



**U. S. SUPPLEMENT
TO**

**ABS RULES FOR STEEL VESSELS
FOR
VESSELS ON INTERNATIONAL VOYAGES**

1 AUGUST 1997

AMERICAN BUREAU OF SHIPPING

MISSION STATEMENT

The mission of the American Bureau of Shipping is to serve the public interest as well as the needs of our clients by promoting the security of life, property and the natural environment, primarily through the development and verification of standards for the design, construction and operational performance of marine-related structures.

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It is the policy of the American Bureau of Shipping to provide quality services in support of our mission and to be responsive to the individual and collective needs of our clients as well as those of the public at large. All of our client commitments, supporting actions and services delivered must be recognized as expressions of quality. We pledge to monitor our performance as an on-going activity and to strive for continuous improvement.

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INTRODUCTION

Those who use this Supplement are asked to review the current ABS Rules for Building and Classing Steel Vessels. Please be aware of the "Scope and Conditions of Classification." This Supplement does not change the scope or conditions of ABS Classification. It is a reference document within the ABS Quality System. The Check Sheets contained in this Supplement are also for reference only and are not to be used in the performance of a Survey. The controlled Check Sheets are available through the normal distribution of controlled documents. The most recent revisions may be obtained from the ABS Surveyor-in-Charge.

As part of their regulatory reform initiative, the United States Coast Guard (USCG) established a task group consisting of USCG personnel and ABS Engineers to conduct a comparison of the applicable requirements contained within Title 46 of the Code of Federal Regulations (CFR) Subchapters "D" and "I" to the similar applicable regulations contained in 1974 SOLAS (as amended), the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78) and the ABS Rules for Building and Classing Steel Vessels. The purpose of this effort was to identify redundancies and to determine if the International Conventions and ABS Class Rules would provide an equivalent level of safety to those regulations contained within 46 CFR Subchapters "D" and "I". Over 370 separate regulations were examined, and it was determined that many of the CFR requirements were satisfied by either the ABS Rules alone, 1974 SOLAS (as amended) alone, MARPOL 73/78 alone, or a combination of all three of these regulations.

The results of the task group's study is codified into this document titled "U.S. Supplement to ABS Rules for Steel Vessels for Vessels on International Voyages." This Supplement identifies those USCG requirements which are in addition to the ABS Rules and the International Conventions. This publication is intended to be used in lieu of 46 CFR Subchapters "D" and "I" for plan review and inspections delegated to ABS by the USCG. The use of the U.S. Supplement is restricted to those vessels which participate in the USCG's Alternate Compliance Program (ACP) with ABS. The procedures for enrollment in the Alternate Compliance Program are addressed on Page 3 of this Introduction.

The Supplement is divided into eight sections:

Section I contains supplemental requirements in areas where there exist ABS Rule cites for which the USCG has additional requirements. For ease of reference, each of these cites is identified by the corresponding ABS Rule number. If a Rule cite does not apply to the vessel under consideration, then the associated supplement requirement does not apply.

Section II contains the interpretations of 1974 SOLAS (as amended) from the U.S. Administration for those areas in which the USCG has amplifying or additional requirements. For ease of reference, each of these cites is identified by the corresponding SOLAS cite. If a SOLAS cite is not applicable to the vessel under consideration, then the associated interpretation does not apply.

Section III contains supplemental requirements in areas not contained in the ABS Rules, MARPOL or SOLAS for which the USCG has requirements. For ease of reference, each of these cites is identified by subject area title and an arbitrarily assigned paragraph identifier.

Section IV contains the check sheets to be used both during and after construction.

Section V contains the check sheet to be used during construction.

Section VI contains the check sheet for Mobile Offshore Drilling Units.

Section VII contains the U.S. Administration's interpretation of 1974 SOLAS (as amended) for the technical review of passenger vessels. The check sheets for surveys are pending enrollment of a vessel.

Section VIII contains the record of revisions commencing after 1 August 1997.

There are specific cites within this document where U.S. domestic standards are specified as mandatory for certain systems, equipment or components. U.S. Federal law is one of the reasons why many items are mandatory. It is recognized that there exist alternative standards developed by regulatory bodies and industry, both internal and external to the United States, which would define systems, equipment or components that are equivalent to those being specified herein. To the extent authorized by USCG Navigation and Vessel Inspection Circular No. 2-95, Change-1 (NVIC 2-95, Change-1), as amended and supplemented, ABS is empowered to accept alternatives built to these international/industry standards and grant the requested equivalency.

In the normal course of technological advancement and application, it is entirely possible that new systems, equipment or components will be available for use onboard vessels covered by this program. In the event that existing design requirements are not applicable, it is incumbent on the owner, builder or his designer to seek from ABS as early as possible a determination of the requirements which will be applied in such cases.

This document is the result of several years of review by ABS and the USCG. As noted above, the vision was to find common ground in their mutual missions of the protection of life and property at sea.

In August 1994 the USCG delegated authority to ABS under a Pilot Program, as defined in NVIC 2-95, to survey ABS-Classed vessels for compliance with the following statutory instruments:

- The International Convention for the Safety of Life at Sea, 1974 (as amended); and
- The International Convention for the Prevention of Pollution from Ships 73/78.

The Pilot Program was completed on 31 July 1997, and NVIC 2-95 was reissued on 1 August 1997 as NVIC 2-95, Change-1. **Incorporated in this revision is the full authorization for ABS to act as agents of the USCG to review plans and conduct surveys on behalf of the USCG for vessels enrolled in the Alternate Compliance Program.** This authorizes ABS to issue all of the relevant documents to support the issuance of a full-term USCG Certificate of

Inspection (COI) by the local Officer in Charge of Marine Inspection (OCMI). **Under no circumstance is ABS authorized to endorse or issue a Certificate of Inspection.**

Under ACP, a voluntary program, the owner may elect to have ABS conduct surveys on existing vessels on behalf of the USCG. For new construction, a request is required from both the shipyard and the owner since enrollment in this program will influence both parties.

The controlling documents pertaining to vessels enrolled in ACP are 1974 SOLAS (as amended), MARPOL 73/78, NVIC 2-95, Change-1 (dated 1 August 1997), Volume II Chapter 32 of the USCG Marine Safety Manual, the ABS Steel Vessel Rules and this Supplement.

A vessel enrolled in the Alternate Compliance Program must satisfy all the requirements contained in the applicable sections of the International Conventions, ABS Rules and the U.S. Supplement, prior to the issuance of the COI.

PROCEDURES FOR ENROLLMENT AND PARTICIPATION IN ACP

The process for enrollment in ACP is defined in the USCG Marine Safety Manual, Volume II Chapter 32.

NEW CONSTRUCTION

For new construction, since the design, fabrication sequences, and construction cost may be affected by the intended enrollment of a proposed new construction in ACP by the owner, it is imperative that the shipyard and owner consult with ABS as early in the design phase as possible. It is prudent to discuss the proposed enrollment in depth as soon as possible to establish the basic fundamentals and administrative clarifications. Upon the completion of such a meeting, both the shipyard and the owner are to forward a written request to ABS to confirm their intentions. For the shipyard, this could be accomplished in concert with the forwarding of the ABS Request for Classification Survey Details (Form A.B.122). For survey purposes, the owner is to forward a separate letter to the local ABS Office or Regional Office (Survey Manager) to confirm their intention regarding the enrollment of the vessel. While this will assist in the proper processing within ABS, it is very important to note that the application for enrollment in ACP is to be forwarded to the USCG in accordance with NVIC 2-95, Change-1.

EXISTING VESSELS

With existing vessels, the owner or operator applies for enrollment by submitting an Application for Inspection of U.S. Vessel (Form CG-3752) to the OCMI, indicating their desire to have their vessel participate in the program. The USCG will subsequently authorize the ABS Program Manager and the local ABS Survey Office to commence the process. A "Hand Over Survey," discussed later in this text, will be scheduled at a mutually-convenient time. Upon completion of this Survey, the owner/operator will receive official notification from the USCG indicating the enrollment status.

RE-FLAGGING

For vessels intending to re-flag to U.S. Flag, it is envisioned that this document will apply in a manner similar to other existing vessels. All re-flaggings require an initial meeting between the owner and USCG headquarters.

HOW TO WITHDRAW

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.

HAND OVER SURVEY

For existing vessels, a "Hand Over Survey" must take place. The Survey is simply a time for the attending USCG and ABS staff to compare notes. The USCG will confirm that the history of the vessel has been properly entered into the ABS Status System. Then the Surveyors and Inspectors will agree on the resolution of any 835s and outstanding requirements. At this time, the USCG will also confirm to the Surveyors that the vessel is in compliance with all CFRs or will advise on those areas that must be corrected. The Surveyor and the Inspector will then complete the ABS Record of Safety Equipment. This record will ensure that the requirements of the USCG continue. The Record of Safety Equipment is to be a permanent part of the vessel's documents.

WHAT HAPPENS WITH THE CERTIFICATE OF INSPECTION?

An ACP vessel will still have a Certificate of Inspection on board. However, it will be distinctively different in that it will not contain details of life-saving appliances and fire-extinguishing equipment. The ABS Status will contain the major details of the vessel.

WHAT HAPPENS IF THE VESSEL IS DAMAGED?

It is the responsibility of the vessel's Master to report Marine Damages, as defined in 46 CFR 4.03 to the cognizant USCG Officer in Charge of Marine Inspection (OCMI). ABS takes the lead in determining "Fitness to Proceed" and is obliged to share this with the local OCMI. If the vessel poses a pollution threat to the environment, such as a Class I structural failure, the local OCMI will take precedence. This decision must be coordinated with the Surveyor in Charge.

REPORTABLE 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 as follows:

NOTICE OF MARINE CASUALTY

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 consisting of:

1. An unintended grounding, or an unintended strike of (allision with) a bridge;
2. An intended grounding, or an intended strike of a bridge, that creates a hazard to navigation, the environment, or the safety of a vessel, or that meets any criterion of paragraphs 3 through 7;
3. A loss of main propulsion, primary steering, or any associated component or control that reduces the maneuverability of the vessel;
4. An occurrence materially and adversely affecting the vessel's seaworthiness or fitness for service or route, including but not limited to fire, flooding, or failure of or damage to fixed fire-extinguishing systems, life-saving appliances, auxiliary power generating equipment, or bilge pumping systems;
5. A loss of life;
6. An injury that requires professional medical treatment (treatment beyond first aid) and, if the person is engaged or employed on board a vessel in commercial service, that renders the individual unfit to perform his or her routine duties; or
7. An occurrence causing property damage in excess of \$25,000 including the cost of labor and materials to restore the property to its condition before the occurrence, but not including the cost of salvage, cleaning, gas-freeing, drydocking, or demurrage.

HOW TO HANDLE THE FORM 835

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 ABS Surveyors by providing the liaison with other USCG offices in dealing with CG-835s. The ABS 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. ABS will be given copies of the 835s for inclusion on the ABS Status as an Outstanding Recommendation. ABS 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. ABS Surveyors may "clear" 835 items, on ACP vessels only. This may be done on other US Flag vessels; however, it requires prior approval from the OCMI that issued the 835.

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. **It is important to note that the ABS Surveyor does not have the right to extend or modify the 835.**

NO SAIL ITEMS

This is a term normally used by the USCG when the condition of a vessel is suspect or has deteriorated or has sustained excessive damages. ABS has the same concerns. However, the ABS terminology differs. ABS defines no sail items in various sections of the ABS Process Instructions. ABS does not use the term "Seaworthy." The term used in ABS is "Fitness to Proceed." A vessel is not considered Fit to Proceed if it has suffered structural damage that affects the longitudinal strength of the vessel or its watertight integrity. It also applies if the

vessel has lost propulsion, steering or electrical generation capacity, including redundant systems. Any of the foregoing would generate a report of noncompliance with the Rules and be listed as an "Outstanding Recommendation." Conversely, if the problem lies with SOLAS or MARPOL items, it would be listed as a "Deficiency." Deficiencies that would prevent a vessel from sailing would be: (1) Loss of life-saving appliances such as life boats; (2) Lack of life-saving appliances; (3) Failure of critical parts of the fire-extinguishing system. Examples of "No Sail" items are inoperable fire pumps or depleted fixed fire-extinguishing systems. On occasion an item that is a deficiency will also be an outstanding recommendation against Class. The emergency fire pump is such an item. The emergency fire pump is required both for Class and for the Safety Equipment Certificate to be issued and/or remain valid.

OUTSTANDING RECOMMENDATIONS (OSR)

This is the term used by ABS to define areas of noncompliance with the Rules. Classification is maintained by a series of Annual Surveys and Periodical Surveys that allow the Class Society an opportunity to survey a vessel and maintain a record of its compliance with the Rules. It also allows ABS to confirm that the owner is maintaining the vessel in a satisfactory condition. A single Outstanding may not necessarily affect the Class of the vessel. Consideration is given to allow time to make corrections or to reach a more appropriate port. A number of Outstanding Recommendations or a major Outstanding Recommendation may be sufficient to question the "fitness of the vessel to proceed."

WHAT HAPPENS IF ANNUAL OR SPECIAL SURVEYS MUST BE EXTENDED?

ACP survey extensions must be processed through the Survey Manager, ABS Americas. The maximum survey extension will be three months and shall not alter the baseline date for the survey concerned. Except for the Special Surveys, all other surveys have windows of time in which they are to be completed. A series of letters are sent to the owner advising of due dates and overdue dates. Provided there are no special circumstances to consider, the Class of the vessel is in jeopardy and will be canceled 90 days after the due date.

DRYDOCKING EXTENSIONS

Regardless of the circumstances, the USCG retains the ultimate authority for granting drydocking extensions to ACP vessels. Under extenuating circumstances, ABS allows extensions of drydockings. The vessel must have no record of a grounding since the last drydocking, and a Survey must be conducted. For a 30 day extension, a general examination of the vessel is conducted. For extensions of 31 days up to 90 days, a modified Under Water Survey In Lieu of Drydocking (UWILD) is required. In the modified survey a record of the examination is made on photographs. The diver has a free swim of the bottom. Extensions of 91 days up to one year are normally done to allow the vessel's surveys to be harmonized with IMO requirements. A one year extension requires a full Under Water Survey in Lieu of Drydocking, including two-way voice and video communications between the Surveyor and the diver. It would be considered unusual to do a one year extension under any other circumstances.

UNDER WATER SURVEY IN LIEU OF DRYDOCKING

An ACP UWILD guide was developed for vessels enrolled in ACP. The Guide for Underwater Surveys In Lieu of Drydocking for Vessels Enrolled in the ABS Based USCG Alternate Compliance Program is now included in NVIC 2-95, Change 1.

OVERSIGHT

The USCG, in delegating surveys to ABS, still retains the ultimate responsibility that vessels meet regulatory requirements. Crucial to fulfilling this responsibility is active and viable oversight by the USCG of surveys conducted by ABS on behalf of the USCG.

The foundation of this oversight is ABS's World Wide ISO 9001 Certified Quality System. As with any successful quality system, it is a smoothly functioning in-service process verification scheme. It provides a source of continuous and timely opinion related to the effectiveness of the processes in place to meet customer requirements. An added benefit is the information it provides to both clients and management to prove that controlled work is being accomplished. In this respect it is very important in facilitating the delegation to ABS of USCG vessel inspection. It provides a framework that will be used in the USCG oversight program for delegated responsibilities.

Oversight will consist of internal and external audits of ABS by the USCG. It will also consist of annual boardings of the 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, Chapter 32.

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I. SUPPLEMENTAL REQUIREMENTS TO CURRENT ABS RULES

Cite: 4/2.1 Boilers and Pressure Vessels

Boilers, pressure vessels and heat exchangers are to comply with the requirements specified in Section 4/2 of the ABS Rules or the ASME Code. Boilers, pressure vessels and heat exchangers manufactured to any other standard will be considered on a case-by-case basis.

Cite: 4/5A3.5.2 Electrical Equipment – Emergency Sources of Power – Power Supply – Generator

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

Cite: 4/5A3.9 Electrical Equipment – Emergency Sources of Power – Emergency Switchboard

Each bus-tie between a main switchboard and an emergency switchboard must be arranged to prevent parallel operation of the emergency power source with any other source of electric power, except for interlock systems for momentary transfer of loads.

If there is a reduction of potential of the normal source by 15 to 40 percent, the final emergency power source must start automatically without load. When the potential of the final emergency source reaches 85 to 95 percent of normal value, the emergency loads must transfer automatically to the final emergency power source. 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.

Cite: 4/5A4 Electrical Equipment – Distribution System

Each grounded system must have only one point of connection to ground regardless of the number of power sources operating in parallel in the system.

There must be ground detection for each ship's service power system, lighting system, and power or lighting distribution system that is isolated from the ship's service power and lighting system by transformers, motor generator sets, or other devices.

The ground indicators must be at the ship's service generator distribution switchboard for the normal power, normal lighting, and emergency lighting systems; and be at the propulsion switchboard for propulsion systems.

Cite: 4/5A5 Electrical Equipment – Circuit Protection System

Each fuse must meet the general provisions of Article 240 of the National Electrical Code or IEC 92-202, as appropriate, and have an interrupting rating sufficient to interrupt the maximum

asymmetrical RMS short-circuit current at the point of application. Each fuse must provide for ready access to test the condition of the fuse.

Cite: 4/5A7.1.3 Electrical Equipment – Lighting Circuits

The construction of each lighting fixture not in a hazardous location must meet UL standard 595 until May 3, 1999; UL 1570, UL 1571 or UL 1572, as applicable, including the Marine Supplement; or IEC 92-306. Each fixture located in the weather or in a ro-ro space, cargo hold or machinery space is to be provided with a suitable lens and guard.

Each lighting fixture must be firmly secured. Each pendent-type fixture must be supported by a short length of rigid conduit.

No fixture may be used as a connection box for other than the branch circuit supplying the fixture.

Non-emergency and decorative interior lighting fixtures in environmentally protected, non-hazardous locations need only meet the applicable UL type fixture standards in UL 1570 through UL 1574 (and either the general section of the Marine Supplement or the general section of UL 595), UL 595 or IEC 92-306. These fixtures must have vibration clamps on fluorescent tubes longer than 102 cm (40 inches), secure mounting of the glassware and rigid mounting.

Cite: 4/5A7.3 Electrical Equipment – Navigation Light System

Each navigation light must meet the following:

- (a) Meet the technical details of the applicable navigation rules.
- (b) Be certified by an independent laboratory to the requirements of UL 1104 or an equivalent standard.
- (c) Be labeled with a label stating the following:
 - (1) "MEETS _____" (Insert the identification name or number of the standard under paragraph (b) above to which the light was tested.)
 - (2) "TESTED BY _____" (Insert the name or registered certification mark of the independent laboratory that tested the fixture to the standard under paragraph (b) above.)
 - (3) Manufacturer's name.
 - (4) Model number.
 - (5) Visibility of the light in nautical miles.
 - (6) Date on which the fixture was Type Tested.
 - (7) Identification of the bulb used in the compliance test.

Cite: 4/5A8 Electrical Equipment – Interior Communication Systems

Each vessel must have an effective means of voice communications not dependent upon the main or emergency source of power for communications between the navigating bridge and the bow or forward lookout station, unless direct voice communication is possible.

Audible signaling devices in the weather must be external to the enclosure.

If a communications station is in the weather and on the same circuit as other required stations, there must be a cut-out switch on the navigating bridge that can isolate this station from the rest of the stations, unless the system possesses other effective means of station isolation during a fault condition.

For sound-powered voice communication systems, each calling circuit must be independent of each talking circuit and any fault on the calling circuit must not affect the talking circuit.

Circuits must be insulated from ground. Cables should not be run through areas of high fire risk, such as machinery rooms and galleys, unless it is technically impractical to route them otherwise or they are required to serve circuits in the high fire risk area. In high ambient noise installations, accommodations to facilitate conversation must be provided.

Jack boxes or portable headsets are prohibited on any circuit that includes any required station. However, a hard-wired headset, with a push-to-talk feature, and cut-out switch if in the weather is acceptable.

Cite: 4/5A8.1.2 Electrical Equipment – Engine Order Telegraph

On a vessel with more than one propulsion engine, each engine must have an engine order telegraph.

On a double-ended vessel that has two navigating bridges, this system must be between the engineroom and each navigating bridge.

On vessels equipped with pilothouse control, each local control station in the engine room must have an indicator if the local control station is not immediately adjacent to the engine room control station.

Engine order telegraph and remote propulsion control systems must be electrically separate and independent, except that a single mechanical operator control device with separate transmitters and connections for each system may be used.

Each vessel with navigating bridge throttle control must have a positive mechanical stop on each telegraph transmitter that prevents movement to the "Navigating Bridge Control" position without positive action by the operator.

Electric Engine Order Telegraph Systems

Where two or more transmitters, located on or on top of, or on the wings of, the navigating bridge operate a common indicator in the engine room, all transmitter handles and pointers must operate in synchronism or operate under the control of a transmitter transfer control as described below. Where the transmitters are mechanically interlocked to effect synchronous operation, a failure of a wire or chain at any transmitter must not interrupt or disable any other transmitter.

- **Transmitter Transfer Control System:** Except for a transmitter in an unattended navigating bridge on a double-ended vessel, each transmitter must operate under the control of a transmitter transfer control so that movement of any one transmitter handle automatically connects that transmitter electrically to the engine room indicator and simultaneously disconnects electrically all other transmitters. The reply pointers of all transmitters must operate in synchronism at all times.

On a double-ended vessel that has two navigating bridges, a manually operated transfer switch which will disconnect the system in the unattended navigating bridge must be provided.

Each electric engine order telegraph system must have transmitters and indicators that are electrically connected to each other.

Each engineroom indicator must be capable of acknowledgment of orders.

Each system must have an alarm on the navigating bridge that automatically sounds and visually signals a loss of power to the system. The alarm is to be provided with means to reduce the audible signal from 100 percent to not less than 50 percent.

Mechanical Engine Order Telegraph System

Each mechanical engine order telegraph system must consist of transmitters and indicators mechanically connected to each other.

Each transmitter and each indicator must have an audible signal device to indicate, in the case of an indicator, the receipt of an order, and in the case of a transmitter, the acknowledgment of an order. The audible signal device must not be dependent upon any source of power for operation other than that of the movement of the transmitter or indicator handle.

If more than one transmitter operates a common indicator in the engine room, all transmitters must be mechanically interlocked and operate in synchronism. Where the transmitters are mechanically interlocked to effect synchronous operation, a failure of a wire or chain at any transmitter must not interrupt or disable any other transmitter.

Cite: 4/5B7 Electrical Equipment – Equipment and Installations in Hazardous Areas

The following applies to installations in hazardous locations as defined in the National Electrical Code and IEC 79-0.

Note: Electrical classifications for chemicals and materials may be found in NEC Table 500-2, IEC 79-12, and in 46 CFR Subchapter O.

Each installation in a hazardous location must meet Articles 500 through 505 of the National Electrical Code or IEC Series 79 publications.

Each item of electric equipment that is required to be explosion-proof under the NEC classification system must be approved as meeting UL 1203. Each item required to be flameproof must be approved as meeting IEC 79-1.

Purged and pressurized equipment must meet the requirements of NFPA 496 or IEC 79-2.

Cable for use in an intrinsically safe system must meet the recommendations of ISA RP 12.6 "Installation of Intrinsically Safe Instrument Systems in Class I Hazardous Locations," except Appendix A.1.

Each explosion-proof enclosure that is in a Class I location must have an approved explosion-proof seal fitting that is threaded directly into the enclosure.

Each cable entrance into Class II and Class III (Zone 10, 11, Z or Y) equipment must have a dust tight cable entrance seal approved for the installation.

Each explosion-proof or flame-proof switch and each switch controlling explosion-proof or flame-proof equipment must have a pole for each ungrounded circuit conductor.

A ventilation duct that ventilates a hazardous space has the classification of that space.

Each belt drive in a hazardous location must have a conductive belt and must have pulleys, shafts, and driving equipment grounded to meet NFPA 77.

Cite: 4/5C4.11.1 Electrical Equipment – Bus Bars – Design

A busway must not need mechanical cooling to operate within its rating. Each busway must meet Article 364 of the National Electric Code.

Cite: 4/5C4.11.4 Electrical Equipment – Switchboards – Internal Wiring

Instrument and control wiring for switchboards is to be rated for 90° C or higher; 14AWG or larger or must be ribbon cable or similar conductor size cable recommended for use in low power instrumentation, monitoring, or control circuits by the equipment manufacturer; and be flame retardant meeting ANSI/UL 1581 test VW-1 or IEC 332-1.

Cite: 4/5C4.15.4 Electrical Equipment – Switchboards – Equipment and Instrumentation

Each AC switchboard must have a voltage regulator functional cut-out switch for transferring from automatic to manual control mode and a manual control rheostat for exciter field.

Cite: 4/5C7 Electrical Equipment – Cables and WiresGeneral

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

Demand Loads Table	
Generator cables	115% of continuous generator rating or 115 percent of the overload for a machine with a 2 hour or greater overload rating.
Switchboard bus-tie, except ship's service to emergency switchboard bus-tie	75% of generator capacity of the larger switchboard.
Emergency switchboard bus-tie	115% of continuous rating of emergency generator.
Motor feeders	Article 430, National Electrical Code.
Galley equipment feeder	100% of either the first 50 kW or one-half the connected load, whichever is the larger, plus 65% of the remaining connected load, plus 50% of the rating of the spare switches or circuit breakers on the distribution panel.
Lighting feeder	100% of the connected load plus the average active circuit load for the spare switches or circuit breakers on the distribution panel.
Grounded neutral of a dual voltage feeder	100% of the capacity of the ungrounded conductors when grounded neutral is not protected by a circuit breaker overcurrent trip, or not less than 50% of the capacity of the ungrounded conductors when the grounded neutral is protected by a circuit breaker overcurrent trip or overcurrent alarm.

Cables

Marine shipboard cables must meet all construction and identification requirements of either IEEE Std. 45, IEC 92-3, MIL-C-24640A, or MIL-C-24643A and the respective flammability tests contained therein. Cables constructed to IEC 92-3 must be designed to pass the IEC 332-3 Category "A" flame test. Direct current electrical cable, for industrial applications only, may be applied in accordance with ADC-DCCS-1/1991.

Cables constructed to IEC 92-350 series standards are not acceptable.

Flame retardant materials may not be used as a substitute for fire stops or in lieu of cables required to meet the fire resistance requirements of IEEE 45 or IEC 92-3.

Internal Wiring

Wire must be of the copper stranded type and in an enclosure. Wire, other than in switchboards, must meet Sections 19.6.4 and 19.8 of IEEE Std. 45, MIL-W-76D, MIL-W-16878F, UL 44, UL83 or equivalent standard.

Cite: 4/5C7.5 Electrical Equipment – Cables and Wires – Portable and Flexing Electric Cables

Each flexible electric cord and cable must meet UL 62, NEMA WC 3, NEMA WC 8, Section 19.6.1 of IEEE Std. 45, or Article 400 of the NEC.

A flexible cord must be used only as allowed under Sections 400-7 and 400-8 of the National Electrical Code; and in accordance with Table 400-4 of the National Electrical Code.

A flexible cord must not carry more current than allowed under Table 400-5 of the National Electrical Code, NEMA WC 3 or NEMA WC 8.

Each flexible cord must be 0.82 mm² (No. 18 AWG) or larger.

Each flexible cord and cable must be without splices or taps except for a cord or cable 3.3 mm² (No. 12 AWG) or larger.

Cite: 4/5E1 Electrical Equipment – Specialized Vessels and Services – Oil Carriers

Each vessel that carries combustible liquid cargo with a closed-cup flashpoint of 60° C (140° F) or higher must have only intrinsically safe electric systems in cargo tanks and intrinsically safe or explosion-proof electrical systems in any cargo handling room.

An enclosed hazardous space that has explosion-proof lighting fixtures must have at least two lighting branch circuits and be arranged so that there is light for relamping any deenergized lighting circuit.

No tank vessel that carries petroleum products grades A through D contracted for on or after June 15, 1977 may have an air compressor or an air compressor intake installed in: a cargo handling room; an enclosed space containing cargo piping; a space in which cargo hose is stowed; a space adjacent to a cargo tank or cargo tank hold; a space within three meters of a cargo tank opening, an outlet for cargo gas or vapor, a cargo pipe flange, a cargo valve, or an entrance or ventilation opening to a cargo handling room; the cargo deck space, except for tank barges (the cargo deck space is the open deck over the cargo area extending 3 m (10 ft) forward and aft of the cargo area and up to 2.4 m (8 ft) above the deck); an enclosed space having an opening into any of the above locations; or a location similar to those described above in which cargo vapors or gases may be present.

Cite: 4/5E5.3 Electrical Equipment – Specialized Vessels and Services – Chemical Carriers

Each vessel that carries liquid sulphur cargo or inorganic acid cargo must meet the requirements of 4/5E1 of the Rules and Cite 4/5E1 above for a vessel carrying oil with a flashpoint not exceeding 60° C, except that a vessel carrying carbon disulfide must have only intrinsically safe electric equipment in cargo tanks, cargo handling rooms, enclosed spaces, cargo hose storage spaces, spaces containing cargo piping and hazardous locations in the weather.

Cite: 4/6.15 Pumps and Piping Systems – Pumps, Pipes, Valves and Fittings – Valves

A valve in which the closure is accomplished by resilient nonmetallic material instead of a metal to metal seat shall comply with the design, material and construction specified in this supplement.

The following are the three categories of resiliently seated valves:

- Positive Shutoff Valves
- Category A Valves – Those valves that would continue to provide effective closure of the line and would not allow appreciable leakage from the valve if the resilient material were damaged or destroyed. Category A valves may be used in any piping system except as positive shutoff valves for systems subject to internal head pressure from tanks containing flammable, combustible, or hazardous materials.
- Category B Valves – Those valves that would not continue to provide effective closure of the line or would allow appreciable leakage from the valve if the resilient material were damaged or destroyed. Category B valves may be used in any piping system except: in any location in a fixed fire extinguishing or bilge system; as a positive closure for any through-hull penetration; as positive shutoff valves for systems subject to internal head pressure from tanks containing flammable, combustible, or hazardous materials.

The following performance criteria apply:

- Positive Shutoff Valve – Tested at rated pressure with all resilient material removed, the closed valve must pass less than 10 ml/hr (0.34 fluid oz/hr) of liquid or 3 liters/hr (0.11 ft³/hr) of gas per inch nominal pipe size through the line. Packing material must be fire resistant. This valve type will be considered suitable for internal head pressure from tanks as well as Category A valve applications.
- Category A Valve – Tested at rated pressure with all resilient material removed, the closed valve must pass less than the greater of 5% or $15\% / \sqrt{(NPS)}$ of its fully open flow rate through the line.
- Category B Valve – Valves containing resilient seating or packing material, nonmetallic composition discs, or similar components and which have not passed either the test for Category A or Positive Shutoff valve.

Cite: 4/6.72.7 Pumps and Piping Systems – Vessels of the Bulk-Oil-Carrier Type and Vessels Carrying Oil Having a Flash Point of 60° C (140° F) or Less – Cargo Heating Systems

A thermal fluid heater must be fitted with a control which prevents the heat transfer fluid from being heated above its flash point.

Cite: 4/6.72.12 Pumps and Piping Systems – Vessels of the Bulk-Oil-Carrier Type and Vessels Carrying Oil Having a Flash Point of 60° C (140° F) or Less – Other Piping Systems – Cargo Vapor Emission Control Systems

In addition to meeting the requirements in ABS Guide for Cargo Vapor Emission Control Systems on Board Tank Vessels (1991):

- (a) Personnel training should be verified.
- (b) Connections on hoses and manifolds must be properly marked with a yellow band 0.8 m (2.64 ft) long between two red bands 0.1 m (.33 ft) long with the word "VAPOR" in black on the yellow band.

Note: Oil Companies International Marine Forum Recommendation for Oil Tanker Manifolds and Associated Equipment, 4th Ed., has an alternative marking arrangement for vessel manifolds that is acceptable. The difference is that reducers on manifolds, where they are used, are lettered (at 2 and 10 o'clock) with the word "vapor". That word does not need to be painted on the last meter of pipe that is before the flange.

- (c) Manifold flanges should have a stud and the hose/loading arm flange should have a hole.
- (d) Markings for overflow protection outside the control room should be in 50 mm (2 in) high black letters on a white background.
- (e) Dual overflow alarms on tank barges, when powered from a shore facility, are to be fitted with a cable and plug which meets ANSI/NEMA WD6, NFPA 70 Articles 410-57 and 501-12 as well as be explosion-proof.
- (f) Tank barges, when equipped to automatically shut down loading by a shore facility, are to be fitted with a male plug which meets IEC 309-1/309-2 with pins S2 and R1 for the overflow sensor circuit, pin G for the cable shielding, and pins N and T3 reserved for an optional high level alarm. The plug must be labeled with the words "Connector for Barge Overflow Control System" and with the inductance and capacitance of the connecting switching and cabling. The sensor activating shutdown must have components that generate or store no more than 1.2 V, 0.1 A, 25 mW or 20×10^{-3} mJ.
- (g) Oxygen measurement, when required either at a facility or for lightering, shall have arrangements that allow the measuring to be continuously made from a point 1 m (3.3 ft) below the tank top and from a point at half the ullage.

Cite: 4/8.9.7 Steering Gear – Instrumentation and Alarms

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

The steering failure alarm system must be independent of each steering gear control system, except for the input received from the steering wheel shaft.

The steering failure alarm system must have audible and visible alarms 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:

- (a) 30 seconds for ordered rudder position changes of 70 degrees,
- (b) 6.5 seconds for ordered rudder position changes of 5 degrees, and
- (c) 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

R = ordered rudder change in degrees

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

Cite: 4/9.7 Fire Extinguishing Systems – 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.

Cite: 4/11.1.4 Shipboard Automatic or Remote Control and Monitoring Systems – General – Required Plans and Data

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.

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, cause and effect relationships, how failures are detected by the crew, alternatives available to the crew, and possible

design verification tests necessary should be included. Questions regarding failure analysis should be referred to the reviewing authority at an early stage of design.

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 checkoff 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.

Test procedure documents must be in a step-by-step or checkoff 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 misadjustment, artificial signals, improper wiring, tampering, or revision of the system unless the test would damage equipment or endanger personnel.

Cite: 4/11.7.3 Shipboard Automatic or Remote Control and Monitoring Systems – Automatic or Remote Propulsion Control and Monitoring Systems for Propulsion – Machinery Spaces Covered Under Class Symbols – Station in Navigating Bridge

The Main Control Station must include control of the main machinery space fire pumps.

Cite: 5/2A.1.1.7 Vessels Intended to Carry Oil in Bulk – Pressure Vacuum Valves

Pressure vacuum relief valves installed on tank vessels must be approved equipment.

Cite: 5/4A.5.1 Vessels Intended to Carry Liquefied Gases and Chemical Cargoes in Bulk – Liquefied Gas Carriers – Process Pressure Vessels and Liquid, Vapor, and Pressure Piping Systems

Cargo containment systems and piping systems carrying nitrogen, other than for deck tanks and their piping systems, must be approved equipment.

Cite: 5/4A.19 Vessels Intended to Carry Liquefied Gases and Chemical Cargoes in Bulk – Liquefied Gas Carriers – Summary of Minimum Requirements – Explanatory Notes to the Summary of Minimum Requirements

A liquefied gas not included in the table in 5/4A.19 of ABS Rules must have USCG approval in order to be carried in bulk in U.S. waters.

Cite: 5/4B.5.2 Vessels Intended to Carry Liquefied Gases and Chemical Cargoes in Bulk-Chemical Carriers – Piping Fabrication and Lining Details

Hoses must have either full threaded connections; ANSI B16.2, 16.24, or B16.31 flanges; or Class 1 quick connect couplings that meet ASTM F1122 and marked "C1-1." The hose should be marked with the date of manufacture and be in good condition (no loose covers, kinks, bulges, soft spots, or gouges/cuts which penetrate the hose reinforcement.) The hose should also be marked with the date of its last inspection, which should be conducted with the hose in a straight, flat, horizontal position and include a static pressure test at the maximum operating pressure.

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C. Life-saving appliances and arrangements (This supplement entry is intended to add clarity to the various terms used but not clearly defined in SOLAS.)

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II. SOLAS INTERPRETATIONS NOT ADDRESSED BY ABS RULES

General

Equipment Approvals

The 1974 SOLAS Convention mandates that fire suppression equipment, structural fire protection materials and life-saving appliances be approved by the Flag Administration.

In the United States, this function is performed by the USCG, generally through independent laboratory testing and inspection. ABS can perform these independent laboratory functions for many approved items. 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 with another country before equipment manufactured and approved in that country can be used on a U.S. vessel.

For structural fire protection items and life-saving appliances, the USCG recognizes that with the implementation of the IMO Fire Test Procedures Code and the Life-saving Appliances 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 approved to the IMO Fire Test Procedures Code under that approval process will be accepted on U.S. ships.

With respect to fire suppression equipment, including fire detection and alarm systems, deck foam systems, fire hose nozzles, portable extinguishers, etc., international standards do not exist. For fire suppression equipment manufactured and approved outside the U.S., ABS Engineering will evaluate the standards under which this equipment is approved on a case-by-case basis and recommend to the USCG whether they provide an equivalent level of safety to the USCG standards. If the standard is found to be equivalent by the USCG and if the approving country's approval program has been evaluated and accepted by the USCG under the criteria in 46 U.S.C. 3306(b)(2), then the item will be accepted. If the approval program has not been evaluated, then ABS will enlist the assistance of the equipment manufacturer in order to provide information to the USCG on its government's approval program. Alternatively, if ABS determines that fire suppression equipment meets a standard equivalent to that required for USCG approval, ABS may consider the design and testing standards used in the manufacture of the equipment and develop a standards evaluation and equipment testing procedure for submission to the USCG for approval.

A. Construction – Subdivision and stability, machinery and electrical installations

Cite: II-1/43 Emergency source of electrical power in cargo ships

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

B. Construction – Fire protection, fire detection and fire extinction

Cite: II-2/3.10 Definitions – Accommodation spaces

"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.

Cite: II-2/4.5 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 figure: "FIRE STATION."

Cite: II-2/4.7.1 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.

Cite: II-2/4.7.2 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.

Cite: II-2/4.8.4 Fire pumps, fire mains, hydrants and hoses – Nozzles

Nozzles must be approved equipment.

Cite: II-2/5 Fixed gas fire-extinguishing systems – General

Fixed gas fire extinguishing systems must be approved equipment.

Cite: II-2/5.2 Fixed gas fire-extinguishing systems – Carbon dioxide systems

The fixed carbon dioxide system must comply with the manufacturer's approved Design, Installation, Operation and Maintenance Manual that meets Chapter II-2, Regulation 5.2 of SOLAS 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 meters, and divided by 0.749 for systems having a volume of 57 cubic meters 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 Chapter II-2, Regulation 5.

For spaces specially suitable for vehicles, any fixed gas fire extinguishing system used to protect these spaces must comply with the requirements of SOLAS Chapter II-2, Regulation 53.2.2.

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 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 or equivalent foreign standards accepted by the USCG as determined by ABS.

Discharge Outlets

Discharge outlets shall be listed or approved by an independent testing laboratory.

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.

Cite: II-2/6 Fire extinguishers

Fire extinguishers must be approved equipment.

Cite: II-2/7 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 a fixed fire extinguishing system. (Also see Cite II-2/44.2.2(9) Paragraphs 1.3 and 1.4)

Cite: II-2/10 Fixed pressure water-spraying fire-extinguishing systems in machinery spaces

Where a water spray system is installed for protection of lamp lockers, paint lockers, or pumprooms, it shall comply with Regulation II-2/10, 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 Section 4/6 of the ABS Steel Vessel Rules as modified by 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 which will not flake off and clog the nozzles are applied. 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.

Spray nozzles shall be of an approved type.

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."

Cite: II-2/12 Automatic sprinkler, fire detection and fire alarm systems

In addition to compliance with Chapter II-2, Regulation 12 of SOLAS, 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 Section 4/5 of the ABS Steel Vessel Rules and this supplement.

All piping, valves, fittings, pressure tanks, etc. must meet the applicable requirements of Sections 4/2 and 4/6 of the ABS Steel Vessel Rules as modified by this supplement.

In lieu of compliance with the above, the automatic sprinkler system may be designed in accordance with NVIC 10-93.

The fire detecting and manual alarm, automatic sprinkler, and smoke detecting 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."

Cite: II-2/13 Fixed fire detection and fire alarm systems

Fire protection systems must be 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 of an approved type.

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.

Cite: II-2/13.2 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.

Cite: II-2/17.4 Fireman's outfit

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

Cite: II-2/18 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.

Cite: II-2/45 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. meters 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 meters. The angle of inclination with the horizontal of such stairways shall not exceed 0.87 radius.

Cite: II-2/56.6 Location and separation of spaces

The coaming shall be at least 0.3 meter (1 foot) in height.

Cite: II-2/61 Fixed deck foam systems

The system must be approved equipment and must comply with the manufacturer's approved Design, Installation, Operation and Maintenance Manual that meets Chapter II-2, Regulation 61 of SOLAS and the following supplemental requirements:

Controls

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.

Piping

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.

Discharge Outlets

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

Markings

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".

C. Life-saving appliances and arrangements (This supplement entry is intended to add clarity to the various terms used but not clearly defined in SOLAS.)

Cite: 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.

"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).

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

Life-saving appliances must be approved equipment to the appropriate CFR, SOLAS or IMO standard. USCG approved products and systems are accepted regardless of country of manufacture. Alternatively, products and systems produced in foreign countries to the appropriate SOLAS or IMO standard may be accepted if they are produced in and approved by or on behalf of the maritime safety administration of a country with which the United States has a Mutual Recognition Agreement in force.

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**
- 160.117 Embarkation-Debarkation Ladders*
- 160.118 Rigid liferafts***
- 160.121 Hand red flares
- 160.122 Floating orange smoke signals
- 160.132 Davits**
- 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

- 161.010 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 ABS 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.
- **** indicates USCG acceptance of ABS review to standard design only.

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.

Cite: III/6 Communications

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

Cite: III/7 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).

Cite: III/8 Muster list and emergency instructions

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

Cite: 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.

Cite: 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.

Cite: III/17 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.

Cite: III/27.3 Personal life-saving appliances – Immersion suits and thermal protective aids (cargo ships)

Immersion suits must be carried on all cargo vessels except those operating between 32 degrees north and 32 degrees south latitude.

Cite: III/41 General requirements for lifeboats

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.

Cite: III/48 Launching and embarkation appliances

The lowering speed for a survival craft loaded with all of its equipment must be not less than 70 percent of the speed required under Regulation III/48.2.6.

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

Cite: III/48.2 Launching and embarkation appliances – 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 which is not more than 300 millimeters (1 foot) above the deck.

Each winch drum must be arranged so the fall wire winds onto the drum in a level wrap.

D. Radiocommunications**Cite: IV/1.4 Radiocommunications – Application**

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

E. Safety of navigation**Cite: V/22 Navigation bridge visibility**

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

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III. ADDITIONAL REQUIREMENTS NOT CONTAINED IN ABS RULES, MARPOL OR SOLAS

A. Diving Support Systems

Diving support systems must meet the following requirements:

- (a) Piping for diving installations which is permanently installed on the vessel must meet the requirements of subpart B (Commercial Diving Operations) of 46 CFR part 197.
- (b) Piping internal to a pressure vessel for human occupancy (PVHO) must meet the requirements of subpart B of 46 CFR part 197.

B. Accommodations for Officers and Crew

1. Application

- (a) The provisions of this section, 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 section insofar as is reasonable and practicable.
- (c) The provisions of this section, 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 section 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 odorproof.
- (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 boilerrooms, 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 Accommodations

(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 section

- (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 section 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.
- (l) 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 section, 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 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 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 accommodations 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 accommodations 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.

C. Navigation Safety Requirements that Apply to All Vessels

This section applies to all self propelled vessels over 1600 G. T. when operating in the navigable waters of the United States, except the St. Lawrence Seaway.)

Cite: 33 CFR 164.35(g) Navigational equipment

1. Application

- (a) The provisions of this section apply to all self propelled vessels over 1600 G.T. when operating in the navigable waters of the United States, except the St. Lawrence Seaway.

2. Maneuvering Information

- (a) Maneuvering characteristics must be posted prominently on a fact sheet in the wheel house. The requirements for posting maneuvering information are found in 33 CFR 164.35. The maneuvering characteristics are to be representative of both normal load, normal ballast conditions, calm weather (wind 10 kts or less), no current, deep water (at least twice the vessel's draft), and clean hull. At the bottom of the fact sheet the following statement shall be provided:

"WARNING"

The response of the (name of vessel) may be different from that listed above if any of the following conditions , upon which the maneuvering information is based, are varied:

1. Calm weather – wind 10 knots or less, calm sea;
2. No current;
3. Water depth twice the vessel's draft or greater;
4. Clean hull; and
5. Intermediate drafts or unusual trim.

- (b) The posted characteristics shall consist of the following maneuvers:

- Turning Circle Diagram to both port and starboard.
- Time, distance, advance, transfer to alter course 90 deg with maximum power settings for either full or half speeds, or full and slow speeds.
- Vessels which have essentially the same turning characteristics to both port, and starboard may substitute a turning circle in one direction only, with a note stating the other direction to be essentially the same.
- Time and Distance to Stop the vessel from either full and half speeds while maintaining initial heading, and minimum rudder application.

- Table of Shaft RPM for a representative range of speeds should be provided for a vessel with a fixed pitch propeller.
 - Table of Control Settings for a representative range of speeds for a vessel with a controllable pitch propeller.
 - Table of Effective Speeds for auxiliary maneuvering devices such as bow thrusters. This table should show the range of speeds for which the unit can be used effectively.
- (c) Navigation and Vessel Inspection Circular (NVIC) 7-89 calls attention to IMO Resolution A.601(15) "Provision and Display of Maneuvering Information Onboard Ships", adopted 19 November 1987, and MSC/Circ. 389, "Interim Guidelines for Estimating Maneuvering Performance in Ship Design," adopted 10 January 1985. These provide guidance to the owner and operator concerning maneuvering performance estimation and a standardized format for presentation of ship maneuvering information to operating personnel, including pilots.

**Cite: 33 CFR 164.33(2)(i) & Charts and publications
33 CFR 164.33(3)(ii)**

1. Application

- (a) The provisions of this section apply to all self propelled vessels over 1600 G.T. when operating in the navigable waters of the United States, except the St. Lawrence Seaway.

2. Requirements

- (a) In addition to the requirements of SOLAS, a vessel must have a current copy of the "U.S. Coast Pilot", and "Tidal Current Tables", published by the National Oceanographic Service. Further detail is provided in 33 CFR 164.33.

Cite: 33 CFR 164.41 Electronic position fixing devices

See Federal Register Vol. 59, No. 56, dated March 23, 1994, page 13757 for additional guidance.

1. Application

- (a) The provisions of this section apply to all self propelled vessels over 1600 G.T. and calling at a port in the United States, including Alaska south of Cape Prince of Wales. Each vessel operated, owned, or bareboat chartered by the United States, State, or Political Subdivision, by a foreign nation, and not engaged in commerce is exempt from this requirement. Requirements for electronic position fixing devices are found in 33 CFR 164.41.

2. Devices

- (a) A Type I or Type II Loran C Receiver meeting Part 2 (Minimum Performance Standards of the Radio Technical Commission for Marine Services (RTCM) Paper 12-78/DOD100. Each receiver installed on or after June 1, 1982 must have a label showing the name and address of the manufacturer, including the following statement: "This receiver was designed and manufactured to meet Part 2 (Minimum Performance Standards) of the RTCM MPS for Loran-C Receiving Equipment."
- (b) A Satellite Navigation Receiver with automatic acquisition of satellite signals, and position updates derived from satellite information.
- (c) A system considered to meet the intent for availability, accuracy, and coverage for the U.S. Confluence Zone (CCZ) contained in U.S. "Federal Radio Navigation Plan" (Report No. DOD-No 4650.4-D or No. DOT-TSC-RSPA-80-16I)

D. Requirements in Addition to MARPOL Annexes

In order to facilitate reference, the applicable CFR cite is given for each entry.

ANNEX I

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: sorbents, 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: sorbents, 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 155.450 Placard

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

Cite: 33 CFR 155.780 Emergency shutdown

Tank vessel 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 shoreside 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 157.21 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.)

Interpretation: MARPOL Reg 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.

Interpretation: MARPOL Reg 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.

Interpretation: MARPOL Reg 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.

Interpretation: MARPOL Reg 25(1)(c)

Subdivision and Stability. Stability for vessels under 100 m: The Commandant, USCG, makes determinations concerning the relaxation 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.

ANNEX II (no differences)

ANNEX III (no differences)

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

Cite: 33 CFR 159 Marine Sanitation Devices (MSDs)

All vessels over 60 feet must be installed with an operable MSD which 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 which is certified and is authorized to label by the Commandant, USCG.

ANNEX V

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 – Recordkeeping 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.

**IV. SURVEYS AFTER CONSTRUCTION
ACP CLASSIFICATION SURVEY CHECK SHEET B
ACP STATUTORY SURVEY CHECK SHEET C
ACP ENVIRONMENTAL SURVEY CHECK SHEET D**

**V. SURVEYS DURING CONSTRUCTION
ACP NEW CONSTRUCTION SURVEY CHECK SHEET E**

**VI. REQUIREMENTS FOR MOBILE OFFSHORE DRILLING UNITS
MODU ACP CLASSIFICATION SURVEY CHECK SHEET F**

VII. PASSENGER VESSELS – SOLAS INTERPRETATIONS NOT ADDRESSED BY ABS RULES

Cite: II-1/8	Stability of passenger ships in damaged condition	VII-1
Cite: II-1/15	Openings in watertight bulkheads in passenger ships	VII-1
Cite: II-1/20	Watertight integrity of passenger ships above the margin line	VII-1
Cite: II-1/42	Emergency source of electrical power in passenger ships	VII-1
Cite: II-2/28	Means of escape	VII-1
Cite: II-2/37.1.3	Protection of special category spaces	VII-2
Cite: II-2/37.1.3 & II-2/37.1.6.3	Protection of special category spaces	VII-3
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Cite: III/21	Personal life-saving appliances	VII-3
Cite: III/21.3	Personal life-saving appliances – Lifejacket lights	VII-4
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VII. PASSENGER VESSELS – SOLAS INTERPRETATIONS NOT ADDRESSED BY ABS RULES

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

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).

Cite: 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."

Cite: 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).

Cite: 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.

Cite: II-2/28 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 26, paragraphs 1.1 and 1.2 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.

Cite: II-2/37.1.3 Protection of special category spaces

Where a manual sprinkling system is installed for protection of vehicle decks, it shall comply with Regulation II-2/37.1.3, 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 meter 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".

Cite: II-2/37.1.3 & II-2/37.1.6.3 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."

Cite: III/20 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/20.

- (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.

Cite: III/21 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.

Cite: III/21.3 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.

Cite: III/21.4.2.2 Personal life-saving appliances – Immersion suits and thermal protective aids

The warm climate exemption in Regulation 21.4.2.2 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/22 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.

VIII. RECORD OF REVISIONS
