



ALTERNATE COMPLIANCE PROGRAM

U.S. SUPPLEMENT

to

Lloyd's Register's Rules and Regulations for the Classification of Ships

ADDENDUM TO ANNEX

to the

MEMORANDUM OF AGREEMENT

between the

UNITED STATES COAST GUARD

and

LLOYD'S REGISTER

GOVERNING PARTICIPATION IN THE ALTERNATE COMPLIANCE

PROGRAM AND THE DELEGATION OF CERTAIN SURVEY

AND CERTIFICATION SERVICES

FOR UNITED STATES OF AMERICA FLAGGED VESSELS

Alternate Compliance Program
U.S. SUPPLEMENT TO LR'S CLASSIFICATION RULES

Contents

	Page
1. INTRODUCTION	4
1.1 Alternate Compliance Via Recognised Classification Society and U.S. Supplement to the Rules	
1.2 Vessel Enrolment in the Alternate Compliance Program	
1.3 Hand-Over and In-Service Survey Procedures	
1.4 USCG ACP Oversight	
1.5 Overview of LR's Classification Rules and U.S. Supplement	
2. LOAD LINE	11
2.1 Supplemental Requirements	
3. TONNAGE MEASUREMENT	12
3.1 Supplemental Requirements	
4. SOLAS - SAFETY CONSTRUCTION	13
4.1 Supplemental Requirements	
Annex - Officer and Crew Accommodation	38
5. SOLAS - SAFETY EQUIPMENT	50
5.1 Supplemental Requirements	
6. IBC CODE	70
6.1 Supplemental Requirements	
7. IGC CODE	75
7.1 Supplemental Requirements	
8. MARPOL	
8.1 Annex I Supplemental Requirements	85
8.2 Annex II	89
8.3 Annex III	90
8.4 Annex IV U.S. Equivalent Requirements	90
8.5 Annex V Supplemental Requirements	90

Alternate Compliance Program
U.S. SUPPLEMENT TO LR'S CLASSIFICATION RULES

Contents

8. MARPOL

8.6 Annex VI 91

9. SOLAS - PASSENGER SHIP SAFETY

9.1 Procedures for this ship type 92

1. INTRODUCTION

1.1 Alternate Compliance via Recognised Classification Society and U.S. Supplement to the Rules

The Coast Guard has issued regulations to provide owners of U.S. Coast Guard regulations for the inspection and certification of ships contained in the Code of Federal Regulations (CFR), Title 46, Chapter I include an alternative method to that required under Subpart 2.01 of Coast Guard regulations to fulfil the requirements for vessel inspection and certification for certain categories of vessels.

The final rule was published in the Federal Register/Vol. 62, No. 247/Wednesday, December 24, 1997 and effective from January 23, 1998.

Under these regulations, the Coast Guard can issue a Certificate of Inspection based upon reports by a recognised, authorised Classification Society that the vessel complies with the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended, the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78), other applicable International Conventions, Classification Society rules and other specified requirements. This procedure is intended to reduce the burden on vessel owners and operators by establishing an alternative in the Coast Guard inspection system so that plan reviews and inspections may be performed by the vessel's Classification Society as well as by the Coast Guard.

The Alternate Compliance Program (ACP) is available to U.S. flag vessels that are, or will be, certificated for international voyages under a Subchapter for which it is allowed and are classed by a recognised Classification Society that is authorised by the Coast Guard to participate in the ACP.

The (ACP) is a voluntary scheme in which a shipowner may elect to have a recognised Classification Society, such as Lloyd's Register, carry out plan appraisal and surveys on behalf of the Coast Guard.

to The ACP allows the issuance or renewal of the Certificate of Inspection (COI) by the Coast Guard Officer in Charge of Marine Inspection (OCMI), the authority for which remains entirely the

prerogative of the Coast Guard, on the basis of reports of the Classification Society authorized to participate in the ACP.

A vessel enrolled in the ACP must comply with all the relevant requirements of the applicable International Conventions, Lloyd's Register's Rules and this document before a COI can be issued.

1.2 Vessel enrolment in the Alternate Compliance Program

Owners, operators, or builders who wish to enrol a vessel (existing or new construction) in the ACP should apply by submitting an Application for Inspection of US Vessel (CG-3752) to the cognisant OCMI. The form must indicate the owner's desire to have vessel become a participating vessel and the name of the ACP Class Society that will verify compliance of the vessel with ACP requirements. The applicant must individually identify each vessel proposed for enrolment. For new construction, applications are required from both the builder and the eventual owner.

Full details of the process for enrolment in the ACP are given in the USCG Marine Safety Manual, Volume II, Section B, Chapter 9. This document can be accessed in the Coast Guard's web site at:

<http://www.uscg.mil/hq/g-m/nmc/pubs/msm/index.htm>

For new construction, since the design, plan approval, and construction schedule/costs may be affected by the intended enrolment in the Alternate Compliance Program, it is recommended that the shipbuilder and the owner consult with LR as early as possible. It is prudent to discuss the proposed enrolment in depth to establish the plans required to be submitted and the procedural arrangements for the survey of materials of construction, equipment and engineering systems. Following agreement of the procedural arrangements, both the shipbuilder and the owner are to forward written confirmation of their intentions. For the shipbuilder this will be completion of LR's Request for Marine Services. For in-service survey purposes, the owner is to forward a separate letter to the local LR Office confirming the intention to continue survey and certification in the ACP. While this will assist in the proper processing within LR, it is very important to note that the application for enrolment in ACP must be forwarded to the USCG in accordance with NVIC 2-95, Current version.

For existing ships that satisfy the conditions of enrolment, the USCG will subsequently authorize LR's ACP Program Manager and the relevant local survey office to commence the process after the Application for Inspection is received. A "Hand Over Survey" will be scheduled for a mutually convenient time and, upon completion of this survey, the owner/operator will receive official notification from the USCG indicating the enrolment status.

For vessels intending to change flag to the United States, the provisions of this document will apply in a manner similar to other existing vessels. NVIC 10-81 (current version) is the guiding document for re-flagging. All re-flaggings require an initial meeting between the owner and USCG to determine the full scope of survey and certification to be carried out by the USCG and LR as well as the required Vessel Deficiency Report ("gap analysis"). The standards applied to the specific vessels are augmented by the gap analysis accepted by the Coast Guard. Further, existing dry cargo ships reflagging to U.S. Flag must meet probabilistic dry cargo ship subdivision and damage stability requirements.

In order to withdraw from ACP, the owner is to advise the USCG in writing. If this is agreeable to the USCG, all data applicable to the vessel during the time period the vessel was enrolled in the program will be forwarded to the USCG for incorporation into the USCG computer files. Upon accomplishment of the information transfer, the owner would then continue the required inspections directly under the jurisdiction of the USCG.

1.3 Hand-Over and In-Service Survey Procedures

For existing vessels, a "Hand-Over Survey" must take place. The purpose of this is for the attending USCG and LR staff to verify the survey status. The USCG will confirm that the history of the vessel has been properly entered in LR's survey status records and agreement will be made for the resolution of any USCG outstanding requirements from CG-835 forms. At this time, the USCG also will confirm to the Surveyors that the vessel is in compliance with all CFRs or will advise on those areas that must be corrected. Where applicable, the Surveyor and the Inspector will then complete an LR Record of Safety Equipment. The Record of Safety Equipment is to be a permanent part of the vessel's documents.

An ACP vessel will have a Certificate of Inspection on board. However, it will now be different in that it will not contain details of the life-saving appliances and fire-extinguishing equipment if these have been entered in LR's ship records.

The USCG issues their recommendations and deficiencies on a form numbered CG-835. It has become common usage to simply refer to the USCG outstandings and deficiencies as "835s". It is intended that the USCG offices will assist LR Surveyors by providing the liaison with other USCG offices in dealing with CG-835s. The LR Surveyor is not expected to communicate directly with a USCG office other than the one in his local area.

The 835 is under the control of the USCG office that did the inspection and wrote the requirements. LR will be given copies of the 835s for inclusion in LR's survey status records. LR may survey and indicate that an 835 has been satisfactorily completed. This will be done by the writing of a miscellaneous report that receives normal distribution plus one additional copy for the USCG office that wrote the 835. It is the responsibility of the local OCMI to forward the 835 to the appropriate persons to cancel the 835 in the USCG files. LR Surveyors may "clear" 835 items, on ACP vessels only.

In those situations where compliance with an 835 has not been satisfied, the USCG office that issued the 835 must be contacted for further advice. This will be done through the OCMI at the port where the vessel is being surveyed. **LR Surveyors do not have the authority to extend or modify the 835.**

During the service life of a vessel it is the responsibility of the Master to report Marine Damages, as defined in 46 CFR 4.03 to the cognizant USCG Officer in Charge of Marine Inspection (OCMI). Further, immediately after addressing all resultant safety concerns, the owner, agent, master, operator, or person in charge, shall notify the nearest Marine Safety Office or USCG Group Office whenever a vessel is involved in a marine casualty. A reportable marine casualty or accident means a casualty or accident involving any vessel within the navigable waters of the U.S., its territories or possessions, or any casualty or accident involving a US Flag vessel anywhere in the world. This definition of marine casualty or accident does not pertain to public vessels. The definition is contained in 46 CFR 4.05-1.

NVIC 2-95 (current version) provides procedural guidance for survey procedures of the ACP. The following link may be used to access this document via the internet:

http://www.uscg.mil/hq/g-m/nvic/2_95/n2-95.htm

1.4 USCG ACP Oversight

The USCG, in delegating surveys to LR, still retains the ultimate responsibility that vessels meet regulatory requirements. In order to fulfil this responsibility the USCG has developed an oversight program for ACP delegated responsibilities.

Oversight consists of audits of LR plan approval and field service offices by the USCG. It also consists of annual boardings of ACP enrolled vessels to conduct renewal and mid-period COI inspections. The boardings will be similar to those done in Port State Inspections. A check sheet describing the considerations to expand the boardings is a part of the USCG Marine Safety Manual, Volume II, Section B, Chapter 9. Further information on USCG oversight activities is given in NVIC No. 2-95. Procedures for plan review oversight are found in Marine Safety Center Technical Note 04-03.

1.5 Overview of LR's Classification Rules and U.S. Supplement

Lloyd's Register's Rules and Regulations for the Classification of Ships [and Rules and Regulations for the Classification of Mobile Offshore Units] address hull structure and essential shipboard machinery and systems. They do not contain requirements prescribed by the International Conventions, except for those instances where such regulations directly affect the scope of classification and their inclusion is necessary to ensure compatibility of class and international requirements from the earliest stage of vessel design. For example, double hull requirements and tank size limitations for tankers, or the location of the collision bulkhead on all ships.

The supplemental requirements given in this document are those of the United States Coast Guard (USCG) which are contained in Titles 33 and 46 of the Code of Federal Regulations but not covered by Lloyd's Register's Rules and Regulations for the Classification of Ships for vessels certificated under Coast Guard regulations, Subchapter D - "Tank vessels", Subchapter H - "Passenger Vessels", and Subchapter I - "Cargo and Miscellaneous Vessels".

The document also contains interpretations of the International Convention for Safety of Life at Sea 1974, as amended (SOLAS 74), and the International Convention for the Prevention of Pollution from Ships, as amended (MARPOL 73/78), where the USCG has amplifying or additional requirements.

Compliance with these requirements, as applicable to ship type and size, is to be verified during plan review and survey of LR classed ships documented or intended to be documented in the United States of America.

The requirements and procedures specified in this document are additional to those contained in the Survey Procedures Manual, which must also be complied with for U.S. flag ships.

Additional information and/or requirements may be accessed via the internet at the LR webpage on the USCG ACP website:

<http://www.uscg.mil/hq/g-m/mse/acp/lr.htm>

Plan approval, stability investigation and survey is to be in accordance with the Classification Rules and Survey Procedures Manual Parts D and E concerning Statutory Surveys, Certification and Reporting.

Principal Reference Documents

Lloyd's Register :

- Rules and Regulations for the Classification of Ships
- Rules and Regulations for the Classification of Ships for the Carriage of Liquid Chemicals
- Rules and Regulations for the Classification of Ships for the Carriage of Liquefied Gases
- Survey Procedures Manual

International Conventions :

- International Convention for the Safety of Life at Sea 1974, as amended (SOLAS 74)
- International Convention for the Prevention of Pollution from Ships 1973 as modified by the Protocol of 1978, as amended (MARPOL 73/78)
- International Convention on Load Lines 1966, as amended (ICLL 66)

Alternate Compliance Program
U.S. SUPPLEMENT TO LR'S CLASSIFICATION RULES

Introduction

Section 1

International Convention on Tonnage Measurement of Ships
1969 (TM 69)

United States :

Title 33, Code of Federal Regulations

Title 46, Code of Federal Regulations

USCG Marine Safety Manual, Volume II, Section B, Chapter 9

Navigation and Vessel Inspection Circular No. 2-95, current
version

[Note: Access to the U.S. Code of Federal Regulations may be made via the
internet at:

<http://www.gpoaccess.gov/cfr/index.html>]

2. LOAD LINE

2.1 The following U.S. Interpretation for ICLL, Reg. 10 is to be adhered to:

Information to be supplied to the master means a loading and stability manual developed in accordance with MSC/Circ.920 "Model Loading and Stability Manuals". To be considered as approved stability information, the vessel shall comply with the requirements and recommendations of the Code of Intact Stability.

3. TONNAGE MEASUREMENT

3.1 Supplemental requirements that are set forth in the current version of Marine Safety Center Technical Notes 01-98, "Tonnage Administrative Policy", and 01-99, "Tonnage Technical Policy", shall be complied with.

4. SOLAS - SAFETY CONSTRUCTION

4.1 Supplemental Requirements

The following supplemental requirements relevant to the issue of a Cargo Ship Safety Construction Certificate by LR or the issue of a Passenger Ship Safety Certificate by the U.S. Coast Guard are given using the appropriate Code of Federal Regulations (CFR) cite or SOLAS regulation number.

Cite: 46 CFR 32.20-5

Pressure-vacuum relief valves are to be of a type approved by the Coast Guard under 46 CFR 162.017.

Pressure-vacuum relief valves, determined by LR to be equivalent to a valve designed to meet the requirements of 46 CFR 162.017, may be submitted to the Coast Guard for acceptance on a case by case basis.

Cite: 46 CFR 32.50-30

If a cargo hose is carried on oil tankers it must be suitable for oil service and designed to withstand the pressure of the shutoff head of cargo pump or pump relief valve setting less static head, but in no case less than 150 psi.

Cite: 46 CFR 32.52-5(c)

Means are to be provided for controlling the cargo or pump room bilge pumps and their suctions or discharges in order that a flooded pumproom may be pumped out. Suitable portable or manually operated pumps may be accepted as complying with this provision, or alternatively, the pump controls shall be arranged so that they are operable from inside the pump room and either from an accessible position outside the pump room, or from the pump room casing above the freeboard deck.

Cite: 46 CFR 39

A vapour control system complying with the requirements of these regulations is required to be fitted. Full details of the regulations, plan appraisal and survey procedures are given in the Marine Division Survey Procedures Manual Part D, Chapter 8, Section 14.8.

Cite 46CFR52.01-2

Boilers, pressure vessels and heat exchangers are to comply with the requirements in Part 5, Ch. 10 of LR Rules or the ASME Code, with additional requirements as given below. Other recognized international standards will be evaluated on a case by case basis.

Cite: 46 CFR 52.01-10(a)

Oil fired main boilers in attended or unattended machinery spaces are to have the following equipment:

- Each burner is to be provided with at least one flame detector.
- The burner valve is to close automatically when loss of burner flame occurs and when activated by the boiler trip system.
- Each boiler is to be provided with a safety trip control system that automatically closes the master and all burner oil fuel valves upon:
 - Inadequate air flow to support complete combustion;
 - Loss of control power;
 - Operation of the manual safety trip; or
 - Loss of flame at all burners
- Each boiler must meet special requirements for automatic safety controls in 46 CFR 62.35-20(a)(1).
- Auxiliary boilers with heat input of less than 3.66 MW must meet the requirements of 46 CFR Part 63.
- Auxiliary boilers with heat input of not less than 3.66 MW must meet the requirements of 46 CFR Part 62.

Cite: 46 CFR 52.01-50

All boilers, except watertube boilers, with a maximum allowable working pressure in excess of 2.06 bar, if fired with solid fuel not in suspension, or if not equipped with unattended operation, are to be fitted with fusible plugs in accordance with this regulation.

Cite: 46 CFR 52.01-105(c)

Steam stop valves over 152mm diameter are to be fitted with bypass arrangements for heating the line and equalising the pressure before the valve is opened.

Cite: 46 CFR 52.01-105(e)

All firetube and drum type boilers are to be fitted with a scum (surface blowoff) valve in addition to a blow-down valve.

Cite: 46 CFR 52.01-110(h)

All watertube boilers used for propulsion purposes are to be provided with an audible and visual high water level alarm.

Cite: 46 CFR 52.01-120

The requirements of ASME Section 1, paragraph PG 68.2 are to be complied with, in agreement with the boiler manufacturer, to ensure that the superheater is protected against damage in all service conditions.

On new installations the safety valve nominal size for propulsion boilers and superheaters must not be less than 38 mm (1 1/2 in.) nor more than 102 mm (4 in.). Safety valves 38 mm to 114 mm (4 1/2 in.) may be used for replacements on existing boilers. The safety valve size for auxiliary boilers must be between 19 mm (3/4 in.) and 102 mm. Cast iron seats and disks are not permitted.

Cite: 46 CFR 53.01-3

Heating boilers for applications below 120°C and steam boilers with pressures less than 3.4 bar and which are not covered by LR Rules, are to be designed, constructed, inspected and tested under 46 CFR 53.01-3.

Cite: 46 CFR 53.05

Pressurised hot water boilers above 120°C and which are not covered by LR Rules, are to be provided with pressure relieving devices under 46 CFR 53.05-2. Cast iron seats and disks are not permitted.

Cite: 46 CFR 54.01-2

Pressure vessels are to be built in accordance with Division 1, Section VIII of ASME Code as modified by 46 CFR 54.01-2. Other international standards will be evaluated by the Coast Guard on a case by case basis.

Cite: 46 CFR 54.10-10.

Pressure vessels with a design temperature greater than (>) 650 deg. F (343 deg. C) must be tested in accordance with 46 CFR 54.10 - 10 and Div. 1, Section VIII of ASME Code respectively.

Cite: 46 CFR 54.15.

Cast iron seats and disks are not permitted.

Cite: 46 CFR 56.15

In Pt. 5 Ch. 12 Sec.2.3, gas welding is not to be used for pipes with outer diameter greater than 76 mm. In Pt. 5 Ch. 12, Sec. 2.3, fittings 76 mm and below, 1 fitting from lot of 100 or fraction thereof must be flattened cold until the opposite walls meet without developing any cracks.

Cite: 46CFR 56.20-15

Valves in which the closure is accomplished by resilient non-metallic materials instead of metal to metal seating are to comply with the performance criteria and category of positive shut-off valves specified in this regulation. Valves employing resilient material shall be divided into three categories; Positive shutoff, Category A and Category B and shall be tested and used as follows:

- Positive Shutoff Valves - The closed valve must pass less than 10 ml/hr (0.34fluid oz/hr) of liquid or 3 liters/hr (0.11 ft³/hr) of gas per inch nominal pipe size through the line after removal of all resilient material and testing at full rated pressure. Packing material must be fire resistant. Piping subject to internal head pressure from a tank containing oil (fuel, lube and cargo) must be fitted with a positive shutoff valve at the tank. See 4/6.45.5 of the Rules for additional requirements for such valves. Positive shutoff valves may also be used in any location in lieu of a required Category A or Category B valve.

- Category A Valves - The closed valve must pass less than the greater of 5% of its fully open flow rate or $15\% / (\text{NPS})^{1/2}$ of its fully open flow rate through the line after removal of all resilient material and testing at full rated pressure. Category A valves may be used in any piping system except where positive shutoff valves are required. Category A valves are required in the following locations:
 - Valves at vital piping system manifolds;
 - Isolation valves in cross-connects between two piping systems, at least one of which is a vital system, where failure of the valve in a fire would prevent the vital system(s) from functioning as designed;
 - Valves providing closure for any opening in the shell of the vessel.
- Category B Valves - The closed valve will not provide effective closure of the line or will permit appreciable leakage from the valve after the resilient material is damaged or destroyed. Category B valves are not required to be tested and may be used in any location except where a Category A or Positive shutoff valve is required.

If a valve designer elects to use either calculations or actual fire testing in lieu of material removal and pressure testing, the proposed calculation method or test plan must be accepted by the Commandant.

Alternative arrangements for acceptance of resilient seated valves are outlined by Federal Register, March 4, 1998 (63 FR 10547).

Cite: 46 CFR 56.50-50

MARPOL 73/78 Annex I, Regulation 13F, paragraphs (e) and (f) apply to all tank vessels.

Cite: 46 CFR 56.50-60(d)

Positive shut-off valves which utilise resilient non-metallic materials for closure are to comply with the applicable requirements of regulation 46 CFR 56.20-15.

Cite: 46 CFR 56.50

Nonmetallic piping must be USCG approved and comply with 46 CFR 56.60 - 25.

Cite: Welding 56.70.

Welding procedures are to be in accordance with the details found in 46 CFR 56.70 and ASME Section IX (alternatively EN 288), respectively.

Cite: 46 CFR 56.97.

Pressure testing may not be waived for small bore pipes as specified in Pt. 5 Ch. 12 Sec.8. Pipes must be hydrostatically tested regardless of radiographic examination as specified in Pt. 5 Ch. 12 Sec. 8. Pressure testing of non-standard piping system components shall meet 46 CFR 56.97 - 5.

Cite: 46 CFR 61.05-10

Hydrostatic testing of boilers in service is to be carried out in accordance with the periodical and test pressure requirements prescribed in this regulation.

Cite: 46 CFR 61.10 - 5

Hydrostatic testing and survey of pressure vessels is to be carried out with intervals and extent as given in this regulation.

Cite: 46 CFR 61.15-5

Steam piping subject to pressure from the main boiler should be subjected to a hydrostatic test in accordance with the requirements of this regulation after every five years of service.

Cite: 46 CFR 61.15-10

Where liquefied petroleum gas is used for heating and cooking the requirements of this regulation are to be complied with.

Cite: 46 CFR 61.15 - 12

Non-metallic expansion joints must be surveyed and replaced as required in this regulation.

Cite: 46 CFR 61.40

Design Verification and Periodic Testing of Vital System Automation

One copy of a qualitative failure analysis must be submitted for propulsion controls, microprocessor-based system hardware, safety controls, automated electric power management, automation required to be independent that is not physically separate and any other automation that in the judgment of the reviewing authority potentially constitutes a safety hazard to the vessel or personnel in case of failure.

The systems to which these requirements apply include

1. Any equipment or system that is automatically controlled or monitored
2. Any equipment or system that is remotely controlled or monitored
3. Any equipment or system that utilizes automation for the purposes of replacing specific personnel or reduce overall crew requirements, i.e. minimally or un-manned machinery spaces

Note: The qualitative failure analysis is intended to assist in evaluating the safety and reliability of the design. It should be conducted to a level of detail necessary to demonstrate compliance with applicable requirements and should follow standard qualitative analysis procedures. Assumptions, operating conditions considered, failures considered, cause and effect relationships, how failures are detected by the crew, alternatives available to the crew, and necessary design verification tests should be included. Questions regarding failure analysis should be referred to the reviewing authority at an early stage of design.

A Design Verification test is to be performed, immediately after the installation of the automated equipment or before issuance of the initial Certificate of Inspection, to verify that automated systems are designed, constructed and operate in accordance with applicable requirements. In addition, Periodic Safety tests must be conducted annually to demonstrate the proper operation of the primary and alternate controls, alarms, power sources, transfer override arrangements, interlocks and safety controls. Systems addressed must include fire detection and extinguishing, flooding safety, propulsion, maneuvering electric power generation and distribution and emergency internal communications. Synthetic signals or simulated test conditions can be allowed if test equipment maintained in good order and calibrated with appropriate documentation to the satisfaction of the attending surveyor.

Design Verification and Periodic Safety test procedures are to be submitted for approval and retained aboard the vessel. Test procedure documents must be in a step-by-step or check-off list format. Each test instruction must specify equipment status, apparatus necessary to perform the tests, safety precautions, safety control and alarm setpoints, the procedure to be followed, and the expected test result. Test techniques must not simulate monitored system conditions by maladjustments, artificial signals, improper wiring, tampering, or revision of the system unless the test would damage equipment or endanger personnel. The Design Verification and Periodic Safety Tests are to be witnessed by the Surveyor. Other test techniques are to be submitted to the USCG (G-MSE) for approval on a case-by-case basis.

Vessels with minimally attended or periodically unattended machinery plants must have a planned maintenance program to ensure continued safe operation of all vital systems. The program must include maintenance and repair manuals for work to be accomplished by maintenance personnel and check-off lists for routine inspection and maintenance procedures.

The planned maintenance program must be functioning prior to the completion of the evaluation period for reduced manning.

Maintenance and repair manuals must include details as to what, when and how to troubleshoot, repair and test the installed equipment and what parts are necessary to accomplish the procedures. Schematic and logic diagrams must be included in this documentation. Manuals must clearly delineate information that is not applicable to the installed equipment.

Cite: 46 CFR 62.20 - 3(a)(2)

A planned maintenance program is required for all vital systems. Requirements are covered by Descriptive Notation **PMS**.

Cite: 46 CFR 62.25 - 20(d)(4)

(4) Flooding safety, fire, loss of power and engineer's assistance-needed alarms extended from the machinery spaces to a remote location must not have a duty crewmember selector.

Note: Other alarms may be provided with such a selector, provided there is no off position.

Cite: 46CFR 62.30-1

- (a) The failsafe state must be evaluated for each subsystem, system or vessel to determine the least critical consequence.
- (b) All automatic control, remote control, safety control, and alarm systems must be fail safe.

Cite: 46CFR 62.30 - 5(b)(2)

Independent sensors are not required except that sensors for primary speed, pitch or direction of rotation control in closed loop propulsion control systems must be independent and physically separate from required safety control , alarm or instrumentation sensors.

Cite: 46 CFR 62.35 - 5(e)

- (e) Control system details. (1) Each operator control device must have a detent at the zero thrust position.

Cite: 46 CFR 62.35 - 15(a)

All required fire pump remote control locations must include the controls necessary to charge the fire main and -

- (1) A firemain pressure indicator; or
- (2) A firemain low pressure alarm.

Cite: 46 CFR 62.50 - 20(b)(1)

For vessels flying U.S. flag a personnel alarm is to be provided and is to annunciate on the bridge if not routinely acknowledged at the EEC or in the machinery space.

Cite: 46 CFR 92.15

Sec. 92.15-5 Vessels using fuel having a flashpoint of 110 degrees or lower.

- (a) Where liquid fuel having a flashpoint of 110 degrees F. or lower is used for main or auxiliary machinery or for starting purposes, the spaces containing such machinery or fuel tanks shall have ventilation as required by this section.
 - (1) At least 2 ventilators fitted with cowls or their equivalent for the purpose of properly and effectively ventilating the

bilges of every engine and fuel-tank compartment in order to remove any flammable or explosive gases.

- (2) Vessels constructed so that the greater portions of the bilges under the engine and fuel tanks are open or exposed to the natural atmosphere at all times are not required to be fitted with ventilators.

Sec. 92.15-10 Ventilation for closed spaces.

- (a) Except as noted in paragraph (c) of this section, all enclosed spaces within the vessel shall be properly vented or ventilated. Means shall be provided to close off all vents and ventilators.
- (b) Means shall be provided for stopping all fans in ventilation systems serving machinery and cargo spaces and for closing all doorways, ventilators and annular spaces around funnels and other openings to such spaces, from outside these spaces, in case of fire.
- (c) On unmanned cargo barges not fitted with a fixed bilge system, vents and ventilators may be omitted from void spaces.
- (d) The ventilation of spaces which are "specially suitable for vehicles" shall be in accordance with the provisions of this paragraph. In addition, if vehicles are operated inside of enclosed spaces, the ventilation shall be in accordance with subpart 97.80 of this subchapter.
 - (1) Areas below the weather deck shall be provided with continuous pressure-positive ventilation at each level on which vehicles are transported.
 - (2) The quantity of ventilating air shall be not less than 1 cubic foot per minute per square foot of deck area.
 - (3) The ventilation system shall be such as to prevent air stratification as well as to prevent the accumulation of air pockets.
 - (4) An alarm system shall be provided which will indicate the loss of required ventilation. The alarm location shall be in a normally manned space acceptable to the Commandant.

- (e) For requirements regarding controls of electrically powered ventilation systems, see subchapter J (Electrical Engineering) of this chapter.

Sec. 92.15-15 Ventilation for crew quarters and, where provided, passenger spaces.

- (a) All living spaces shall be adequately ventilated in a manner suitable to the purpose of the space.
- (b) On vessels of 100 gross tons and over, except for such spaces as are so located that under all ordinary conditions of weather, windows, ports, skylights, etc., and doors to passageways can be kept open, all crew spaces shall be ventilated by a mechanical system, unless it can be shown that a natural system will provide adequate ventilation. However, vessels which trade regularly in the tropics shall, in general, be fitted with a mechanical ventilation system.

Cite: 46 CFR 111.12-1

- (b) Each generator prime mover must have an overspeed device that is independent of the normal operating governor and adjusted so that the speed cannot exceed the maximum rated speed by more than 15 percent.
- (c) Each prime mover must shut down automatically upon loss of lubricating pressure to the generator bearings unless otherwise accepted by the Commandant.

Cite: 46 CFR 111.15-5(e)

Each battery must be provided with the name of its manufacturer, model number, type designations, either the cold cranking amp rating or the amp-hour rating at a specific discharge and, for a lead-acid battery, the fully charged specific gravity value. This information must be permanently fixed to the battery.

Cite: 46 CFR 111.12 - 1(c)

Each prime mover must shut down automatically upon loss of lubricating pressure to the generator bearings if the generator is directly coupled to the engine. If the generator is operating from a power take-off, such as a shaft driven generator on a main propulsion engine, the

generator must automatically declutch (disconnect) from the prime mover upon loss of lubricating pressure to generator bearings.

Cite: 46 CFR 111.12 - 9(a)

The current-carrying capacity of generator cables must not be:

- (1) Less than 115 percent of the continuous generator rating; or
- (2) Less than 115 percent of the over load for a machine with a 2 hour or greater overload rating.

Cite: 46 CFR 111.25-15

Each motor must be rated for continuous duty, except a motor for an application listed in Table 111.25-15 or a similar duty must meet the minimum short-time rating stated in the table.

Table 111.25-15

Application of motor	Minimum short-time rating of motor, in hours
Deck winch and direct acting capstan	Half
Deck winch with hydraulic transmission	Continuous at no load followed by 1/2 hr. at full load
Direct acting windlass	One fourth
Windlass with hydraulic transmission	Half hour idle pump operation, followed by 1/4 hr. full load operation
Steering gear, direct acting	One
Steering gear, indirect drive	Continuous operation at 15 pct. load followed by 1 hr. at full load
Watertight door operators	1/12
Boat winches	1/12

Cite: 46 CFR 111.30 - 29(g)(5)

Each emergency switchboard must have an exciter field rheostat.

Cite: 46 CFR 111.50-3(b)

Overcurrent protection of conductors. Each conductor must be protected in accordance with its current carrying capacity, except a conductor for the following circuits, which must meet the specific requirements as outlined in the regulations.

Cite: 46 CFR 111.60 - 7
Demand loads.

Generator, feeder and bus-tie cables must be selected on the basis of a computed load of not less than given in the following table:

Type of circuit	Demand load
Generator cables	115 percent of continuous generator rating
Switchboard bus-tie, except ship's service to emergency switchboard bus-tie	75 percent of generating capacity of the larger switchboard
Emergency switchboard bus-tie	115 percent of continuous rating of emergency switchboard
Motor feeders	Article 430, National Electric Code
Galley equipment feeder	100 percent of either the first 50 KW or one-half the connected load, whichever is the larger, plus 65 percent of the remaining connected load, plus 50 percent of the rating of the spare switches or circuit breakers in the distribution panel.
Lighting feeder	100 percent of the load plus the average active circuit load for the spare switches or circuit breakers on the distribution panels.
Grounded neutral of a dual voltage leader	100 percent of the capacity of the ungrounded conductors when grounded neutral is not protected by a circuit breaker overcurrent trip, or not less than 50 percent of the capacity of the ungrounded conductors when the grounded neutral is protected by a circuit breaker overcurrent trip or overcurrent alarm.

Cite: 46 CFR 111.60 - 19(a)

A cable must not be spliced in a hazardous location, except in intrinsically safe systems.

Cite: 46 CFR 111.70-5

- (a) If an enclosure for a motor, master switch, or other equipment has an electric heater inside the enclosure that is energized from a separate circuit, the heater circuit must be disconnected from its source of potential by a disconnect device independent of the enclosure containing the heater. The heater disconnecting device must be adjacent to the equipment disconnecting device. A fixed sign, warning the operator to open both devices, must be on the enclosure of the equipment disconnect device, except as in paragraph (b) of this section.
- (b) If the location of the enclosure for a motor, master switch, or other equipment for deck machinery is remote from the motor and controller disconnect device, a sign must be fixed to the enclosure if the disconnect arrangement required by paragraph (a) of this section is not used. The sign must warn the operator of the presence of two sources of potential within the enclosure and show the location of the heater circuit disconnect device.
- (c) Electric heaters installed within motor controllers and energized from a separate circuit must be disconnected in the same manner as required by paragraph (a) of this section or by Sec. 111.70-7(d).

Cite: 46 CFR 111.75-17(d)

Requirement for navigation light to be independently ab tested to UL 1104 or an equivalent standard.

Cite: 111.95-1 Applicability.

- (a) The electric installation of each electric power-operated boat winch must meet the requirements in this subpart, except that limit switches must be adapted to the installation if there are no gravity davits.
- (b) The provisions of this subpart supplement the requirements for boat winches in other parts of this chapter under which vessels are certified and the requirements for equipment approvals as outlined in CFR 31.36 - 1, CFR 70.28 - 1 and CFR 90.27 - 1.

Cite: 111.95-3 General requirements.

- (b) Each main line emergency disconnecting switch, if accessible to an unauthorized person, must have a means to lock the switch in the open-

circuit position with a padlock or its equivalent. The switch must not lock in the closed-circuit position.

Cite: 46 CFR 111.95-7

- (a) If the motor controller of a boat winch power unit is next to the winch, the main line emergency switch must disconnect all parts of the boat winch power unit, including the motor controller and limit switches, from all sources of potential. Other power circuit switches must be connected in series with the main line emergency switch and must be ahead of the motor controller. The main line emergency switch must be the motor and controller disconnect required by Subpart 111.70 and must have a horsepower rating of at least that of the winch motor.
- (b) If the motor controller of a boat winch power unit is remote from the winch, there must be a switch at the controller that can disconnect the entire winch electric installation from all sources of potential. The switch must be in series with and on the supply side of the main line emergency switch.
- (c) Each davit arm limit switch, whether connected in the power circuit or in the control circuit, must disconnect all ungrounded conductors of the circuit controlled.
- (d) If one motor is used with two winches, there must be a main line emergency switch, a clutch interlock switch, and a master switch for each winch, except that a single main line emergency switch located as required by paragraph (e) of this section may be used for both winches. The main line emergency switches must be connected, in series, ahead of the motor controller. The master switches must be connected in parallel and each, in series, with the corresponding clutch interlock switch for that winch. Each clutch interlock switch must open the circuit to its master switch, except when the power unit is clutched to the associated winch. There must be a means to prevent the power unit from being clutched to both winches simultaneously.
- (e) The main line emergency disconnect switch must be adjacent to the master switch, within reach of the winch operator, accessible to the person in charge of the boat stowage, and for gravity davit installations, in a position from which the movement of boat davit arms can be observed as they approach the final stowed position.

Cite: 46 CFR 112.05 - 3

Main emergency bus-tie.

Each bus-tie between a main switchboard and an emergency switchboard must:

(b) Be arranged to prevent parallel operation of an emergency power source with any other source of electric power, except for interlock systems for momentary transfer of loads; and

(c) If arranged for feedback operation, open automatically upon overload of the emergency power source before the emergency power source is tripped off the line from the overload.

Cite: 46 CFR 112.05 - 5(b)

A stop control for an emergency generator must be only in the space that has the emergency generator, except a remote mechanical reach rod is permitted for the fuel oil shut-off valve to an independent fuel oil tank located in the space.

Cite: 46 CFR 112.15 - 1 & 5

Final (including temporary) emergency loads.

On vessels required to have final emergency power sources, the following emergency lighting and power loads must be arranged so that they can be energized from the final emergency power source:

(f) At least one light in each space where a person may be maintaining, repairing or operating equipment, stowing or drawing stores or equipment, or transiting, such as public spaces, work spaces, machinery spaces, workshops, galleys, bow thruster rooms, storage areas, underdeck passageways in cargo areas, windlass rooms, accessible duct keels with valve operators, cargo handling rooms and holds of roll-on/roll-off vessels.

(q) All lighting relative to helicopter operations and landing if installed, unless provided by another source power (such as independent batteries separately charged by solar cells).

(r) Each general emergency alarm system required by SOLAS 74.

5(c) Each charging panel for:

(1) Temporary emergency batteries;

- (2) Starting batteries for diesel engines or gas turbines that drive emergency generators; and
- (3) General alarm batteries.
- (g) If necessary, the lube oil pump for each propulsion turbine and reduction gear, propulsion diesel reduction gear, and ship's service generator turbine which needs external lubrication.
- (h) Each rudder angle indicator.
- (l) Each general emergency flashing light required.
- (m) Each blow-out-preventer control system.
- (n) Any permanently installed diving equipment that is dependent upon the vessel's power.
- (o) Each emergency generator starting compressor.
- (r) Each vital system automation load required.
- (s) Motor-operated valves for each cargo oil and fuel oil system, if the emergency power source is the source of power.
- (t) Each ship's stabilizer wing, unless a separate source of emergency power is supplied.
- (u) Each indicator that shows the position of the stabilizer wings.
- (v) Each smoke extraction fan (not including smoke detector sampling).

Cite: 46 CFR 112.05-5

- (a) The emergency power source must meet table 112.05-5(a) and have the capacity to supply all loads that are simultaneously connected to it, except a load on a bus-tie to the main switchboard or non-required loads that are connected in accordance with Sec. 112.05-1(c).

Table 112.05-5(a)

Size of vessel and service	Type of emergency power source or lighting	Period of operation and minimum capacity of emergency power
Passenger vessels:		
Ocean, Great Lakes, or coastwise; or on an international voyage	Temporary emergency power source; and final emergency power source (automatically connected storage battery or an automatically started generator).	36 hours.\1\ \2\
Other than Ocean, Great Lakes, or coastwise and not on an international voyage	Final emergency power source (automatically connected storage battery or an automatically started generator).	8 hours or twice the time of run, whichever is less.\2\
Cargo vessels; miscellaneous self-propelled vessels; tankships; barges with sleeping accommodations for more than 6 persons; mobile offshore drilling units; and oceanographic vessels:		
Ocean, Great Lakes, or coastwise and 500 GT or	Final emergency power source (automatically	18 hours.\1\ \2\

more; on an international voyage and 500 GT or more; or all waters and 1600 GT or more.	connected storage battery or an automatically started generator).	
Ocean, Great Lakes, or coastwise and less than 500 GT; or other than ocean, Great Lakes, or coastwise, 300 GT or more but less than 1600 GT, and not on an international voyage	Emergency lighting provided by an automatically connected or manually controlled storage battery; automatically or manually started generator; or relay-controlled, battery operated lanterns.\3\4\.	6 hours or twice the time of run, whichever is less.

\1\ A 12-hour power supply may be especially considered for vessels engaged regularly in voyages of short duration.

\2\ The capacity for the operation of the steering gear, as required by Sec. 111.93, is for a period of 30 minutes continuous operation.

\3\ The emergency lighting requirements of Sec. 112.15-1 (b), (c), (f), and (g) must be met.

\4\ Requirements of Subpart 112.39 must be met by the relay-controlled, battery-operated lanterns.

Cite: 46 CFR 112.15-1

On vessels required by 112.05-5(a) to have a temporary emergency power source, the following emergency lighting and power loads must be arranged so that they can be energized from the temporary power source:

- (d) Illuminated signs with the word "EXIT" in red letters throughout a passenger vessel so the direction of escape to the open deck is obvious from any portion of the vessel usually accessible to the passengers or crew, except machinery spaces, and except stores and similar spaces where the crew are not normally employed. There must be sufficient signs so that the direction of escape is obvious, with all fire doors in stairway enclosures and main vertical zone bulkheads closed and all watertight doors closed. For the purpose of this paragraph, an individual stateroom or other similar small room is not required to have a sign, but the direction of escape must be obvious to a person emerging from the room.

- (e) Illumination to allow safe operation of each power operated watertight door.

Cite: 46 CFR 112.20 - 5(b)

For systems in which a reduction of frequency of the normal source or final emergency power source adversely affects the emergency system and emergency loads, there must be means to transfer the loads under §112.15 - 1 to the temporary emergency power source upon a reduction in the frequency of the normal source or final emergency power source

Cite: 46 CFR 112.20 - 15

(b) When the potential from the normal source has been restored, the emergency loads must be manually or automatically transferred to the normal source, and the final emergency power source must be manually or automatically stopped.

(c) If the potential of the final emergency power source is less than 75 to 85 percent of normal value while supplying the emergency loads, the temporary emergency loads under 112.15 - 1 must transfer automatically to the temporary emergency power source.

Cite: 46 CFR 112.43-7

- (a) Except as allowed in paragraph (b) of this section, the following emergency lights must be supplied from a distribution panel on the navigating bridge:
 - (1) Navigation lights not supplied by the navigation light indicator panel.
 - (2) Lights for survival craft launching operations under Sec. 111.75-16, except as allowed in Sec. 112.43-5.
 - (3) Signalling lights.
 - (4) Emergency lights:
 - (i) On open decks;
 - (ii) On the navigating bridge;
 - (iii) In the chartroom;

- (iv) In the fire control room; and
 - (v) For navigation equipment.
- (b) On a mobile offshore drilling unit, the distribution panel required in paragraph (a) of this section must be in the control room.
- (c) Each distribution panel required in paragraphs (a) and (b) of this section must have a fused switch or circuit breaker for each branch circuit.

Cite: 46 CFR 112.50 - 1(g)

The generator set must shut down automatically upon loss of lubricating oil pressure, over-speed, or operation of a fixed fire extinguishing system in the emergency generator room (see § 111.12-1(b) for detailed over-speed trip requirements).

Cite: 46 CFR 112.55 - 10(d)

Storage battery charging. There must be instruments to show the rate of charge.

Cite: 46 CFR 113.30 - 5(g)

Lookout.

Each vessel must have a means of communication between the navigating bridge and the bow or forward lookout station unless direct voice communication is possible.

Cite: 46 CFR 113.43 - 1,3,5

1. This subpart applies to each vessel of 1600 gross tons and over that has power driven main or auxiliary steering gear.

3(a). Each vessel must have steering failure alarm system that actuates an audible and visible alarm in the pilothouse when the actual position of the rudder differs by more than 5 degrees from the rudder position ordered by the follow-up control systems, for more than:

- (1) 30 seconds for ordered rudder position changes of 70 degrees;
 - (2) 6.5 seconds for ordered rudder position changes of 5 degrees;
- and

(3) The time period calculated by the following formula for ordered rudder position changes between 5 degrees and 70 degrees:

$$t = (R / 2.76) + 4.64$$

Where t = maximum time delay in seconds and R = ordered rudder change in degrees.

5. Each steering failure system must be supplied by a circuit that is independent of other steering gear alarm circuits.

Cite: 46 CFR Part 171, Subpart C

For Passenger vessels not using Res. A.265(VIII) as an equivalent to Part B, the stability of passenger ships in the damaged condition shall comply with the requirements of 46 CFR 171.080 in association with subdivision requirements given in 46 CFR Part 171.

Cite: 46 CFR Part 174, Subpart J - Special Rules Pertaining to Dry Cargo Ships

Dry cargo ships being reflagged must meet the requirements of SOLAS 1974, as amended, Chapter II-1, Part B-1 as given in 174.350/355/360.

Additional United States Interpretation Requirements

SOLAS Chapter II-1 Construction - Subdivision and stability, machinery and electrical installations ;Part B - Subdivision and Stability

Regulation II-1/11.2

Obtain USCG approval for collision bulkheads located at a distance of less than 5% or more than 8% of the length of the ship from the forward perpendicular.

Regulations II-1/22.4 and II-1/22.5

An inclining test for sister ships may be waived if a responsible officer from the shipbuilding company certifies that the subject vessel does not differ from its inclined sister ship in any way that would result in a lessening of stability characteristics.

The inclining test may be waived if a responsible officer from the shipbuilding company certifies the conditions of this paragraph are met."

Regulations II-1/23-1.2, II-1/23-1.3.1 and II-1/23-1.3.2

A recommended list of shell doors and other watertight openings, which could lead to major flooding if left open or not properly secured, should be forwarded to the Commanding Officer, Marine Safety Centre, for approval.

A recommended list of equipment, conditions and operational procedures considered necessary to maintain watertight integrity shall be forwarded to the Commanding Officer, Marine Safety Centre, for approval.

A recommended list of elements (i.e. closures, security of cargo, sounding of alarms, etc.) considered vital to the survival of the ship and its crew shall be forwarded to the Commanding Officer, Marine Safety Centre, for approval.

Part D - Electrical Installations

Regulation II-1/45.5.2

Regulations 46 CFR 111.60-2 through 111.60-9 are to be used as guidance for any exemptions to the requirements of flame retardant cables when used in speciality applications.

Regulation II-1/45.6.1

If the allowance of a circuit to not be protected against short-circuit is desired, approval must be obtained from the Commanding Officer, Marine Safety Centre (MSC).

Chapter II-2 Fire Protection, Fire Detection and Fire Extinction
Part A - General

Regulations II-1/3.1, 3.8, 3.23.3, 3.23.4, 3.23.5, 18.1.1 and 18.1.2

Reference should be made to parts 1, 5, 7, 6, 8 or 3 respectively, of the International Code for Application of Fire Test Procedures (FTP Code) when assessing the acceptability of materials. Additionally, the following guidance is given with respect to the approval of structural fire protection items :

Equipment Approvals

The 1974 SOLAS Convention mandates that structural fire protection materials be approved by the flag Administration.

In the United States this function is performed by the USCG, generally through independent laboratory testing and inspection. Provisions within the 1996 USCG Authorisation Act also allow the use of equipment approved by or on behalf of other governments, under certain circumstances.

For structural fire protection items the USCG recognises that, with the implementation of the IMO FTP Code, there exist acceptable IMO Standards for approval of this equipment and these standards are used by the USCG to approve "SOLAS" equipment and materials. Materials and equipment from both U.S. and foreign sources approved in accordance with the procedures contained in 46 CFR 159 will continue to be acceptable and those items manufactured in a country with which the United States has a Mutual Recognition Agreement in force, or the USCG has found to have an equivalent approval program, will also be acceptable.

Because reciprocity is not required for structural fire protection materials, the USCG will accept structural fire protection materials that are approved by a foreign Administration once the USCG has determined that a country's approval process is acceptable. After this acceptance of a country's approval process, structural fire protection materials manufactured in that country and approved in accordance with the provisions of the IMO Fire Test Procedures Code will be accepted for use on United States ships.

Regulation II-2/3.1

"A pantry containing no cooking appliances" is one which contains only low heat warming equipment, has steel furnishings and is not used as a storeroom for cleaning gear, linen supplies or any other combustible material. A dining room containing such appliances shall not be regarded as a pantry.

Regulation II-2/13

The doors giving access to either of the two required means of escape shall not be lockable, except that crash doors or locking devices, capable of being easily forced in an emergency, may be employed provided that a permanent and conspicuous notice giving instructions on how to open the door or lock is attached to both sides of the door. This paragraph shall not apply to outside doors to the deckhouses where such doors are locked by key only and such key is under control of one of the vessel's officers.

Regulation II-2/13

All public spaces having a deck area of over 28m² shall have at least two exits. Where applicable, the exits shall give egress to different corridors, spaces or rooms to minimise the possibility of one incident blocking both means of escape.

Regulation II-2/13

All interior stairways, other than those within the Machinery Spaces or Cargo Holds, shall have a minimum width of 0.71 metre. The angle of inclination with the horizontal of such stairways shall not exceed 0.87 radians (50 degrees).

OFFICER AND CREW ACCOMMODATION

1. Application

- (a) The provisions of this annex, with the exception of paragraph 13, shall apply to all vessels other than tankships of 100 gross tons and over contracted for on or after November 19, 1952. Vessels other than tankships of 100 gross tons and over contracted for prior to November 19, 1952, shall meet the requirements of paragraph 13.
- (b) Vessels other than tankships of less than 100 gross tons shall meet the applicable requirements of this annex insofar as is reasonable and practicable.
- (c) The provisions of this annex, with the exception of paragraphs 14 and 15, apply to all tankships of 100 gross tons and over constructed on or after June 15, 1987.
- (d) Tankships of less than 100 gross tons and manned tank barges must meet the requirements of paragraph 14.
- (e) Tankships of 100 gross tons and over constructed prior to June 15, 1987, must meet the requirements of paragraph 15.

2. Intent

- (a) It is the intent of this annex that the accommodations provided for officers and crew on all vessels shall be securely constructed, properly lighted, heated, drained, ventilated, equipped, located, arranged, and, where practicable, shall be insulated from undue noise and effluvia.
- (b) The crew referred to herein includes all persons, except the licensed officers, regularly employed on board any vessel. Where the requirements for the accommodation of licensed officers are not otherwise specified, they shall be of at least equivalent to that indicated herein for the crew.
- (c) For the purpose of this subpart, the term "crew spaces" shall include sleeping rooms, messrooms, recreational rooms, toilet

and shower spaces, etc., which are intended for the exclusive use of the crew.

3. Location of Crew Spaces

- (a) Crew spaces shall be located, where practicable, so that the maximum amount of fresh air and light are obtainable, having due regard to the service of the vessel and the requirements of other space users.
- (b) Crew quarters shall not be located farther forward in a vessel than a vertical plane located at 5 percent of the vessel's length abaft the forward side of the stem at the designed summer load waterline. However, for vessels in other than ocean or coastwise service, this distance need not exceed 28 ft. For the purpose of this paragraph, the length shall be as defined in CFR 42.13-15 of subchapter E (Load Lines). No section of the deck of the crew spaces shall be below the deepest load line, except that in special cases, on vessels other than tankships, such an arrangement may be approved provided that in no case shall the deck head of the crew space be below the deepest load line.
- (c) Hawse pipes or chain pipes shall not pass through crew spaces.
- (d) There shall be no direct communication, except through solid, close fitted doors or hatches between crew spaces and chain lockers, cargo, stowage or machinery spaces.
- (e) There shall be no access, vents, or sounding tubes from fuel or cargo oil tanks opening into crew spaces, except that sounding tubes and access openings may be located in corridors.
- (f) Where practicable, crew spaces shall be located entirely separate and independent of spaces allotted to passengers or licensed officers.

4. Construction

- (a) All crew spaces are to be constructed in a manner suitable to the purpose for which they are intended. The bulkheads separating the crew space from cargo and machinery spaces, lamp and paint rooms, storerooms, drying rooms, washrooms, and toilet spaces shall be made odour-proof.

- (b) Toilet spaces, except when provided as private or semiprivate facilities, shall be so built, fitted, and situated, that no odor from them will readily enter other crew spaces.
- (c) Where the shell or unsheathed weather decks form boundaries of crew spaces, suitable protective coverings shall be applied to prevent formation or accumulation of moisture.
- (d) Where crew spaces adjoin or are immediately above spaces such as galleys machinery spaces or casings, donkey boiler rooms, etc., they shall be suitably protected from the heat and noise.
- (e) The interior sides and deckheads of crew spaces shall be covered with enamel, paint, or other material light in color.
- (f) Crew spaces shall be properly drained where considered necessary.
- (g) All washrooms and toilet rooms shall be properly drained and so constructed and arranged that they can be kept in a clean, workable, and sanitary condition. The scuppers shall be located in the lowest part of the space, due consideration being given to the average trim of the vessel.

5. Sleeping Accommodation

- (a) Arrangements
 - (1) Separate sleeping accommodations are to be provided for the deck, engine, and steward groups of the crew.
 - (2) Each watch of seamen, firemen or similar ratings on duty in watches is to be provided with separate sleeping room or rooms, unless the total space for accommodations makes this impracticable.
 - (3) Where practicable, each licensed officer shall be provided with a separate stateroom.
- (b) Size
 - (1) Sleeping accommodations for the crew shall be divided into rooms, no one of which shall berth more than four

persons. Except on passenger ships requiring a large number of personnel in the steward's department, rooms may be arranged to accommodate not more than 10 such persons.

- (2) Each room shall be of such size that there are at least 30 square feet of deck area and a volume of at least 210 cubic feet for each person accommodated. The clear headroom shall be not less than 6 ft 3 in. In measuring sleeping quarters allocated to crews of vessels, any equipment contained therein for the use of the occupants is not to be deducted from the total volume or from the deck area.

(c) **Equipment**

- (1) Each person shall have a separate berth and not more than one berth shall be placed above another. The berths shall have a framework of metal or other hard, smooth material not likely to corrode or harbor vermin, and shall be so arranged that they provide ample room for easy occupancy. The overall size of a berth shall not be less than 30 inches wide by 76 inches long, except by special permission of the Commandant, USCG. Where berths adjoin, they shall be divided by a partition not less than 18 inches in height. Where two tiers of berths are fitted, the bottom of the lower must not be less than 12 inches above the deck, and the bottom of the upper must not be less than 2 ft 6 in both from the bottom of the lower and from the deck overhead. The berths shall not be obstructed by pipes, ventilating ducts, or other installations.
- (2) A locker of metal or other hard, smooth material shall be provided for each person accommodated in a room. Each locker shall be not less than 300 square inches in cross section area and 60 inches high. It shall be so placed as to be readily accessible. The interior of the locker shall be so arranged as to facilitate the proper stowage of clothes.

6. Wash spaces; toilet spaces; and shower spaces

- (a) For the purposes of this annex

- (1) Private facility means a toilet, washing, or shower space that is accessible only from one single or double occupancy sleeping space;
 - (2) Semiprivate facility means a toilet, washing, or shower space that is accessible from one or two one-to-four person occupancy sleeping spaces; and
 - (3) Public facility means a toilet, washing, or shower space that is not private or semiprivate.
- (b) Each private facility must have one toilet, one shower, and one washbasin, all of which may be in a single space.
 - (c) Each semiprivate facility must have at least one toilet and one shower, which may be in a single space.
 - (d) Each room adjoining a semiprivate facility must have a washbasin if a washbasin is not installed in the semiprivate facility.
 - (e) Each tankship must have enough public facilities to provide at least one toilet, one shower, and one washbasin for each eight persons without private facilities.
 - (f) Urinals may be installed in toilet rooms, but no toilet required in this annex may be replaced by a urinal.
 - (g) Each public toilet space and washing space must be convenient to the sleeping space that it serves.
 - (h) No public facility may open into any sleeping space.
 - (i) Each washbasin, shower, and bathtub must have hot and cold running water.
 - (j) Adjacent toilets must be separated by a partition that is open at the top and bottom for ventilation and cleaning.
 - (k) Public toilet facilities and shower facilities must be separated.

- (1) Each public facility that is a toilet space must have at least one washbasin unless the only access to the toilet space is through a washing space.
- (m) Each toilet must have an open front seat.
- (n) Each washing space and toilet space must be so constructed and arranged that it can be kept in a clean and sanitary condition and the plumbing and mechanical appliances kept in good working order.
- (o) Washbasins may be located in sleeping spaces.

7. Messrooms

- (a) Messrooms shall be located as near to the galley or suitably equipped serving pantry as is practicable, except where messroom is equipped with a steam table. The messrooms shall be of such size as to seat the number of persons normally scheduled to be eating at one time.
- (b) Messrooms shall be properly equipped with tables, seats, and other necessary equipment and shall be so arranged as to permit access to each seat.

8. Hospital Space

- (a) Except as specifically modified by paragraph (f) of this annex, each vessel, which in the ordinary course of its trade makes voyages of more than 3 days duration between ports and which carries a crew of 12 or more, shall be provided with a hospital space. This space shall be situated with due regard to the comfort of the sick so that they may receive proper attention in all weathers.
- (b) The hospital shall be suitably separated from other spaces and shall be used for the care of the sick and for no other purpose.
- (c) The entrance shall be of such width and in such a position as to admit a stretcher case readily. Berths shall be of metal and may be in double tier, provided the upper berth is hinged and arranged to be secured clear of the lower berth when not in use.

At least one berth shall be so arranged that it can be made accessible from both sides when necessary.

- (d) The hospital shall be fitted with berths in the ratio of one berth to every twelve members of the crew or portion thereof who are not berthed in single occupancy rooms, but the number of berths need not exceed six.
- (e) The hospital shall have a toilet, washbasin, and bath tub or shower conveniently situated. Other necessary suitable equipment of such character as clothes locker, table, seat, etc., shall be provided.
- (f) On vessels in which the crew is berthed in single occupancy rooms a hospital space will not be required: *Provided*, that one room shall be designated and fitted for use as a treatment and/or isolation room. Such room shall meet the following standards:
 - (1) The room must be available for immediate medical use;
 - (2) The room must be accessible to stretcher cases;
 - (3) The room must have a single berth or examination table so arranged that it can be made accessible from both sides when necessary; and,
 - (4) A washbasin with hot and cold running water must be installed either in or immediately adjacent to the space and other required sanitary facilities must be conveniently located.

9. Other Spaces

- (a) Sufficient facilities, depending upon the number of the crew, shall be provided where the crew may wash their own clothes. There shall be at least one tub or sink fitted with the necessary plumbing, including hot and cold running water.
- (b) Clothes drying facilities or space shall be provided for the needs of the crew.

- (c) Recreation accommodations shall be provided. Where messrooms are used for this purpose, they shall be suitably planned.
- (d) A space or spaces of adequate size shall be available on an open deck to which the crew has access when off duty.

10. Lighting

- (a) All crew spaces shall be adequately lighted.
- (b) Berth lights shall be provided for each member of the crew.

11. Heating

- (a) All crew spaces shall be adequately heated in a manner suitable to the purpose of the space.
- (b) The heating system will be considered satisfactory if it is capable of maintaining a minimum temperature of 70°F. under normal operating conditions without undue curtailment of the ventilation.
- (c) Radiators and other heating apparatus shall be so placed, and where necessary shielded, as to avoid risk of fire, danger or discomfort to the occupants. Pipes leading to radiators or heating apparatus shall be insulated where those pipes create a hazard to persons occupying the space.

12. Insect Screens

- (a) Except in such areas as are considered to be insect free, provisions shall be made to protect the crew quarters against the admission of insects. This may be accomplished by the fitting of suitable screens to ventilating skylights, air ports, ventilators, and doors to unscreened spaces and the open deck or by other methods. Insect screens are not required in air conditioned crew quarters for windows, air ports, and doors that are normally kept closed.

13. **For all vessels other than tankships contracted for prior to November 19, 1952.**

(a) Vessels of less than 100 gross tons, contracted for prior to November 19, 1952, shall meet the general intent of paragraph and in addition shall meet the following requirements:

(1) Existing structure, arrangements, materials, and facilities, previously accepted or approved will be considered satisfactory so long as they are maintained in a suitable condition to the satisfaction of the Surveyor. Minor repairs and alterations may be made to the same standard as the original construction.

(b) Vessels of 100 gross tons and over, contracted for prior to March 4, 1915, shall meet the requirements of this paragraph.

(1) Existing structure, arrangements, materials, and facilities, previously approved will be considered satisfactory so long as they are maintained in good condition to the satisfaction of the Surveyor. Minor repairs and alterations may be made to the same standard as the original construction:

Provided, that in no case will a greater departure from the standards of paragraphs 2 through 12 be permitted than presently exists.

(c) Vessels of 100 gross tons and over, contracted for on or after March 4, 1915, but prior to January 1, 1941, shall meet the requirements of this paragraph.

(1) Existing structure, arrangements, materials, and facilities, previously approved will be considered satisfactory so long as they are maintained in a suitable condition to the satisfaction of the Surveyor. Minor repairs and alterations may be made to the same standard as the original construction.

(2) Where reasonable and practicable, a minimum of one toilet, shower, and washbasin shall be provided for each 10 members of the crew or fraction thereof.

- (3) Crew spaces shall have a volume of at least 120 cubic feet and a deck area of at least 16 square feet for each person accommodated.
 - (4) Each crewmember shall have a separate berth, and berths may not be placed more than two high.
 - (5) Each vessel, which in the ordinary course of its trade makes a voyage of more than three days' duration between ports and which carries a crew of 12 or more persons, shall be provided with a suitable hospital space for the exclusive use of the sick or injured. Berths shall be provided in the ratio of one berth for each twelve members of the crew or fraction thereof, but the number of berths need not exceed six.
 - (6) The crew spaces shall be securely constructed, properly lighted, heated, drained, ventilated, equipped, located, and arranged, and where practicable, shall be insulated from undue noise and effluvia.
- (d) Vessels of 100 gross tons and over, contracted for on or after January 1, 1941, but prior to November 19, 1952, shall meet the requirements of this paragraph.
- (1) Existing structure, arrangements, materials, and facilities, previously approved will be considered satisfactory so long as they are maintained in a suitable condition to the satisfaction of the Surveyor. Minor repairs and alterations may be made to the same standard as the original construction.
 - (2) Washrooms and toilet rooms:
 - (i) There shall be a minimum of one toilet, shower, and washbasin for each 8 members of the crew or fraction thereof who are not accommodated in rooms having attached private or semiprivate facilities.
 - (ii) Separate facilities shall be provided for the engine room, deck, or stewards department when the

number of crew in that department, exclusive of officers, exceeds 8.

(iii) Toilet rooms shall be separate from the wash rooms. At least one washbasin shall be installed in each toilet room.

(iv) Toilets shall be provided with seats of the open front type. Urinals may be fitted in toilet rooms, if desired, but no reduction will be made in the required number of toilets.

(v) Washbasins, showers, and bath tubs if substituted for showers, shall be equipped with proper plumbing including hot and cold running water.

(3) Crew spaces shall have a volume of at least 120 cubic feet and a deck area of at least 16 square feet for each person accommodated.

(4) Each crew member shall have a separate berth, and berths may not be placed more than two high.

(5) Each vessel, which in the ordinary course of its trade makes a voyage of more than three days duration between ports and which carries a crew of 12 or more persons, shall be provided with a suitable hospital space for the exclusive use of the sick or injured. Berths shall be provided in the ratio of one berth for each 12 members of the crew or fraction thereof, but the number of berths need not exceed six.

(6) The crew spaces shall be securely constructed, properly lighted, heated, drained, ventilated, equipped, located, and arranged, and where practicable, shall be insulated from undue noise and effluvia.

14. Crew accommodation on tankships of less than 100 gross tons and manned tank barges

(a) The crew accommodations on all tankships of less than 100 gross tons and all manned tank barges must have sufficient size and equipment, and be adequately constructed to provide for the

protection of the crew in a manner practicable for the size, facilities, and service of the tank vessel.

- (b) The crew accommodations must be consistent with the principles underlying the requirements for crew accommodations on tankships of 100 gross tons or more.

15. Crew accommodation on tankships constructed before June 15, 1987

All tankships of 100 gross tons and over constructed before June 15, 1987 may retain previously accepted or approved installations and arrangements so long as they are maintained in good condition to the satisfaction of the Surveyor.

5. SUPPLEMENTAL REQUIREMENTS

The following supplemental requirements relevant to the issue of a Cargo Ship Safety Equipment Certificate are given using the appropriate Code of Federal Regulations (CFR) cite or SOLAS regulation number.

5.1 General

Equipment Approvals

For U.S. flag vessels, specific and type approvals for fire suppression equipment, structural fire protection materials and life-saving appliances are performed by the USCG as mandated by SOLAS 1974, generally through independent laboratory testing and inspection. Provisions within the 1996 USCG Authorization Act also allow the use of equipment approved by or on behalf of other governments under certain circumstances. In the case of life-saving appliances, there must be a reciprocal agreement in place before equipment approved by that country could be used on a U.S. vessel. ACP does not change the requirements to use USCG approved materials and equipment. Therefore, class society approvals cannot be used to fulfil the obligations of the USCG, as an Administration, where type approval is required by the regulations.

The USCG approves applicable "SOLAS" lifesaving equipment using the IMO LSA Code. For fire protection items, the USCG approves "SOLAS" materials using the IMO Fire Test Procedures Code and the IMO Fire Safety Systems Code.

When a Mutual Recognition Agreement (MRA) between the U.S. and the European Community comes into effect, it will address a limited number of items of fire protection, lifesaving, and navigation equipment. The MRA will make it possible for a manufacturer with a European Approval (MED/Wheelmark) to obtain USCG approval for certain equipment covered by the MRA. This will be accomplished by permitting the "Notified Bodies" responsible for issuing approvals in Europe to issue USCG approval. Likewise, the USCG will be able to issue the European Approval (MED/Wheelmark) for manufacturers having a USCG approval if the item is included within the scope of the MRA. It is important to note that this MRA does not change the requirement of using USCG approved equipment and materials on U.S. Flag vessels. It allows an alternative means for obtaining USCG

approval. The European Marine Equipment Directive (MED) "Wheelmark" will not be accepted in lieu of USCG approval.

5.2 FIRE EQUIPMENT AND ARRANGEMENTS

USCG type-approved materials and equipment from both U.S. and foreign sources approved in accordance with the procedures contained in 46 CFR 159 will continue to be acceptable, and those items manufactured in a country with which the United States has a Mutual Recognition Agreement in force or the USCG has found to have an equivalent approval program will also be acceptable.

As mentioned above in the "General" section, the 1996 USCG Authorization Act allows the use of materials approved by or on behalf of other governments under certain circumstances. Because reciprocity is not required for structural fire protection materials, the USCG will accept structural fire protection materials that are approved by a foreign administration once the USCG has determined that a country's approval process is acceptable. There are two countries (Canada and Japan) that produce and approve structural fire protection materials that would be acceptable to the USCG. A key point is that the product must be manufactured in the country and approved by, or on behalf of, that country's administration. For example, a fire door manufactured in Korea and approved by Japan would not be acceptable.

As discussed above, the following structural fire protection materials approved by, or on behalf of, other governments (Canada and Japan) may be used in lieu of USCG type approved materials for ACP vessels:

Item	USCG Approval Category
Deck assembly	164.105
Primary deck covering	164.106
Structural insulation ("A" and "B" class)	164.107
Bulkhead panels ("B" class)	164.108
Non-combustible material	164.109
Structural ceiling	164.110
Draperies, curtains, & other suspended textiles	164.111
Interior finish	164.112
Floor coverings	164.117

Fire doors ("A" and "B" class): limited to doors without windows or with total window area no more than 645 cm ² in each door leaf. Approval limited to maximum door size tested. Doors must be used with a fire tested frame design.	164.136
Windows* (see note below)	164.137
Penetration seals (fire stops)	164.138
Dampers	164.139
Bedding components	164.142
Upholstered Furniture	164.144
Fire door control system	164.146

*Note: the following table must be used to determine when the applicable hose stream and thermal radiation test are required for "A" and "B" class windows.

Window Dimension	Classification	Hose Stream Test Required?	Heat Flux Test Required?
≤645 cm ²	A-Class	No	No
>645 cm ²	A-Class	Yes	Yes
>645 cm ²	A-0	Yes	No
≤645 cm ²	B-15	No	No
> 645 cm ²	B-15	No	Yes
Any dimension	B-0	No	No

Regulation : II-2/10.2.1.5

Fire pumps, fire mains, hydrants and hoses - Number and position of hydrants

At each fire hose valve there shall be marked in not less than 50 mm (2 in) red letters and figures : "FIRE STATION."

Regulation : II-2/10.2.3.1.1

Fire pumps, fire mains, hydrants and hoses - Fire hoses

Each section of fire hose shall be lined commercial fire hose that conforms to Underwriters' Laboratories, Inc. Standard 19 or Federal Specification ZZ-H-451E.

Regulation : II-2/10.2.3.2.1

Fire pumps, fire mains, hydrants and hoses - Fire hoses

The minimum hydrant and hose size shall be 40 mm (1.5 in.). On tankships over 125 m (L.O.A.), the minimum hydrant and hose size for exterior locations is 65 mm (2.5 in.). On passenger and cargo ships over 1500 gross tons, the minimum hydrant and hose size for interior and exterior locations is 65 mm (2.5 in.). Where 65 mm (2.5 in.) hydrants and hose are required, two 40 mm (1.5 in.) outlets and hoses may be substituted; however, both of the outlets operating simultaneously are to be considered as a single outlet for the purpose of complying with the minimum number of jets criteria for fire pump capacity.

Regulation : II-2/10.2.3.3

Fire pumps, fire mains, hydrants and hoses - Nozzles

Nozzles must be USCG approved equipment.

Regulation : II-2/10

Fire pumps, fire mains, hydrants and hoses - Fire Mains

Fire mains may not be used for other than fire, deck wash or tank cleaning services unless specific provisions are included in the system design which ensure that system availability and performance requirements to fight shipboard fires are not compromised.

All distribution valves in the fire main system shall be distinctly marked to indicate the compartments or parts of the vessel to which they lead.

Any material with a solidus melting point of 1700° F or less is considered to be capable of being rendered ineffective by heat. Consideration may be given to the acceptance of materials with a solidus melting point of 1700° F or less, on a case by case basis, based on an LR evaluation and subject to USCG approval.

Gaskets in fire main systems are not required to meet the 1700°F criteria but are required to meet the criteria for flexible pipes contained in IACS Unified Requirement F42 or equivalent.

Regulation : II-2/10.4 and FSS Code Ch. 5
Fixed gas fire-extinguishing systems - General

Fixed gas fire extinguishing systems must be USCG approved equipment.

Regulation : II-2/10.4 & FSS Code Ch. 5.2.2
Fixed gas fire-extinguishing systems - Carbon dioxide systems

The fixed carbon dioxide system must comply with the manufacturer's USCG approved Design, Installation, Operation and Maintenance Manual that meets SOLAS Regulation II-2/10.4 and the following supplemental requirements:

Quantity, Pipe Sizes and Discharge Rate

In dry cargo spaces, the number of kilograms of carbon dioxide required for each space shall be equal to the gross volume of the space in cubic meters divided by 1.873. The gross volume includes trunks extending from the space; however, tonnage openings may be considered sealed. Branch lines to various cargo holds and 'tween decks shall be sized as to ensure a uniform distribution over the space protected.

For CO₂ systems installed for enclosed ventilation systems of rotating electrical propulsion equipment, the number of kilograms of carbon dioxide required for the initial charge shall be equal to the gross volume of the system divided by 0.624 for systems having a volume of less than 57 cubic metres, and divided by 0.749 for systems having a volume of 57 cubic metres or more.

The piping for the initial charge shall be sized as to ensure a uniform distribution over the space protected, and the discharge of the required amount shall be completed within 2 minutes.

For CO₂ systems installed for enclosed ventilation systems of rotating equipment, in addition to the above there shall be sufficient carbon dioxide available to permit delayed discharges of such quantity as to maintain at least a 25% concentration until the equipment can be stopped. If the initial discharge is such as to achieve this concentration until the equipment is stopped, no delayed discharge need be provided.

For machinery spaces, tanks, pumprooms, paint lockers and similar spaces, any fixed gas fire extinguishing system used to protect these spaces must comply with the requirements of SOLAS Regulation II-2/10.4.1.1.1.

For spaces specially suitable for vehicles, any fixed gas fire extinguishing system used to protect these spaces must comply with the requirements of SOLAS Regulation II-2/20.6.1.1.

Controls

If the same cylinders are used to protect more than one space, a manifold with normally closed stop valves shall be used to direct the carbon dioxide into the proper space. If the cylinders are used to protect only one space, a normally closed stop valve shall be installed between the cylinders and the space except for systems for protection of machinery spaces, pumprooms, paint lockers and similar space which contain not more than 130 kilograms of carbon dioxide.

Distribution piping to dry cargo spaces shall be controlled from not more than two stations. One of the stations controlling the system for the main machinery space shall be located as convenient as practicable to one of the main escapes from the space. All control stations and the individual valves and controls shall be distinctly marked to indicate the compartments or parts of the vessel to which they lead.

Systems for protection of machinery spaces, pumprooms, paint lockers and similar spaces shall be actuated at each station by one control operating the valve to the space and a separate control releasing at least the required amount of carbon dioxide. These two controls shall be located in a box or other enclosure clearly identified for the particular space. Systems installed without a stop valve shall be operated by one control releasing at least the required amount of carbon dioxide.

Where provisions are made for the simultaneous release of a given amount of carbon dioxide by operation of a remote control, provisions shall also be made for manual control at the cylinders. Where gas pressure from pilot cylinders is used as a means for releasing the remaining cylinders, not less than two pilot cylinders shall be used for systems consisting of more than two cylinders. Each of the pilot cylinders shall be capable of manual control at the cylinder, but the remaining cylinders need not be capable of individual manual control.

Systems for machinery spaces, pumprooms and similar type spaces, which are of more than 130 kilograms of carbon dioxide shall be fitted with an approved delayed discharge so arranged that an approved audible alarm will be automatically sounded for at least 20 seconds before the carbon dioxide is released into the space. Such systems of not more than 130 kilograms of carbon dioxide shall also have a similar delayed discharge, except for spaces which have a suitable horizontal escape. The alarm shall depend on no source of power other than the carbon dioxide. In systems where an alarm is required, the alarm shall be conspicuously and centrally located. Adjacent to all carbon dioxide extinguishing alarms there shall be conspicuously marked:

"WHEN ALARM SOUNDS VACATE AT ONCE. CARBON DIOXIDE BEING RELEASED."

All distribution valves and controls shall be approved equipment. All controls shall be suitably protected.

On systems in which the CO₂ cylinders are not within the protected space the instructions shall also include a schematic diagram of the system and instructions detailing alternate methods of discharging the system should the manual release or stop valve fail to operate. Each control valve to a branch line shall be marked to indicate the space served.

If the space or enclosure containing the CO₂ supply or controls is to be locked, a key to the space or enclosure shall be in a break-glass type box conspicuously located adjacent to the opening.

Piping

The piping, valves and fittings shall have a bursting pressure of not less than 41 N/mm² (6000 psi). All piping, valves and fittings of ferrous materials shall be protected inside and outside against corrosion unless specifically approved otherwise.

Installation test requirements are as follows:

Upon completion of the piping installation, and before the cylinders are connected, a pressure test in accordance with the manufacturer's USCG approved Design, Installation, Operation, and Maintenance Manual shall be conducted. Only CO₂ or other inert gas shall be used for this test.

Carbon Dioxide Storage

All cylinders used for storing carbon dioxide must be fabricated, tested, and marked in accordance with 46 CFR 147.60 and 46 CFR 147.65

Discharge Outlets

Discharge outlets shall be USCG approved.

Enclosure Openings

In all spaces protected by a carbon dioxide system, except cargo spaces, stopping of the ventilating fans is to be automatically actuated upon operation of the carbon dioxide system. This will not be required where the carbon dioxide system is a secondary system in addition to another approved primary system protecting the space.

Pressure Relief

Where necessary, relatively tight compartments such as refrigeration spaces, paint lockers, etc., shall be provided with suitable means for relieving excessive pressure accumulating within the compartment when the carbon dioxide is injected.

Markings

CO₂ fire smothering apparatus shall be marked "CO₂ FIRE APPARATUS" in not less than 50 mm (2 in) red letters.

Regulation : II-2/10.3 & FSS Code Chapter 4 Fire extinguishers

Fire extinguishers must be USCG type-approved equipment.

Regulation : II-2/10.5 Fire-extinguishing arrangements in machinery spaces - Incinerator space

An enclosed space containing an incinerator shall be considered a machinery space of category A and, therefore, shall be provided with fire detection and fixed fire extinguishing systems in accordance with IMO Resolution MEPC. 76(40), "Standard Specification for Shipboard Incinerators" for the incinerator and waste storage spaces.

Regulation : II-2/10.4.1.1.3 and FSS Code Ch. 7

Fixed pressure water-spraying fire-extinguishing systems in machinery spaces

A fixed pressure water-spraying, fire extinguishing system is not acceptable by the USCG except for lamp lockers, paint lockers and pumprooms. Where installed in these spaces, it shall comply with Chapter 7 of the FSS Code, and the following:

Capacity and Arrangement

The spacing of the spray nozzles shall be on the basis of the spray pattern provided by the lowest pressure at any spray nozzle in the system. In no instance shall a system be designed for any spray nozzle to be operated at a pressure less than that for which it was approved. The maximum permissible height of the spray nozzle above the protected area shall not exceed that specified in its approval. Whenever there are obstructions to coverage by the spray patterns, additional spray nozzles shall be installed to provide full coverage.

If a fire pump is used to supply water to the water spray system it is to be sized to provide the quantity of water required for operation of the water spray system while simultaneously supplying the required water to the fire main system.

Controls

Complete, but simple instructions for the operation of the system shall be located in a conspicuous place at or near the controls.

Piping

All piping, valves and fittings shall meet the applicable requirements of LR's Classification Rules Part 5 Chapter 11 as modified by the requirements of this supplement.

Distribution piping shall be of materials resistant to corrosion, except that steel or iron pipe may be used if inside corrosion resistant coatings are applied which will not flake off and clog the nozzles. Materials readily rendered ineffective by heat of a fire shall not be used.

All piping, valves, and fittings shall be securely supported, and where necessary, protected against injury.

Drains, strainers and dirt traps shall be fitted where necessary to prevent the accumulation of dirt or moisture.

Threaded joints shall be metal to metal, with no thread compound used. Distribution piping shall be used for no other purpose.

All piping shall be thoroughly cleaned and flushed before installation of the water spray nozzles. Pumproom spray nozzles shall be USCG approved .

Markings

The control cabinets or spaces containing valves or manifolds shall be distinctly marked in conspicuous red letters at least 50 mm (2 in) high - "WATER SPRAY FIRE APPARATUS."

Regulation : II-2/10.6 and FSS Code Ch. 8 Automatic sprinkler, fire detection and fire alarm systems

Automatic sprinkler systems are also to comply with National Fire Protection Association (NFPA) Standard 13-1996. Where SOLAS Reg. II-2/12 and NFPA Std. 13 have similar requirements, the higher standard is to be satisfied. The following supplemental requirements apply:

The sprinkler heads, alarms, dry pipe valves, and actuating mechanisms shall be listed or approved by a recognized independent testing lab.

All wiring and electrical circuits and equipment shall meet the applicable requirements of LR's Classification Rules Part 6 Chapter 2 and this supplement.

All piping, valves, fittings, pressure tanks, etc. must meet the applicable requirements of LR's Classification Rules Part 5 Chapter 11 as modified by this supplement.

The fire detecting and manual alarm, automatic sprinkler, and smoke detection alarm bells in the engine room shall be identified by at least 25 mm (1 in) red lettering "FIRE ALARM", "SPRINKLER ALARM", or "SMOKE DETECTING ALARM" as appropriate. Where such alarms on the bridge or in the fire control station do not form a part of an easily

identifiable alarm cabinet, the bells shall be suitably identified as above.

The control cabinets or spaces containing valves or manifolds shall be distinctly marked in conspicuous red letters at least 50 mm (2 in) high "AUTOMATIC SPRINKLING SYSTEM."

**Regulation : II-2/7 and FSS Code Ch. 9
Fixed fire detection and fire alarm systems**

Fire detection systems must be USCG approved equipment.

A conductor must not be used as a common return from more than one zone. Each connection box that has conductors for more than one zone must be watertight.

There must be at least two sources of power for the electrical equipment of each fire detecting and alarm system. The normal source must be the main power source. The other source must be the emergency power source or an automatically charged battery. Upon loss of power to the system from the normal source, the system must be automatically supplied from the other source.

The capacity of each system's storage battery must be sufficient to supply the fire detecting and alarm system for a period of not less than one week without recharging. At the end of the one week discharge period, the battery potential must not be less than 80 percent of nominal potential under design load.

The capacity of each branch circuit providing power to a fire detection or alarm system must not be less than 125 percent of the maximum load.

Each fire detecting zone must not include spaces on more than one deck, except:

- (a) Adjacent and communicating spaces on different decks in the ends of the vessel having a combined ceiling area of not more than 279 m² (3000 square feet).
- (b) Isolated rooms or lockers in such spaces as mast houses, wheelhouse top, etc., which are easily communicable with the area of the fire-detecting circuit to which they are connected.

(c) Systems with indicators for individual spaces.

The fire detecting zone must not contain more than 50 protected rooms or spaces.

The system must visually indicate the zone in which the alarm originated.

The detectors, the detecting cabinet and alarms must be USCG approved .

The fire detecting system must be used for no other purpose, except it may be incorporated with the manual alarm system.

A framed chart or diagram must be installed in the wheelhouse or control station adjacent to the detecting cabinet indicating the location of the detecting zones and giving operating instructions.

Regulation : II-2/7.2 & FSS Code Ch. 9

Fixed fire detection and fire alarm systems - Installation requirements

A sufficient number of call points must be employed such that a person escaping from any space would find an alarm box convenient on the normal route of escape.

The manual alarm system must be used for no other purpose, except it may be incorporated with the fire detecting system.

Manual fire alarm boxes shall be clearly and permanently marked "IN CASE OF FIRE BREAK GLASS" in at least 12.5 mm (1/2 in) letters.

Detector spacing shall be in accordance with the manufacturer's recommendation. Detector spacing in spaces with ceilings greater than 3 m (10 ft) must be corrected in accordance with NFPA 72E.

Regulation : II-2/10.10.3

Fireman's outfit

Lockers or spaces where emergency equipment is stowed shall be marked: "EMERGENCY EQUIPMENT".

Regulation : II-2/13
Miscellaneous items

Small rooms or spaces having a secondary means of escape which is not obviously apparent shall have a suitable sign in red letters "EMERGENCY EXIT" directing attention to such escape.

Regulation : II-2/13
Means of escape

The doors giving access to either of the two required means of escape shall not be lockable, except that crash doors or locking devices, capable of being easily forced in an emergency, may be employed provided that a permanent and conspicuous notice giving instructions on how to open the door or the lock is attached to both sides of the door. This paragraph shall not apply to outside doors to deckhouses where such doors are locked by key only, and such key is under control of one of the vessel's officers.

All public spaces having a deck area of over 28 sq. metres shall have at least two exits. Where practicable, the exits shall give egress to different corridors, spaces, or rooms to minimize the possibility of one incident blocking both means of escape.

All interior stairways, other than those within the Machinery Spaces or Cargo Holds, shall have a minimum width of 0.71 metres. The angle of inclination with the horizontal of such stairways shall not exceed 0.87 radius.

Regulation : II-2/10.8 and FSS Code Ch. 14
Fixed deck foam systems

The system must be USCG approved equipment and must comply with the manufacturer's approved Design, Installation, Operation and Maintenance Manual that meets regulation II-2/10.8 of SOLAS and the following supplemental requirements:

Complete, but simple instructions for the operation of the system shall be located in a conspicuous place at or near the controls.

The deck foam system must be capable of being actuated, including introduction of foam to the foam main, within three minutes of notification of a fire.

All piping, valves, and fittings of ferrous materials shall be protected inside and outside against corrosion unless specifically approved otherwise.

All piping, valves, and fittings shall be securely supported, and where necessary, protected against injury.

Drains and dirt traps shall be fitted where necessary to prevent the accumulation of dirt or moisture.

Piping shall not be used for any other purpose than firefighting, drills and testing.

At least one mounted foam appliance shall be provided for each required foam station.

Foam apparatus, the control cabinets or spaces containing valves or manifolds for the various fire extinguishing systems shall be distinctly marked in conspicuous red letters at least 50 mm (2 in) high "FOAM FIRE APPARATUS".

3.3 LIFE-SAVING APPLIANCES AND ARRANGEMENTS

Regulation: III/3 Definitions

"Accommodation" means a cabin or other covered or enclosed place intended to carry persons. Each place where passengers are carried is considered an accommodation, whether or not it is covered or enclosed. Accommodations include, but are not limited to halls, dining rooms, mess rooms, lounges, corridors, lavatories, cabins, offices, hospitals, cinemas, game and hobby rooms, and other similar spaces open to persons on board. "Embarkation station" means the place where a survival craft is boarded.

"Embarkation station" means the place where a survival craft is boarded.

"Fleet angle for a wire rope leading to a winch drum" means the angle included between an imaginary line from the lead sheave perpendicular to the axis of the drum and the line formed by the wire rope when led from the lead sheave to either extremity of the drum.

"Marine evacuation system" means an appliance designed to rapidly transfer large numbers of persons from an embarkation station by means of a passage to a floating platform for subsequent embarkation into associated survival craft, or directly into associated survival craft.

"Muster station" means the place where the crew and passengers assemble before boarding a survival craft.

"Seagoing condition" means the operating condition of the ship with the personnel, equipment, fluids and ballast necessary for safe operation on the waters where the ship operates. For bottom-bearing mobile offshore drilling units, the term also applies in the bottom-bearing mode, but the "lightest seagoing condition" is considered to be the highest anticipated operating condition.

"Survival craft" means a craft capable of sustaining the lives of persons in distress after abandoning the ship on which they were carried. The term includes lifeboats, liferafts, buoyant apparatus, and life floats, but does not include rescue boats.

"Toxic vapor or gas" means a product for which emergency escape respiratory protection is required under subchapter 17 of the International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk (IBC Code), and in subchapter 19 of the International Code for the Construction and Equipment of Ships carrying Liquefied Gases in Bulk (IGC Code).

Regulation: III/4 Evaluation, testing and approval of life-saving appliances and arrangements

Life-saving appliances must be approved to the appropriate CFR, SOLAS or IMO standard. USCG approved products and systems are accepted regardless of country of manufacture. The USCG recognizes that with the Life-saving Appliances Code (LSA Code) there exists an acceptable IMO standard for approval.

As mentioned above in the "General" section, the 1996 USCG Authorization Act allows the use of materials approved by or on behalf of other governments under certain limited circumstances. In the case of life-saving appliances, there must be a reciprocal agreement in place with another country before equipment approved by that country can be used on a U.S. vessel. Pending finalization of the US-EC MRA, interim reciprocal acceptance agreements have been established with Germany (free-fall lifeboats and associated launching appliances only)

and Norway (all life-saving equipment). These agreements require that the equipment be manufactured within the country that approved it. A copy of the USCG acceptance letter must be provided with each piece of equipment supplied to a U.S. flag ship under these interim agreements.

The following approval series indicate approval to the SOLAS requirements:

- 160.017 Embarkation-Debarkation Ladders (only if marked "SOLAS 74/83")*
- 160.040 Line-throwing appliances
- 160.115 Winches**, if winches for Rescue Boats***
- 160.117 Embarkation-Debarkation Ladders*
- 160.118 Rigid liferafts***
- 160.121 Hand red flares
- 160.122 Floating orange smoke signals
- 160.132 Davits**, if davits for Rescue Boats***
- 160.135 Lifeboats**
- 160.136 Rocket parachute flares
- 160.150 Ring life buoys*
- 160.151 Inflatable liferafts***
- 160.155 Lifejackets
- 160.156 Rescue boats***
- 160.157 Self-activating smoke signals
- 160.162 Hydrostatic release units*
- 160.163 Liferaft launching appliance
- 160.170 Liferaft automatic disengaging apparatus
- 160.171 Immersion suits
- 160.174 Thermal protective aids
- 160.175 Marine Evacuation Systems***
- 160.176 Inflatable Lifejackets (SOLAS)
- 161.110 Floating electric water lights
- 161.112 Lifejacket lights

Those items without an asterisk (*) are to be forwarded directly to the USCG for their approval.

* indicates those items for which [LR] possesses USCG acceptance to conduct approval (design review and testing) work on behalf of the USCG.

** indicates items which come under the U.S. District Court Order of 31 May 1983, which declares invalid any inspection or test not conducted

by or in the presence of a USCG Marine Inspector. The Order does not address pre-approved reviews. This Order remains in effect until such time as the USCG publishes a final regulation in the Federal Register removing the requirement for a USCG Marine Inspector to witness the inspections or test.

*** indicates that the USCG reserves the right to attend prototype testing of this equipment as a condition of approval. This option will normally be exercised in the case of a manufacturer seeking approval of this equipment for the first time, or for a substantially new or innovative design.

Where a particular life-saving appliance or arrangement is required, the Commandant, USCG, may accept any other appliance or arrangement that is at least as effective as that specified. If necessary, the Commandant, USCG, may require engineering evaluations and tests to demonstrate the equivalence of the substitute appliance or arrangement.

Life-saving appliances carried on board the ship in addition to equipment of the type required under this part must be approved equipment or be acceptable to the cognizant USCG Officer in Charge of Marine Inspection (OCMI) for use on the ship.

Regulation: III/6 Communications

Each item of radio communications equipment must be type accepted by the Federal Communications Commission.

Regulation: III/7 and LSA Code Ch. 2 Personal life-saving appliances

Each child-size lifejacket and immersion suit must be appropriately marked and stowed separately from adult or extended-size devices.

Each lifejacket and immersion suit must be marked with the vessel's name.

Inflatable lifejackets, if carried, must all be of the same or similar design.

Each lifejacket, immersion suit, and anti-exposure suit container must be marked in block capital letters and numbers with the quantity,

identity, and size of the equipment stowed inside the container. The equipment may be identified in words or with the appropriate symbol from IMO Resolution A.760(18).

Regulation: III/8 Muster list and emergency instructions

Instructions for passengers must include illustrated instructions on the method of donning lifejackets.

Regulation: III/11 Survival craft muster and embarkation arrangements

If a davit-launched survival craft is not intended to be moved to the stowed position with persons on board, the craft must be provided with a means for bringing it against the side of the vessel and holding it alongside the vessel to allow persons to safely disembark after a drill.

Regulation: III/13 Stowage of survival craft

Each liferaft must be arranged to permit it to drop into the water from the deck on which it is stowed. The liferaft stowage arrangement meets this requirement if it:

- (i) is outboard of the rail or bulwark,
- (ii) is on stanchions or on a platform adjacent to the rail or bulwark, or
- (iii) has a gate or other suitable opening large enough to allow the liferaft to be pushed directly overboard and, if the liferaft is intended to be available for use on either side of the vessel, such gate or opening is provided on each side of the vessel.

Regulation: III/18 and LSA Code Ch. 7 Line-throwing appliances

In addition to the equipment approved and carried as part of the appliance, each line throwing appliance must also have an auxiliary line that:

- (1) if other than manila, has a breaking strength of at least 40 kN (9,000 lb);

- (2) if other than manila, is of a dark color or of a type certified to be resistant to deterioration from ultraviolet light; and
- (3) is at least 450 m (1,500 ft) long.

The line throwing appliance and its equipment must be readily accessible for use, stowed in its container carried within the pilothouse or on the navigating bridge or stowed in a portable magazine chest.

Regulation: III/32.3 and LSA Code Ch. 2 Personal life-saving appliances - Immersion suits and thermal protective aids (cargo ships)

Immersion suits must be carried for each person on board on all cargo vessels except those operating between 32 degrees north and 32 degrees south latitude, regardless of whether it has totally enclosed lifeboats.

Regulation: III/33 Survival craft embarkation and launching arrangements

On a tank vessel certificated to carry cargoes that have a flashpoint less than 60 degrees C as determined under ASTM D93-94, each lifeboat or launching appliance of aluminum construction must be protected by a water spray system.

Regulation III/34 and LSA Code 6.1.2.9 Launching appliance using falls and a winch

The lowering speed for a fully loaded survival craft must be not more than 1.3 metres per second (256 feet per minute).

Regulation III/34 and LSA Code 6.1.2 Launching appliances using falls and a winch

Each unguarded fall must not pass near any operating position of the winch, such as hand cranks, pay out wheels, and brake levers. Each fall, where exposed to damage or fouling, must have guards or equivalent protection. Each fall that leads along a deck must be covered with a guard that is not more than 300 millimetres (1 foot) above the deck. Each winch drum must be arranged so the fall wire winds onto the drum in a level wrap.

Regulation: IV/7.1.6 Radiocommunications - Application

The required EPIRB must be marked with the vessel's name.

Regulation: V/22 Navigation Bridge Visibility

In addition to the SOLAS implementation schedule, this regulation applies to all cargo and passenger vessels of 100m or more in length and contracted for construction on or after 7 September 1990.

6. INTERPRETATIONS AND GUIDANCE RELATING TO THE INTERNATIONAL CODE FOR THE CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING DANGEROUS CHEMICALS IN BULK (IBC CODE)

6.1 General

Unless otherwise noted below, LR is authorised to interpret the expressions "*left to the satisfaction of the Administration,*" or similar expressions in the IBC Code pertaining to the International Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk.

6.2 Interpretations and Guidance

Chapter 1

1.1.3 USCG will handle matters relating to carriage conditions of cargoes not listed in the IBC Code.

1.3.13 The approved closed cup test uses the Tagliabue tester.

1.4 Generally, USCG acts as the administration for findings of equivalency.

1.5 Under this section, the Administration means the USCG.

1.5.4.1 The Certificate of Fitness issued by LR on behalf of the USCG will not include an asterisk against the ship type notation.

1.5.4.2 Chapter 2 – Ship survival capability and location of cargo tanks

2.2.2 Intact stability shall meet requirements for gas carriers contained in 46 CFR 172.165, viz:

(a) Design calculations must show that 2 inches (50 mm) of positive metacentric height can be maintained by each tankship when it is being loaded and unloaded.

(b) For the purpose of demonstrating compliance with the requirements of paragraph (a) of this section, the effects of the addition of water ballast may be considered.

- 2.2.3 An acceptable method for determining free surface effect is contained in the Code on Intact Stability (IMO Res. A.749(18) as amended).
- 2.3.3 The valve shall be to LR's rules.
- 2.8.2 No dispensations for smaller ships will be allowed.
- 2.9.2.3 Residual stability should not be less than that allowed in 2.9.3.

Chapter 3 – Ship arrangements

- 3.4.4 Smaller dimensions are not permitted unless authorised by the USCG.

Acceptable openings must permit entry with breathing apparatus.
- 3.7.2 Toxic cargoes cannot be unloaded bow or stern unless authorised by the USCG.
- 3.7.3.5 Alternative arrangements must be authorised by USCG.
- 3.7.4 USCG must authorise relaxations.

Chapter 4 – Cargo Containment

- 4.1.3 LR's rules apply for tank testing.
- 4.1.4 ASME Code Section VIII, Division 1 or 2, applies for pressure vessel design.

Chapter 5 – Cargo transfer

- 5.1.1 Piping standards are listed in 46 CFR 56.60.
- 5.1.3 Flanges valves and fittings should meet applicable standards of the ASME.
- 5.2.1 Relaxation's must be authorised by the USCG.
- 5.2.2 Exceptional cases should be authorised by the USCG.
- 5.2.3 Piping standards are listed in 46 CFR 56.60.
- 5.2.4 Piping standards are listed in 46 CFR 56.60.

5.2.4 Piping standards are listed in 46 CFR 56.60.

5.4 Relaxation's must be authorised by USCG.

Chapter 6 – Materials of construction

6.1.1 Materials must meet LR's rules.

Chapter 7 – Cargo temperature control

7.1.1 Construction, fitting and testing must comply with LR's rules.

Chapter 8 – Cargo tank vent systems

8.3.4 High velocity vents must be approved in accordance with 46 CFR Subchapter Q.

8.3.5 Flame arresters installed on tanks should meet ASTM F-1273.

Chapter 10 – Electrical installations

10.1.5 The International Electrotechnical Commission Standard IEC 60092-502 shall be the standard of hazardous areas.

10.2.2.1 No electric motors should be installed in chemical tanks.

10.2.3.4.2 Electric motors are not permitted in the cargo area.

Chapter 11 – Fire protection and fire extinction

11.2.2 Tankers carrying a restricted number of cargoes should not receive relaxation's.

11.3.2 More than one type of foam should be provided when fires of cargoes cannot be extinguished using only one foam.

11.3.7 Reduced monitor capacities for ships less than 4,000 DWT should be referred to USCG.

Chapter 12 – Mechanical ventilation in the cargo area

n/a No special requirements.

Chapter 13 – Instrumentation

13.2.3 Exemptions from toxic-vapour detection are only to be authorised by USCG.

Chapter 14 – Personnel protection

14.1.2 Interpretation of the expression "*adequately segregated*" is left to LR, subject to USCG oversight.

Chapter 15 – Special Requirements

15.2.3 USCG only authorises carriage of ammonium nitrate (93% or less) in tanks which have not contained other cargoes.

15.5 Cooling systems, when fitted, should also be provided with leak detection systems.

15.6.3 USCG only authorises entry into tanks that have not contained MFAK compounds.

15.7 USCG only authorises carriage of molten phosphorous.

15.8.11 The materials listed are not acceptable under any circumstances.

15.8.22.2 The refrigeration requirements may not be waived.

15.8.25.2 Cargo handling plans are left to LR, subject to USCG oversight.

15.8.26.3 Cargo tank filling limits are left to LR, subject to USCG oversight.

15.8.29 The waterspray shall operate automatically in a fire involving the cargo containment system, have at least two manual actuators, and have an application rate of 10.5 l/m² / min.

15.12.1.4 High velocity vents must be approved in accordance with 46 CFR Subchapter Q.

15.14.3 No waivers will be granted for restricted operations.

15.19.7 LR acts as the Administration.

Chapter 16 – Operational Requirements

16.2.2 USCG will review all cargoes which are mixtures.

16.5.1 Samples must be stored in the cargo area.

Chapter 16A – Additional measures for the protection of the marine environment

n/a No special interpretations.

Chapter 17 – Summary of minimum requirements

n/a No special interpretations.

Chapter 18 – List of chemicals to which the code does not apply

n/a No special interpretations.

Chapter 19 – Requirements for ships engaged in the incineration at sea of liquid chemical waste

The provisions of this section do not apply. No vessels will be certified for incineration at sea.

Chapter 20 – Transportation of Liquid Chemical Wastes.

Transportation of liquid chemical wastes, although not generally permitted, requires USCG authorisation in concert with the US EPA.

7. INTERPRETATIONS AND GUIDANCE RELATING TO THE INTERNATIONAL CODE FOR THE CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING LIQUEFIED GASES IN BULK (IGC CODE)

7.1 General

Unless otherwise noted below, LR is authorised to interpret the expressions "*left to the satisfaction of the Administration,*" or similar expressions in the IGC Code pertaining to the International Certificate of Fitness for the Carriage of Liquefied Gases in Bulk.

Carriage of Chlorine is not permitted without the prior agreement of USCG.

7.2 Interpretations and Guidance

Chapter 1

1.1.6 USCG acts only as a port administration for this requirement.

1.4 USCG acts as the Administration for this section.

1.5 USCG acts as the Administration for this section.

1.5.4.2 The Certificate of Fitness issued by LR on behalf of the USCG will not include an asterisk against the ship type notation.

Chapter 2 – Ship survival capability and location of cargo tanks

2.2.2 Intact stability shall meet requirements for gas carriers contained in 46 CFR 172.165, viz:

(a) Design calculations must show that 2 inches (50 mm) of positive metacentric height can be maintained by each tankship when it is being loaded and unloaded.

(b) For the purpose of demonstrating compliance with the requirements of paragraph (a) of this section, the effects of the addition of water ballast may be considered.

2.2.3 An acceptable method for determining free surface effect is contained in the Code on Intact Stability (IMO Res. A.749(18) as amended).

- 2.9.1.3 Residual stability should not be less than the requirement in 2.9.2.1.

Chapter 3 – Ship arrangements

- 3.1.1 Machinery spaces forward of the cargo area are not normally permitted.
- 3.3.1.1 Relaxation of the pump or compressor room location requirement is not permitted.
- 3.5.3.2 Relaxation of the access dimensions are not is not permitted.
- 3.8.1.1 Bow and stern unloading is not permitted for toxic products.
- 3.8.4 Relaxation of this section's requirements is not permitted.

Chapter 4 – Cargo Containment

- 4.1 Cargo containment systems not previously accepted by the USCG will require USCG review and approval. A list of cargo containment systems currently accepted by the USCG may be obtained from Commandant (G-MSO-3).
- 4.2.2.3 See note concerning 4.1.
- 4.2.4.2 Recognised standards are LR's rules.
- 4.2.4.4 Type C tanks may be allocated only to Type B.
- 4.2.5.4 Internal insulation tanks shall not have a design vapour pressure greater than 0.7 bar.
- 4.2.6.4 Higher vapour pressures in port are not allowed.
- 4.2.7 Provisions to cover low temperature prevention are covered in Chapter 13.
- 4.3.2.1 Equivalent calculation procedures must be submitted to USCG.
- 4.3.4.3 Simplified loading spectra shall not be used.
- 4.3.4.5 No special consideration shall be given for restricted service.
- 4.4.1 Integral tanks must meet LR's rules.

- 4.4.2.5 ShipRight shall be used for structural analysis, and LR's rules will be used for recognised standards.
- 4.4.4.1 LR's rules will be used for recognised standards.
- 4.4.4.2 LR's rules will be used for recognised standards.
- 4.4.5.5 Model tests will normally be required.
- 4.5.1.4 The value of A shall be 4.0 for all materials.
- 4.4.6 ASME Boiler and Pressure vessel Code will be used as the acceptable standard, except as required otherwise.
- 4.4.7.2.1 ShipRight will be used for structural analysis.
- 4.4.7.2.3 LR's rules are the recognised standards.
- 4.4.7.3 See note on 4.1.
- 4.5.1.1 LR's rules are recognised standards.
- 4.5.1.3 Acceptable stresses are those which agree with LR's rules.
- 4.5.1.7.2 Special consideration of improved tensile and yield properties must be demonstrated to the USCG.
- 4.5.1.10 Unspecified materials must be reviewed by USCG.
- 4.5.2.1 Corrosion allowances will be required for tanks that are not surrounded by inert gas or dry air or for corrosive cargoes. The USCG will provide the values for these allowances upon request.
- 4.7.3 Semi-membrane tanks shall have a full secondary barrier.
- 4.7.7 Either a pressure/vacuum test or a visual test shall be specified.
- 4.8.1 For vessels that intend to trade to Alaska, lower ambients are required. U.S. ambients are as listed in 46 CFR 154.176.
- 4.8.4.4 In general, hull heating systems are not acceptable.
- 4.9.1 Recognised standards are LR's rules, but vessels should have crack arresting steels specified by USCG.

- 4.9.8 Quality control of insulation is delegated, subject to USCG oversight.
- 4.10.1.2.1 Alternative edge penetrations are generally not permitted.
- 4.10.1.2.2 The ASME Code is the acceptable standard; other standards require USCG approval.
- 4.4.10.2 USCG should be contacted concerning workmanship. In general, tolerances shall be half of the ASME Code.
- 4.10.5.2 Sampling tests shall be according to LR's rules.
- 4.10.6 Testing should be in accordance with LR's rules for type A tanks, USCG requirements for type B tanks, and ASME Code requirements for type C tanks.
- 4.10.8.1 Recognised standards are LR's rules.
- 4.10.8.2 Recognised standards are LR's rules.
- 4.10.8.3 LR's tank testing rules are satisfactory to USCG.
- 4.10.9 ASME code is the standard acceptable.
- 4.10.10.3.4 Hydropneumatic testing is not acceptable.
- 4.10.10.3.5 Higher stresses are not acceptable.
- 4.10.12 See Note concerning 4.7.7.
- 4.10.13 Tanks constructed to the ASME Code do not need stress level confirmation.
- 4.11.1.4 Soaking should be according to the ASME Code.
- 4.11.2 Stress relief shall comply with the ASME Code.
- 4.11.2.14 Mechanical stress relief methods must be approved beforehand by USCG.
- Chapter 5 – Process pressure vessels and liquid, vapour, and pressure piping systems**
- 5.1.2 Process pressure vessels shall meet the ASME Code.

- 5.2.2.1 Piping standards shall be as required by 46 CFR Subchapter F.
- 5.3.2.1 No higher or lower temperature may be specified.
- 5.3.2.2 No higher or lower temperature may be specified.
- 5.2.4.4 No lower design pressure may be accepted.
- 5.2.4.5 Flanges must comply with ASME B16.5.
- 5.2.5 Stress analysis is delegated to LR, subject to oversight by USCG.
- 5.3.2.2.2 In general, pressure tests need not be performed at the design temperature.
- 5.3.2.2.5 Performance of tests may not be waived.
- 5.4.2.3 Piping standards shall be as required by 46 CFR Subchapter F.
- 5.4.3.2 Flanges must comply with ASME B16.5.
- 5.4.4 Alternative piping arrangements require USCG approval.
- 5.4.6.2 Thermal stress relieving may not be waived.
- 5.4.6.3.1 Radiography may not be reduced.
- 5.5.1 No relaxation's are permitted.
- 5.5.2 Alternative fluids must be liquids that have a flashpoint greater than 125°F.

Chapter 6 – Materials of construction

- 6.1.3 Recognised standards are LR's rules.
- 6.1.4.1 A Charpy V-Notch test is required.
- 6.1.4.2 Other tests may not be substituted for the Charpy V-Notch test.
- 6.1.5 Material properties must meet LR's rules.
- 6.1.7 Alternative chemical properties are not acceptable.

- Table 6.1 (footnotes) No special approval is permitted.
- Table 6.2 (footnotes) No special agreement or approval is permitted.
- Table 6.3 (footnotes) No special approval is permitted.
Generally, Charpy testing should be required.
- Table 6.4 (footnotes) No special approval is permitted.
Generally, Charpy Testing should be required.
- 6.3.1 Testing may not be omitted.
Generally, Charpy testing should be required.
- 6.3.2 Welding consumables shall meet LR's rules for type A tanks, USCG specifications for type B tanks, and ASME Code requirements for type C tanks. Welding tests may not be waived.
- 6.3.3.1 Radiography is required.
- 6.3.3.2.2 Transverse bend tests are at the discretion of LR.
- 6.3.3.2.4 Requirements for these tests are left to the discretion of LR.
- 6.3.4.2 No special agreement is permitted.
- 6.3.4.3 Recognised standards for this section will be individually reviewed.
- 6.3.5 Test requirements should be in accordance with 6.3.4.
- 6.3.6.1 A reduction in test for secondary barrier is not acceptable.
- 6.3.6.2.2 USCG will consider alternatives to the energy requirements on a case by case basis.
- 6.3.6.3 USCG will consider alternatives to the energy requirements on a case by case basis.
- 6.3.6.4 Integral and membrane tests must be inspected according to USCG approved standards available from the manufacturer.
- 6.3.7.1.2 Tank examination will be as approved by USCG for the tank designed.

6.3.7.1.3 LR's rules shall be the recognised standards, except that for membrane tanks the USCG accepted manufacturer's procedures shall be used.

6.3.7.3 See Note for 6.3.7.1.3.

Chapter 7 – Cargo pressure/Temperature Control

7.1.1 Design of cargo pressure and temperature control must contain cargo for 21 days, and cargo venting cannot be used to control tank pressure while in US ports.

7.1.2 Special design ambient temperatures apply for Alaskan waters, as given in 46 CFR 154.176.

Chapter 8 – Cargo tank vent systems

8.2.2 Pressure/vacuum relief is delegated to LR, subject to USCG oversight.

8.2.5 LR is the acceptable authority.

8.2.7 Changing of relief valve settings will be overseen by an agent of LR.

8.2.10 No relaxation of this requirement is accepted for ships less than 90 m.

8.4.2.3 Other vacuum relief systems must be handled under the conditions of 1.4.

8.5.2 Approval for F=0.5 is delegated to LR, subject to USCG oversight.

Chapter 9 – Environmental control

9.5.2 A check valve is an acceptable means.

Chapter 10 – Electrical installations

The International Electrotechnical Commission Standard IEC 60092-502 shall be applied.

Chapter 11 – Fire protection and fire extinction

- 11.3.4 When the fire main pumps are used to supply the water main system, the fire main must still be able to operate at full capacity.
- 11.4.3 LR is delegated to accept standards for ships with a capacity less than 1,000 m³.
- 11.4.4 Suitable alternatives will be considered according to 1.4.
- 11.5.2 Relaxation's are not permitted for ships carrying a restricted number of cargoes.

Chapter 12 – Mechanical ventilation in the cargo area

- 12.1.5 Positive pressure ventilation is not acceptable.

Chapter 13 – Instrumentation (gauging, gas detection)

- 13.1.4 Testing intervals and procedures are delegated to LR, subject to USCG oversight. Vessels in US ports should be able to demonstrate that the instruments function, and in the case of gas detection that they are properly calibrated.
- 13.2.4 Gauge glasses need USCG approval, but are generally not acceptable.
- 13.3.1 USCG should be contacted in the case that it is the port authority.

Sensors required for automatic closing of the shut-off valve for overflow controls as specified by 13.3.1 and the liquid level as specified by 13.2.1, must be independent of each other, however, the sensors may send signals to the same actuator.
- 13.5.4 Temperature sensors should be at the bottom of the tank and near the top of the tank, below the maximum filling level.
- 13.6.1 Gas detection is delegated to LR, subject to USCG oversight.
- 13.6.11 Other limits are not acceptable.

- 13.6.13 Portable gas detectors should meet the thresholds specified by OSHA.

Chapter 14 – Personnel protection

- 14.2.4 The provisions of this paragraph are not acceptable.
- 14.4.5 This requirement is delegated to LR, subject to USCG oversight.

Chapter 15 – Filling limits for cargo tanks

- 15.1.3 Higher filling limits are permitted.
- 15.2 The approval of this list is delegated without restriction.

Chapter 16 – Use of cargo as fuel

- 16.5.2 This requirement is delegated to LR, subject to USCG oversight.
- 16.5.6 This requirement is delegated to LR, subject to USCG oversight.
- 16.6 This requirement is delegated to LR, subject to USCG oversight.

Chapter 17 – Special Requirements

- 17.14 Chlorine may not be carried in US waters.
- 17.18.3 Other compositions require USCG approval.
- 17.19 Nitrogen cargo carriage requires special USCG approval.
- 17.20.3.1 Only steel or stainless steel are acceptable.
- 17.20.13.2 The approval of handling plans is delegated to LR.
- 17.20.14 The approval of filling limits is delegated to LR.

Chapter 18 – Operating requirements

No special requirements.

Chapter 19 – Summary of minimum requirements

No special requirements.

8. MARPOL

8.1 ANNEX 1 - Supplemental Requirements

The following supplemental requirements relevant to the issue of an International Oil Pollution Prevention Certificate are given using the appropriate Code of Federal Regulations (CFR) cite or SOLAS regulation number.

Cite: 33 CFR 151.27 Shipboard Oil Pollution Emergency Plan

For the issue of a Certificate of Inspection, the Shipboard Oil Pollution Emergency Plan (Reg. 26) outlined in IMO Res. MEPC.86(44) only can be approved by the Coast Guard (G-MOR).

Cite: 33 CFR 155.205 Discharge removal equipment for vessels 400 feet or greater in length

Oil carrying tank vessels with a length that is at least 400 ft. must carry discharge removal equipment for on-deck spills up to 12 bbl. The equipment must include: absorbents, non-sparking hand scoops, containers for the recovered spillage, emulsifiers for deck cleaning, protective clothing, one non-sparking portable pump with hoses, and scupper plugs.

Cite: 33 CFR 155.210 Discharge removal equipment for vessels less than 400 feet in length

Oil carrying tank vessels with a length that is less than 400 ft. must carry discharge removal equipment for on-deck spills up to 7 bbl. The equipment must include: absorbents, non-sparking hand scoops, containers for the recovered spillage, emulsifiers for deck cleaning, protective clothing, one non-sparking portable pump with hoses, and scupper plugs.

Cite: 33 CFR 155.225 Internal cargo transfer capability

Unless the vessel's cargo piping system can transfer cargo among all tanks within the cargo block, the vessel must be equipped with hoses and reducers which can enable the transfer of cargo from any tank to any other tank.

Cite: 33 CFR 155.230 Emergency towing capability for oil barges

Offshore barges must carry an emergency tow wire or a tow line, that is rigged and ready for use, which has the same characteristics as the primary tow wire or tow line.

Cite: 33 CFR 155.310 Containment of oil and hazardous material cargo discharge

Under hose connections there must be a fixed container or enclosed deck area with a mechanical means of closing the drain for that containment which has a capacity:

- 1/2 bbl for lines no more than 2"
- 1 bbl for lines more than 2" up to 4"
- 2 bbl for lines no less than 4" up to 6"
- 3 bbl for lines no less than 6" up to 12"
- 4 bbl for lines 12" or more

Cite: 33 CFR 155.320 Fuel oil and bulk lubricating oil discharge containment

Under fill connections and vents there must be a fixed container or enclosed deck area with a mechanical means of closing the drain for that containment which has a capacity:

- 1/2 bbl for vessels 300 g.t. or more but less than 1600 g.t.
- 1 bbl for vessels 1600 g.t. or more

Cite: 33 CFR 155.380 Oily-water Separating Equipment, Bilge Alarm and Bilge Monitor Approval Standards

Oily-water separating equipment and oil content meters for bilge alarms are to be USCG approved equipment.

Cite: 33 CFR 155.450 Placard

Each machinery space must have a sign indicating that the discharge of oil is prohibited.

Cite: 33 CFR 155.780 Emergency shutdown

Tank vessels must have an emergency means of stopping transfers within a vessel.

Cite: 33 CFR 155.790 Deck lighting

Tank vessels must have a means of illuminating the deck in transfer operation work areas - 1.0 foot candle measured 3 feet above the deck - and at transfer connections - 5.0 foot candle measured 3 feet above the deck.

Cite: 33 CFR 155.800 Transfer hoses

Transfer hoses must have burst pressure of at least 600 psi and four times the MAWP, which must be at least 150 psi. Hose flanges must meet ANSI B16.5 or B16.24. The hoses must be marked with the MAWP, type of service, date of manufacture and the date of the last pressure test. The date of manufacture and the date of the last pressure test may be recorded in lieu of being marked on the hoses.

Cite: 33 CFR 155.1010 Response Plans - Purposes

Applies to tank vessels without regard so size. (Reg 26 applies to tank vessels greater than 150 g.t. and all vessels greater than 400 g.t.) Applies to discharges of oil. (Reg 26 applies to all discharges of oil.) Requires formal agreements for spill notification and cleanup. (Reg 26 requires only shipboard procedures and a shore-side contact.) Requires a geographic specific appendix for U.S. ports. (Reg 26 requires a world wide list.)

Cite: 33 CFR 157.03(n) Definition - Oil

Oil is not limited to petroleum and includes animal fats and other "oils." (MARPOL regulates animal fats and vegetable oils under Annex II.)

Cite: 33 CFR 157.10b Segregated ballast tanks, dedicated clean ballast tanks, and special ballast arrangements for tank vessels transporting Outer Continental Shelf oil

Tank vessels servicing the OCS are permitted to carry ballast water in cargo tanks. (MARPOL makes no special allowances for these sorts of vessels.)

Cite: 33 CFR 157.10d Double hulls on tank vessels

U.S. dates for required double hull construction are three (3) years earlier than Reg 13F. There is no minimum tonnage limit for applicability to vessels. (Reg 13F applies for vessels greater than 5000 dwt.)

Cite: 33 CFR 157.12 Cargo Monitor and Control System

The oil discharge monitoring and control system is to be USCG approved equipment. The ODMC system manual also is required to be approved.

Cite: 33 CFR 157.15 Slop Tanks in Tank Vessels

The oily-water detectors installed in slop tanks are to be USCG approved equipment.

Cite: 33 CFR 157.21 Subdivision and stability

For US Flag vessels, MARPOL damage stability requirements are applicable to the following vessels:

- (a) New vessels delivered after 31 December 1977
- (b) New vessels contracted after 31 December 1974, and
- (c) New vessels whose keels were laid (or similar stage of construction) after 30 June 1975

New (defined in 157.03i) applies to vessels as under contract, constructed, or completed between 1975/1976/1979. (Reg 1(26) defines "new" as four (4) years later.)

Additional United States interpretation requirements

Regulation 13(5)

Segregated ballast tanks, dedicated clean ballast tanks and crude oil washing. Vessels less than 150 m in length: The U.S. has not adopted the requirements in Appendix 1 to Annex I which addresses segregated ballast for vessels less than 150 m in length. Determination under this regulation must be made by the Commandant, USCG.

Regulation 13F(4)

Prevention of oil pollution in the event of collision or stranding. Mid-deck tankers: The U.S. has not ratified that the mid-deck design is equivalent to a double hull.

Regulation 13G

Prevention of oil pollution in the event of collision or stranding. Determinations by the Administration: The Commandant, USCG, makes determinations on behalf of the U.S.

Regulation 25(1)(c)

Subdivision and Stability. Stability for vessels under 100 m: The Commandant, USCG, makes determinations concerning the relaxation of requirements for vessels less than 100 m if the standards for a vessel 150 m or longer would impair the operational qualities of the ship.

8.2 ANNEX II

Cite: 33 CFR 151.27 Shipboard Oil Pollution Emergency Plan for NLS

For the issue of a Certificate of Inspection, the Shipboard Oil Pollution Emergency Plan for Noxious Liquid Substances (Reg. 16) outlined in IMO Res. MEPC.85(44) only can be approved by the Coast Guard (G-MOR).

Additional United States interpretation requirements

Regulation 5 - Discharge of noxious liquid substances

The discharge of Category D residues must be made below the waterline and through a discharge system that meets the same standards as a discharge used for category B or C discharges.

8.3 **ANNEX III (for vessels enrolled in the Alternate Compliance Program only)**

No supplemental requirements.

8.4 **ANNEX IV (NOT ADOPTED) COMPARISON OF USCG RULES TO MARPOL**

Cite: 33 CFR 159 Marine Sanitation Device (MSD)

All U.S. vessels over 19.7 meters in length with an installed toilet are required to be equipped with a Coast Guard certified Marine Sanitation Device that controls the discharged fecal coliform bacteria count to 200 per 100 ml and the suspended solids to 150 mg/l or with an operable MSD which retains the sewage on board. An MSD which does not retain sewage on board must be fabricated by a manufacturer that is authorized by the Commandant, USCG to label the MSD with the manufacturer's certification per 33 CFR Part 159.

8.5 **ANNEX V (for vessels enrolled in the Alternate Compliance Program only)**

Cite: 33 CFR 151.51 Garbage Pollution - Applicability

The U.S. applies Annex V to U.S. public vessels after January 1, 1994. MARPOL does not generally apply to public vessels.

Cite: 33 CFR 151.55 Garbage Pollution - Record keeping requirements

U.S. ships over 40 ft. must keep records of garbage disposal.

Cite: 33 CFR 151.57 Garbage Pollution - Waste management plans

U.S. ships over 40 ft. with galleys must have a waste management plan.

Cite: 33 CFR 151.59 Garbage Pollution - Placards

U.S. ships over 26 ft. must have placards describing prohibited waste discharges.

8.6 ANNEX VI (NOT ADOPTED)

[Note: USCG to advise any requirements pertaining to engine certification in accordance with the NO_x Technical Code]

9. Passenger Ship Safety Certificate

- 9.1 Although passenger vessels are included in the Alternate Compliance Program, authority for the issue of a Passenger Ship Safety Certificate to U.S. registered vessels has been retained by the USCG.

However, the supplemental requirements relevant to the issue of a Cargo Ship Safety Construction Certificate given in Section 2 of this document are also applicable to the hull construction and essential engineering systems aspects related to the issue of a Passenger Ship Safety Certificate and compliance with the relevant LR Rules and U.S. Supplement will be accepted by the Coast Guard as part of the passenger ship safety certification process.

The granting of authority to carry out plan review and surveys for any other aspects of the issue of a Passenger Ship Safety Certificate and U.S. requirements for the Certificate of Inspection is solely at the discretion of the USCG. A shipbuilder and/or shipowner intending to construct a passenger ship to be registered in the U.S. should, in the first instance, discuss the matter with LR who will assist at the necessary meetings to be held with the USCG.

In addition to the requirements of Section 4 of this document, cognizance of the following should also be taken.

Regulation: II-1/6 (see Cite: 46 CFR Part 171, Subpart C)

For Passenger vessels not using Res. A.265(VIII) as an equivalent to Part B, the factor of subdivision is determined according to 46 CFR 171.065(b) .

Regulation: II-1/8 Stability of passenger ships in damaged condition

The assumed extent of damage shall be taken according to 46 CFR Table 171.080(a).

MSC/Circ. 541 - Guidance notes on the integrity of flooding boundaries above the bulkhead deck of passenger ships should be followed for proper application of SOLAS Chapter II-1, Regulation 8 (Damage Stability) and Regulation 20 (Watertight Integrity of Passenger Ships).

Regulation: II-1/15 Openings in watertight bulkheads in passenger ships

All watertight doors in subdivision bulkheads shall be numbered conspicuously on both sides on an etched plate or equivalent in not less than 10 mm (3/8 in) letters and figures "W.T.D. 1," "2," "3," etc. If stenciled or similar notice is used, the letters and figures shall be at least 25 mm (1 in) high. If the construction is such that the number cannot be seen with the door in the open position, a similar number shall be placed on the frame or other location immediately adjacent to the door. All watertight door remote control stations shall be marked in the same manner, and in addition, the direction of operation of the lever or wheel to open and close the door shall be conspicuously marked. Doors fitted in accordance with Subdivision and Stability requirements must be additionally marked "RECLOSE AFTER USE."

Regulation: II-1/20 Watertight integrity of passenger ships above the margin line

Provisions of this regulation are mandatory. Each opening in an exposed weatherdeck must have a coaming of at least 15.2 centimeters and a means for closing it weathertight. MSC/Circ. 541 - Guidance notes on the integrity of flooding boundaries above the bulkhead deck of passenger ships should be followed for proper application of SOLAS Chapter II-1, Regulation 8 (Damage Stability) and Regulation 20 (Watertight Integrity of Passenger Ships).

Regulation: II-1/42 Emergency source of electrical power in passenger ships

There must be visible indicators in the machinery space to show when the automatically controlled emergency power source is supplying the emergency loads.

Regulation: II-2/13 Means of escape

Stairways on new passenger ships shall comply with the following:

In no case shall lifts be considered as forming one of the required means of escape. The two means of escape required by Regulation 13, paragraphs 3.2.1 and 3.2.2 shall be as remote as possible to minimize the possibility of one incident blocking both escapes. Vertical ladders and deck scuttles shall not in general be considered as one of the

required means of escape. However, where it is demonstrated that the installation of a stairway would be impracticable, a vertical ladder may be used as the second means of escape. Doors giving access to either of the two required means of escape shall not be lockable, except that crash doors or locking devices, capable of being easily forced in an emergency, may be employed provided that a permanent and conspicuous notice giving instructions on how to open the door or lock is attached to both sides of the door. Vertical communication shall be provided between weather decks by means of permanent inclined ladders. Where ladders are for the exclusive use of the crew, and do not form part of the escape route, vertical ladders may be employed.

Small rooms or spaces having a secondary means of escape which is not obviously apparent shall have a suitable sign in red letters "EMERGENCY EXIT" directing attention to such escape.

Readily accessible enclosed stairway is defined to mean it must either be in the MVZ or immediately adjacent to the zone such that entrance into the stairway does not require entering into the adjoining zone to gain access to the stairway.

Regulation: II-2/20.6 Protection of special category spaces

Where a manual sprinkling system is installed for protection of vehicle decks, it shall comply with Regulation II-2/20.6, IMO Assembly Resolution A.123(V), and the following:

Capacity and Arrangement

The system shall be so designed and arranged that the overhead is effectively sprayed and all portions of the deck are covered. The capacity shall be such that at least 5 liters of water per square metre per minute are applied to all parts of the deck area.

Controls

Complete, but simple instructions for the operation of the system shall be located in a conspicuous place at or near the controls.

Piping

All piping, valves and fittings shall meet the applicable requirements of Section 4/6 of the ABS Steel Vessel Rules as modified by this supplement.

All piping, valves, and fittings of ferrous materials shall be protected inside and outside against corrosion unless specifically approved otherwise.

All piping, valves, and fittings shall be securely supported, and where necessary, protected against injury.

Drains, strainers and dirt traps shall be fitted where necessary to prevent the accumulation of dirt or moisture.

Distribution piping shall be used for no other purpose.

Markings

The control cabinets or spaces containing valves or manifolds shall be distinctly marked in conspicuous red letters at least 50 mm (2 in) high - "MANUAL SPRINKLING SYSTEM".

Regulation: II-2/20.6 & II-2/20.3.1.3 Protection of special category spaces

The alarm required to indicate loss of ventilation in spaces specially suitable for vehicles shall be marked with a conspicuous sign in at least 8 mm (1/4 in) letters "VENTILATION FAILURE IN VEHICULAR SPACE."

Regulation: III/21 Survival Craft and Rescue Boats

Each passenger vessel that is less than 500 tons gross tonnage and is certified to permit less than 200 persons on board may carry the following survival craft and rescue boat in lieu of the lifeboat/liferaft combination addressed in 1974 SOLAS as amended Chapter III/21.

- (1) On each side of the vessel
 - (i) liferafts are carried with an aggregate capacity sufficient to accommodate the total number of persons on board and are stowed

in a position providing for easy side-to-side transfer at a single open deck level; or

(ii) liferafts are carried with an aggregate capacity sufficient to accommodate 150 per cent of the total number of persons on board. If the required rescue boat is also a lifeboat, its capacity may be included to meet the aggregate capacity requirement.

(2) If the largest survival craft on either side of the vessel is lost or rendered unserviceable, there must be survival craft available for use on each side of the vessel, including those which are stowed in a position providing for side-to-side transfer at a single open deck level, with a capacity to accommodate the total number of persons on board.

Each passenger vessel of less than 500 tons gross tonnage must carry at least one rescue boat.

Regulation: III/22 Personal Life-Saving Appliances

Immersion suits and thermal protective aids are required to be provided for persons accommodated in totally or partially enclosed lifeboats, unless the vessel operates only on routes between 32 degrees north and 32 degrees south latitude.

Regulation: III/22.3 Personal Life-Saving Appliances - Lifejacket Lights

Passenger ships engaged on international and short international voyages are to be fitted with a lifejacket light approved under Approval Series 161.112.

Regulation: III/22.4.1.2 Personal Life-Saving Appliances - Immersion Suits and Thermal Protective Aids

The warm climate exemption in Regulation 22.4.1.2 applies to ships operating only on routes between 32 degrees north and 32 degrees south latitude.

An immersion suit of suitable size for each person is to be provided for each person assigned to a marine evacuation system crew.

Cite: III/23 Survival Craft and Rescue Boat Embarkation Arrangements

Each lifeboat on passenger vessels of 80 meters (262 feet) in length and upwards must be stowed where the after-end of the lifeboat is at least 1.5 times the length of the lifeboat forward of the vessel's propeller.

The height of the davit head of each davit when it is in position to launch the survival craft should, as far as practicable, not exceed 15 meters (49 feet) to the waterline when the vessel is in its lightest seagoing condition.