Verify operation
  IGC 14.4.3

FGCE-GH03 - Examine respiratory and eye protection

.01 Verify presence
  IGC 14.4.2

.02 Verify filter type respiratory protection are not being used
  IGC 14.4.2.1.1

.03 Verify SCBAs service duration
  IGC 14.4.2.1.2

.04 Verify equipment markings
  IGC 14.4.2.2

.05 Verify location of additional equipment
  IGC 14.4.2.3

FGCE-GH04 - Examine personnel safety equipment

.01 Verify presence
  IGC 14.2.1
  GC 14.3

.02 Verify each set contains required equipment
  IGC 14.2.2
  GC 14.4

.03 Verify adequate supply of compressed air
  IGC 14.2.3.1 & .2
  IGC 14.2.4
  GC 14.4
  GC 14.5(a)(i), (a)(ii) & (b)

.04 Verify compressed air is inspected monthly
  IGC 14.2.6
  GC 14.7
  46 CFR 154.1846(a)

.05 Verify compressed air inspected is inspected and tested annually
  IGC 14.2.6
  GC 14.7

.06 Verify presence of additional equipment
  IGC 14.4.4

FGCE-GH05 - Examine first aid equipment

.01 Verify stretcher(s)
  IGC 14.3.1
  GC 14.8

.02 Verify presence of equipment
  IGC 14.3.2 & GC 14.9
  Medical Guide
  MFAG

.03 Verify presence of oxygen resuscitation equipment
  IGC 14.3.2 & GC 14.9
  Medical Guide
  MFAG

.04 Verify presence of antidotes (when applicable)
  IGC 14.3.2
  GC 14.9
  MFAG

FGCE-GH06 - Examine air locks

.01 Verify doors are self closing
  IGC 3.6.2
  GC 3.6.2

.02 Verify operation of audible alarm system
  IGC 3.6.3
  GC 3.6.3

.03 Verify operation of visual alarm
  IGC 3.6.3
  GC 3.6.3

.04 Verify no hold back arrangements for doors
  IGC 3.6.2
  GC 3.6.2