



**Addendum 2 to Annex**

To the MEMORANDUM OF AGREEMENT

Between the

UNITED STATES COAST GUARD

and

DET NORSKE VERITAS  
GOVERNING PARTICIPATION IN  
THE ALTERNATE COMPLIANCE PROGRAM  
AND THE DELEGATION OF CERTAIN SURVEY  
AND CERTIFICATION SERVICES  
FOR UNITED STATES OF AMERICA FLAGGED  
MOBILE OFFSHORE DRILLING UNITS

Supplement To  
DNV RULES AND IMO MODU CODE, Consolidated Edition  
FOR PARTICIPATION IN THE  
UNITED STATES COAST GUARD ALTERNATIVE COMPLIANCE PROGRAM

USCG Approval letter – April 26, 2006

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## **DNV OBJECTIVE, VISION, VALUES**



### **Objective**

**To safeguard life, property and the environment**

### **Vision**

To be the leading independent, international provider of services for managing risk. The name of DNV will evoke an image of safety, quality and concern for the environment.

This means that:

- we set the agenda on safety, quality and environmental issues,
- customers, authorities and the public trust and accept our services,
- our services create business advantages for our customers,
- our technology is state of the art,
- we are leaders in our areas of competence,
- we provide uniform services world-wide,
- our independence is sustained by integrity and impartiality and by our financial solidity.

### **Values**

#### **Customers**

We:

- focus on our customers' needs, expectations and opinions, understand their business and treat them as important partners,
- share experience with our customers while maintaining customer confidentiality, and involve them in developing our services,
- document agreements with our customers and deliver services in accordance with these agreements
- use standard service specifications to ensure uniform services.

#### **People**

We believe in the potential of people and in systematic training and education.  
Challenging and satisfying tasks and equal opportunities are available to all.

#### **Communication**

We have open, active and honest communication with customers, colleagues and the public.

#### **Laws and regulations**

We comply with laws and regulations in all our operations.

#### **Safety, health & the environment**

We:

- maintain the highest standards for health and safety,
- demonstrate our safety and environmental commitment through our services and operations
- give preference to suppliers with safe and environmentally friendly products and services.

#### **Leadership**

We believe in customer focus, process orientation, continuous improvement and people empowerment.

We:

- achieve results through teamwork and co-operation,
- demonstrate commitment, desired attitudes and behaviour through the example of our own actions,
- share a common vision, values and goals,
- maintain a management system satisfying applicable international and national standards.

## **QUALITY MANAGEMENT SYSTEM CERTIFICATION**

DNV Technology Services' Global Quality Management System is certified by an independent body (TNO) to ISO 9001:2000. The Global Quality Management System for Classification activities is also certified to IACS standards. Copies of the certification are reproduced overleaf.

**DNV TECHNOLOGY SERVICES ISO 9001: 2000 CERTIFICATE**



**IACS QUALITY SYSTEM CERTIFICATE OF CONFORMITY**

**IACS**

**INTERNATIONAL ASSOCIATION  
OF  
CLASSIFICATION SOCIETIES**

**QUALITY SYSTEM  
CERTIFICATE OF CONFORMITY**

THIS IS TO CERTIFY THAT THE QUALITY SYSTEM OF:

**DET NORSKE VERITAS**

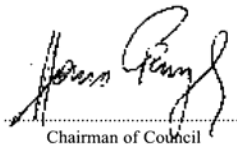
has been found to conform to IACS QSCS Requirements and the requirements of ISO 9001.


IACS QSCS covers the following services rendered by a classification society:

- classification of ships and offshore installations in respect of both newbuilding and in service,
- statutory work carried out on behalf of appropriate national Administrations.

Date 25th August 1999

For IACS

  
.....  
Chairman of Council

  
.....  
Quality Secretary

**ABBREVIATED TERMS/DEFINITIONS**

IACS	International Association of Classification Societies
DNV	Det Norske Veritas
USCG	United States Coast Guard
ACP	Alternative Compliance Program
COI	Certificate of Inspection
CFR	Code of Federal Regulations
MODU	Mobile Offshore Drilling Unit
MOU	Mobile Offshore Unit
DNV Rules	DNV Offshore Service Specification DNV-OSS-101 “Rules for Classification of Offshore Drilling and Support Units October 2003” and Offshore Standards and Recommended Practices specifically related to MODUs (refer to OSS-101 Chapter 1 Section 1 C200). There are also references where applicable to DNV Rules for Classification of Ships 2005 and DNV Rules for Certification of Lifting Appliances 1994.
OACI	Officer in Charge, Marine Inspection
UWILD	Under Water Inspection in Lieu of Drydocking
MODU Code	IMO MODU Code, Consolidated Edition
ANSI	American National Standards Institution
ASME	American Society of Mechanical Engineers
MSS SP-45	Manufacturers Standardization Society standard on Bypass & Drain Connections.
MSS SP-25	Manufacturers Standardization Society standard on Marking System for Valves, Fittings, Flanges and Unions
MODU Code	Code for the Construction and Equipment of Mobile Offshore Drilling Units, 1989, A.649 (16), including all amendments.



## INTRODUCTION

A requirement placed on a Classification society that seeks authorization to participate in the Alternative Compliance Program (ACP) is to produce, and have approved by the United States Coast Guard (USCG), a U.S. Supplement to the Classification Society rules and recognized International Codes/Standards. The Supplement is to include all regulations applicable for the issuance of a USCG Certification of Inspection that, in the opinion of the Commandant, are not adequately covered by the Classification Society's Rules or by applicable International Codes/Standards.

An Owner/Operator of a Mobile Offshore Drilling Unit (MODU) enrolled in the Alternative Compliance Program who wishes to have DNV perform approval and surveys on the vessel on behalf of USCG must satisfy all the requirements contained within the applicable sections of the DNV Rules, the IMO MODU Code and this Supplement prior to the issuance of an USCG Certificate of Inspection (COI).

The following supplement is produced following a careful review of the applicable regulations contained within Part 46, Chapter I - Shipping of the Code of Federal Regulations (46 CFR Chapter I) and comparison to the DNV Offshore Service Specifications and other applicable codes. The comparison has identified additional requirements not contained within DNV OSS or other applicable standards and documents. It is these additional requirements which have been used to produce this supplement. The additional requirements are included in this supplement under one of two sections:

1) *USCG Supplemental Requirements to DNV OSS and IMO MODU Code:*

This section contains supplemental requirements that are in addition to or amplify those that already exist within the DNV OSS and the IMO MODU Code or other applicable Code. In each case the relevant CFR regulation is referenced along with the corresponding DNV and/or IMO MODU Code reference.

2) *USCG Requirements Not Addressed By DNV OSS or IMO MODU Code:*

This section contains supplemental requirements not contained or covered by DNV OSS or the IMO MODU Code. In this case the applicable CFR regulation is referenced.

**Application:** This supplement is to be used, along with DNV OSS and the IMO MODU Code and other Standards as applicable in lieu of Coast Guard regulations for plan review and inspections delegated to DNV by the USCG. The use of this supplement is restricted to those MODUs which carry U.S. Flag which are enrolled in the Alternative Compliance Program, and which are to be certificated under 46 CFR Subchapter I-A .

Although this document has been prepared following a careful review of the applicable regulations contained within 46 CFR Chapter I and comparison to the DNV Offshore Service Specifications and other applicable requirements, it is possible that there may be omissions. Notwithstanding this possibility, the fact that a CFR requirement is missing from this document does not absolve the Owner of the MODU of the responsibility for complying with requirements of 46 CFR Chapter I which, in the opinion of the Commandant, are not adequately covered in DNV Rules or the IMO MODU Code.

U.S. Federal law mandates the use of U.S. domestic Standards for certain systems, equipment and components and these Standards are referenced where required. However, it is also recognized that there exist alternative Standards developed by regulatory bodies and the industry both external and internal to the U.S. which define systems, equipment or components to an equivalent level. DNV is authorized to approach USCG with a request for USCG to review these alternatives to demonstrate equivalency and to accept alternatives built in to these international/industry Standards if the Standards are found satisfactory. Acceptance of equivalent standards can only be performed by USCG. DNV is not authorized to accept alternative standards without agreement from the USCG Marine Safety Center.

Note: Access to the US Code of Federal Regulations may be gained via the Internet at:

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

## **EQUIPMENT APPROVALS**

### **General**

Equipment and material that is required under 46 CFR Subchapter I-A is to be approved or of an approved type and must have been manufactured and approved in accordance with the design and testing requirements in 46 CFR Subchapter Q or as otherwise specified by the Commandant.

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

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

Additionally, an MRA between the US and the EC has entered into effect.

The MRA product scope includes 43 products in three categories:

- Fire protection
- Life saving
- Navigational equipment.

The MRA allows reciprocal approvals to be given by both the US and the EC for certain marine products where it has been found that the approval process is identical or equivalent. This makes it possible for a manufacturer with a European Approval (MED/Wheelmark) to obtain USCG approval for certain equipment covered by the MRA. This will be accomplished by permitting the “Notified Bodies” responsible for issuing approvals in Europe to issue USCG approval.

Likewise, the USCG will be able to issue the European Approval (MED/Wheelmark) for manufacturers having a USCG approval if the item is included within the scope of the MRA. It is important to note that this MRA does not change the requirement of using USCG approved equipment and materials on US Flag vessels. It allows an alternative means for obtaining USCG approval. The European MED/ “Wheelmark” will not be accepted in lieu of USCG approval.

Further guidance on marine equipment approvals covered by the US–EC MRA is given in NVIC 8-04 as can be found on the following web site:

<http://www.uscg.mil/hq/g%2Dm/nvic/>

Information concerning the status of USCG approval of marine equipment may be obtained by accessing the following website:

<http://cgmix.uscg.mil/equipment>

Each OCMI or the Marine Safety Center may be contacted for information concerning approved equipment.

## **PROCEDURE FOR ENROLLMENT AND PARTICIPATION IN ACP**

Under ACP, a voluntary program, the Owner may elect to have DNV conduct approval and surveys on both new and existing Units on behalf of USCG. For new construction, a request for enrollment is required from both the Shipyard and the Owner as the enrollment in this program will affect both parties. The guiding documents for the enrollment process are: (1) 46 CFR Part 8 – Vessel Inspection Alternatives; (2) the USCG Marine Safety Manual, Vol. II, Section B, Chapter 9; and (3) NVIC 2-95, current version.

NVIC 2-95 (current version) may be accessed via the Internet at:

[http://www.uscg.mil/hq/g-m/nvic/2\\_95/n2-95.htm](http://www.uscg.mil/hq/g-m/nvic/2_95/n2-95.htm)

The USCG Marine Safety Manual may be accessed via the Internet at:

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

Below is an overview of the procedures covering various enrollment aspects associated with ACP, which is taken from these references.

### **New Construction**

Enrollment into the ACP may have implications on the design, fabrication sequence and cost of construction for a proposed new vessel. In this respect it is imperative that the Shipyard and the Owner consult with DNV as early in the design phase as possible to discuss the proposed enrollment in depth to establish the basic fundamentals of the program and to clarify administrative requirements. On completion of such meetings, both the Owner and the Shipyard are to forward to the Officer in Charge, Marine Inspections (OCMI) written requests confirming their intention to enroll in the ACP. The Shipyard request is to include a copy of the Request for Classification (DNV Form 40.55a). The Owner is to forward to DNV Regional Office a separate letter confirming his intention to enroll in the ACP. It is also important that the application for enrollment in the ACP is forwarded to the local OCMI in accordance with NVIC 2-95 Change 1.

### **Existing Vessels**

The Owner or Operator should apply for enrollment by submitting an Application for Inspection of U.S. Vessel (form CG-3752) to the OCMI, indicating their desire to have the vessel enrolled in the program. USCG will subsequently authorize the applicable DNV Offices to commence the ACP enrollment process. A hand-over survey (see below) will be conducted at a mutually convenient time and on completion of the survey, the Owner/Operator will be notified by USCG of the enrollment status.

## **Hand Over Surveys**

For all existing units a hand-over survey must take place. This survey will allow time for the USCG Inspector and the DNV Surveyor to compare notes on the vessel. USCG will confirm to DNV that the vessel is in compliance with the CFR or will advise on those areas that require corrective action. USCG will also confirm that the history of the vessel has been properly incorporated into DNV's Class status system (Nauticus/Exchange). The Surveyor and the Inspector will complete the DNV Record of Approved Safety Equipment, which is to be a permanent part of the vessel's documentation.

## **Re-Flagging**

All re-flaggings require an initial meeting between the Owner and the USCG. The guiding document is NVIC 10-81, current version, in conjunction with applicable guidance from the USCG Marine Safety Center.

## **Certificate Of Inspection**

A MODU operating under the ACP 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 or fire-fighting equipment. The DNV Status will contain the major details of the vessel.

## **Procedure if the MODU Is Damaged**

The Offshore Installation Manager must report any damage sustained by the MODU to the USCG OCMI. DNV will take the lead and initiate surveys to determine the MODU's "Fitness to Proceed" and share survey information with the local OCMI. If the vessel poses a threat to the environment such as a class I structural failure, the local OCMI will take precedence after co-coordinating with the Surveyor in charge.

## **Procedure for Handling Form CG-835**

USCG issues recommendations and deficiencies on a form numbered CG-835. It has become common practice within the industry to refer to these deficiencies as '835s'. USCG will assist the DNV surveyor by providing liaison with other USCG offices in dealing with CG-835's, and it is expected that the DNV surveyor will communicate with the local USCG offices.

Any outstanding '835' is under the control of the USCG office which performed the inspection and initially observed the deficiency for which it was issued. DNV will be given copies of the 835s for inclusion in the DNV Class Status as Outstanding Recommendations/Conditions of Class/Conditions of Administration. DNV may perform a survey and indicate that an '835' has been satisfactorily addressed. This will be documented by issue of a Survey Report, which, in addition to being forwarded to the Owner of the Unit, is sent via the local OCMI to the OCMI which issued the '835'. It is the responsibility of the local OCMI to forward the follow up to the '835' to the appropriate persons within the USCG organization in order to cancel the 835 in the USCG files. A DNV Surveyor may clear '835' items on an ACP Unit only.

If an '835' has not been satisfactorily addressed, the OCMI which issued the '835' must be contacted for further advice. This will be done via the local OCMI at the port where the Unit is being surveyed. **It is important to note that a DNV surveyor does not have the authorization to extend, modify or delete an '835'.**

### **Conditions of Class / Conditions of Administration**

Classification is maintained by a series of Annual Surveys and Periodical Surveys that allow the Class Society an opportunity to survey a MODU and maintain a record of its compliance with the Rules and applicable regulations. For non-compliances, DNV refers to Conditions of Class (CCs), (i.e. Class remains valid on the condition the defect is rectified within a certain time period) and Conditions of Administration (CAs) (i.e. compliance with Flag Administration requirements remains valid on the condition the defect is rectified within a certain time period). There are four levels of seriousness of Conditions: Minor, Standard, Serious and Major.

- Minor: Rectification can be confirmed by Master of Unit, can be postponed with good reason
- Standard: Rectification may be confirmed by Master of Unit (decided on a case by case basis), can be postponed with good reason
- Serious: Seriously affects safety of unit, rectification must be followed up by DNV, due date cannot be postponed.
- Major: Unit cannot operate, rectification must be followed up by DNV, due date cannot be postponed.

A typical period granted for rectification of a defect is three months, although this depends on the seriousness of the deficiency. Consideration is given to allow time to make corrections, to move the MODU to a more appropriate location or to complete operations. A number of Outstanding Conditions of Class or a major Outstanding Condition of Class may be sufficient to question the fitness of the MODU to proceed or operate.

### **No Sail Items / Conditions of Class, Administration**

'No Sail' is a term used by USCG when the condition of a MODU is suspect or has deteriorated or it has sustained excessive damages resulting from non-compliance or a deficiency with respect to the applicable regulations to the point where, in the opinion of the USCG Inspector, it cannot continue to operate safely. The term comes from the ship inspection regime where a ship would not be 'Fit to Proceed' and hence be detained in the port of inspection by issue of a 'No Sail' item. DNV has a similar process however DNV terminology differs.

A MODU is not considered 'Fit to Proceed' if it has suffered structural damage that affects its structural strength or its watertight integrity, or has lost position holding capability, has sustained leg damage, has lost propulsion or steering capability or electrical generation capacity including redundant systems. Any of the foregoing would generate a report of non-compliance with the Rules and be listed as a Major Condition of Class.

Similarly, if a 'Fit to Proceed' deficiency is with statutory requirements, it would be listed as a Major Condition of Administration. Typical Statutory deficiencies that would prevent a MODU from sailing or operating would be loss of or lack of life saving appliances such as lifeboats, or failure of critical parts of the firefighting system, e.g. inoperable fire pumps or depleted fixed fire fighting systems.

On occasion, a defect on an item may generate a CC and a CA if the deficiency is with both Class Rules and Statutory Requirements. The emergency fire pump is such an item as it is required for both Class and for MODU Code Safety Certificate.

### **Drydocking Extensions**

Regardless of the circumstances, USCG retains the ultimate authority for granting drydocking extensions to MODUs operating in the ACP regime. Only under extenuating circumstances will DNV allow extensions of drydockings. Extensions if granted will take into consideration the following:

- 1) The MODU must not have any records of significant hull or leg damage or grounding since its last drydocking and
- 2) A survey of the vessel must be conducted.
  - a) For a 30 day extension, a general examination of the MODU is conducted.
  - b) For extensions 31 days up to 90 days, a modified Under Water Inspection in Lieu of Drydocking (UWILD) is required. In the modified survey, a record of the examination is typically marked on photographs/video taken by the diver.
  - c) Extensions of 91 days up to one year are normally granted to allow the MODU's survey to be harmonized with IMO requirements. A one year extension requires a full UWILD, including two-way voice and video communication between the Surveyor and the diver. It would be considered unusual to allow a one-year extension under any other circumstances.

### **OVERSIGHT**

The USCG, in delegating surveys to DNV, retains the ultimate responsibility for MODUs meeting their Regulatory requirements and complying with all stipulations. To achieve this, the USCG will maintain oversight by conducting audits in two main areas.

First, ACP enrolled MODUs will be audited through annual boardings to conduct renewal and mid-period COI inspections to ensure regulations are being correctly applied. The boardings will be similar to those done in Port State Inspections. A check sheet describing the considerations to expand the boardings is a part of the USCG Marine Safety Manual, Volume II, Section B, Chapter 9.

Second, DNV procedures will be audited to ensure they remain in compliance with DNV's Quality Management System, which is certified to both IACS QSCS requirements (for Classification activities) and to ISO 9001: 2000.



**SECTION I: SUPPLEMENTAL REQUIREMENTS TO DNV RULES AND IMO MODU CODE**

**SUBCHAPTER C – AIDS FOR NAVIGATION**

<b>USCG Reference</b> <b>33CFR 67.05</b>	<b>Obstruction Lights</b>	<b>DNV Reference</b> <b>NONE</b>	<b>MODU Code</b> <b>Reference 14.7.2</b>
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IMO requires compliance with Coastal State Regulations. USCG states specific requirements as a Coastal State in 33 CFR 67.05

**SUBCHAPTER F – MARINE ENGINEERING**

<b>USCG Reference</b> <b>46CFR 50.10-25</b>	<b>Pressure Vessels – Marking</b>	<b>DNV Reference</b> <b>Instructions to Surveyors</b> <b>(Internal)</b>	<b>MODU Code</b> <b>Reference NONE</b>
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USCG inspectors stamp is shown in Figure 46CFR50.10-25(B).

<b>USCG Reference</b> <b>46CFR 50.30</b>	<b>Pressure Vessels – Inspection During Fabrication</b>	<b>DNV Reference</b> <b>OS-D101 Ch. 3</b>	<b>MODU Code</b> <b>Reference 4.</b>
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USCG requires inspections of Class 1, 1-L, II, II-L and III pressure vessels during fabrication when determined necessary or requested by the OCMI.

<b>USCG Reference</b> <b>46 CFR 52.01 - 2</b>	<b>Power Boilers – ASME Requirements</b>	<b>DNV Reference</b> <b>OS-D101 Ch. 2 Sec. 5</b>	<b>MODU Code</b> <b>Reference 4.1.3</b>
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Boilers, pressure vessels and heat exchangers are to comply with the requirements of the ASME Code, with additional requirements as given in 46CFR 52.01. Other recognized international standards will be evaluated for equivalency on a case by case basis by USCG Marine Safety Center.

<b>USCG Reference</b> <b>46 CFR 52.01 - 50</b>	<b>Power Boilers – Fusible Plugs</b>	<b>DNV Reference</b> <b>OS-D101 Ch. 2 Sec. 5</b>	<b>MODU Code</b> <b>Reference 4.1.3</b>
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For water tube boilers with working pressure less than 30 psig and other boilers having a steam temperature less than 425 degrees F (218 degrees C) it is required to have fusion plugs.

<b>USCG Reference</b> <b>46 CFR 52.01 - 120</b>	<b>Power Boilers – Safety Valves and Safety Relief Valves</b>	<b>DNV Reference</b> <b>OS-D101 Ch. 2 Sec. 5</b>	<b>MODU Code</b> <b>Reference 4.1.3</b>
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Section I

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

<b>USCG Reference</b> <b>46CFR 53.01</b>	<b>Heating Boilers</b>	<b>DNV Reference</b> <b>OS-D101 Ch. 2 Sec. 5</b>	<b>MODU Code</b> <b>Reference 4.2, 4.3</b>
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Heating boilers for applications below 95 degrees C and steam boilers with pressure less than 3.5 bar are to be designed, constructed, inspected and tested in accordance with relevant requirements of Section IV of the ASME Code, with limitations and modifications as given in CFR Table 53.01 - 1(A).

<b>USCG Reference</b> <b>46CFR 53.05</b>	<b>Heating Boilers – Safety Valves</b>	<b>DNV Reference</b> <b>OS-D101 Ch. 2 Sec. 5</b>	<b>MODU Code</b> <b>Reference 4.2, 4.3</b>
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Pressure relieving devices. Cast iron seats and disks are not permitted.

<b>USCG Reference</b> <b>46CFR 54.01</b>	<b>Pressure Vessels</b>	<b>DNV Reference</b> <b>OS-D101 Ch. 2 Sec. 5</b>	<b>MODU Code</b> <b>Reference 4.2, 4.3</b>
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Pressure vessels are to be built in accordance with Div. 1, Section VIII of the ASME Code as modified by CFR 54.01 – 2, specified in Table 54.01 - 1(A). Other recognized international standards will be evaluated by the U.S. Coast Guard Marine Safety Center on a case by case basis as an equivalency.

<b>USCG Reference</b> <b>46CFR 54.10-10</b>	<b>Pressure Vessels – Hydrostatic Testing</b>	<b>DNV Reference</b> <b>OS-D101 Ch. 2 Sec. 5</b>	<b>MODU Code</b> <b>Reference 4.2, 4.3</b>
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Pressure vessels with a design temperature greater than (>) 650 degrees F (343 degrees C) must be tested in accordance with 46 CFR 54.10 – 10 and Div. 1, Section VIII of ASME Code respectively.

<b>USCG Reference</b> <b>46CFR 54.10-15</b>	<b>Pressure Vessels – Pneumatic Testing</b>	<b>DNV Reference</b> <b>OS-D101 Ch. 2 Sec. 5</b>	<b>MODU Code</b> <b>Reference 4.2, 4.3</b>
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Pneumatic tests of welded pressure vessels are allowed only for those units which are so designed and/or supported that they cannot be safely filled with water or for those units which cannot be dried and are to be used in a service where traces of the testing medium cannot be tolerated.

Supplement to DNV Rules and IMO MODU Code, Consolidated Edition for participation in ACP  
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<b>USCG Reference</b> <b>46CFR 54.15</b>	<b>Pressure Vessels – Safety and Relief Valves</b>	<b>DNV Reference</b> <b>OS-D101 Ch. 2 Sec. 5</b>	<b>MODU Code</b> <b>Reference 4.2, 4.3</b>
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Pressure vessels: Pressure relief devices. Cast iron seats and disks are not permitted.

<b>USCG Reference</b> <b>46CFR 56</b>	<b>Piping Systems</b>	<b>DNV Reference</b> <b>OS-D101 Ch. 2 Sec. 2, 3, 4, 6</b>	<b>MODU Code</b> <b>Reference 4.1 - 4.9</b>
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USCG has detailed requirements for certification of piping in 46CFR 56. NOTE 46CFR 56 modifies ANSI B31.1 Code.

<b>USCG Reference</b> <b>46CFR 56.04</b>	<b>Piping Systems – Classification</b>	<b>DNV Reference</b> <b>OS-D101 Ch. 2 Sec. 2 Table A1</b>	<b>MODU Code</b> <b>Reference NONE</b>
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Low temperature classification shall be in accordance with the requirements of 46CFR 56.50-105.

<b>USCG Reference</b> <b>46CFR 56.10-5</b>	<b>Pipe</b>	<b>DNV Reference</b> <b>OS-D101 Ch. 2 Sec. 2 B</b>	<b>MODU Code</b> <b>Reference 4</b>
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Pipe and tubing selections shall comply with 56.60-1(a). Ferrous, non-ferrous, copper, brass, alloy, aluminium, and non-metallic piping shall comply with specified USCG and ANSI requirements.

<b>USCG Reference</b> <b>46CFR 56.15-1</b>	<b>Pipe Joining Fittings</b>	<b>DNV Reference</b> <b>OS-D101 Ch. 2 Sec. 2 G &amp; H</b>	<b>MODU Code</b> <b>Reference 4</b>
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USCG has special requirements for testing of fittings above and below 3” diameter. One fitting for lot of 100 or fraction thereof must be flattened cold until the opposite walls meet without developing any cracks. Gas welding is not to be used for pipes with outer diameter greater than 3”.

<b>USCG Reference</b> <b>46CFR 56.15-5</b>	<b>Fluid Conditioner Fittings</b>	<b>DNV Reference</b> <b>OS-D101 Ch. 2 Sec. 2</b>	<b>MODU Code</b> <b>Reference 4</b>
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Fluid conditioner fittings not in accordance with 46CFR50.25 shall meet specific standards outlined in 46CFR56.15-5.

<b>USCG Reference</b> <b>46CFR 56.15-10</b>	<b>Special Purpose Fittings</b>	<b>DNV Reference</b> <b>OS-D101 Ch. 2 Sec. 2</b>	<b>MODU Code</b> <b>Reference 4</b>
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Special purpose fittings not complying with the requirements of 46CFR50.25 shall meet the special standards outlined in 46CFR56.60-1(b). Non-standard special purpose fittings must meet other CFR requirements described in 46CFR56.15-10.

<b>USCG Reference</b> <b>46CFR 56.20-5</b>	<b>Valves – Marking</b>	<b>DNV Reference</b> <b>OS-D101 Ch. 2 Sec. 2</b>	<b>MODU Code</b> <b>Reference 4</b>
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All valves shall bear the manufacturer's name or trademark and identify the acceptable design service conditions specified by the manufacturer. The markings shall be in accordance with MSS-SP-25 (see page 8).

<b>USCG Reference</b> <b>46CFR 56.20-15</b>	<b>Valves and Valves Employing Resilient Material</b>	<b>DNV Reference</b> <b>OS-D101 Ch. 2 Sec. 2</b>	<b>MODU Code</b> <b>Reference 4</b>
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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, construction and testing for valves specified in this part.

Valves employing resilient material shall be divided into three categories, Positive shutoff, Category A, and Category B, and shall be tested and used as follows:

- Positive shutoff valves. The closed valve must pass less than 10 ml/hr (0.34 fluid oz/hr) of liquid or less than 3 l/hr (0.11 cubic ft/hr) of gas per inch nominal pipe size through the line after removal of all resilient material and testing at full rated pressure. Packing material must be fire resistant. Piping subject to internal head pressure from a tank containing oil must be fitted with positive shutoff valves located at the tank in accordance with Sec. 56.50-60(d). Otherwise positive shutoff valves may be used in any location in lieu of a required Category A or Category B valve.
- Category A valves. The closed valve must pass less than the greater of 5 percent of its fully open flow rate or 15 percent divided by the square root of the nominal pipe size (NPS) of its fully open flow rate through the line after complete removal of all resilient seating material and testing at full rated pressure; as represented by the formula:  $(15\% / \text{SQRT } x \text{ (NPS)}) \text{ (Fully open flow rate)}$ . Category A valves may be used in any location except where positive shutoff valves are required by 46 CFR 56.50-60(d). Category A valves are required in the following locations:
  - Valves at vital piping system manifolds;
  - Isolation valves in cross-connects between two piping systems, at least one of which is a vital system, where failure of the valve in a fire would prevent the vital system(s) from functioning as designed.
  - Valves providing closure for any opening in the shell of the vessel.
- Category B valves. The closed valve will not provide effective closure of the line or will permit appreciable leakage from the valve after the resilient material is damaged or destroyed. Category B valves are not required to be tested and may be used in any location except where a Category A or positive shutoff valve is required.

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

<b>USCG Reference</b> <b>46CFR 56.20-20</b>	<b>Valve Bypasses</b>	<b>DNV Reference</b> <b>OS-D101 Ch. 2 Sec. 2</b>	<b>MODU Code</b> <b>Reference 4</b>
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Sizes of bypasses shall be in accordance with MSS-SP-45.

Pipe for bypasses should be at least Schedule 80 seamless, and of a material of the same nominal chemical composition and physical properties as that used for the main line. Lesser thickness may be approved depending on the installation and service conditions.

Bypasses may be integral or attached.

<b>USCG Reference</b> <b>46CFR 56.25</b>	<b>Pipe Flanges, blanks, flange facings, gaskets and bolting</b>	<b>DNV Reference</b> <b>OS-D101 Ch. 2 Sec. 2</b> <b>Table G1</b>	<b>MODU Code</b> <b>Reference 4</b>
In general in accordance with ASME VIII, with additional requirements for material. Requirements for blanks, flange facings, gaskets and bolting are specified.			
<b>USCG Reference</b> <b>46CFR 56.30-5</b>	<b>Welded Joints</b>	<b>DNV Reference</b> <b>OS-D101 Ch. 2 Sec. 2 G,</b> <b>Sec. 6, Table G2</b>	<b>MODU Code</b> <b>Reference NONE</b>
Welding procedures, welders, and welding machine operators are to meet the qualifications stated in 46CFR56.50-57.			
<b>USCG Reference</b> <b>46CFR 56.30-10</b>	<b>Flanged Joints</b>	<b>DNV Reference</b> <b>OS-D101 Ch. 2 Sec. 2 G,</b> <b>Sec. 6, Table G2</b>	<b>MODU Code</b> <b>Reference NONE</b>
Construction of flanged joints must be in accordance with specific ANSI standards determined by the intended service and material characteristics.			
<b>USCG Reference</b> <b>46CFR 56.30-15</b>	<b>Expanded or Rolled Joints</b>	<b>DNV Reference</b> <b>OS-D101 Ch. 2 Sec. 2 G,</b> <b>Sec. 6, Table G2</b>	<b>MODU Code</b> <b>Reference NONE</b>
Expanded or rolled joints are permitted when suitable for all conditions the system will encounter.			
<b>USCG Reference</b> <b>46CFR 56.30-25</b>	<b>Flared, Flareless, and Compression Fittings</b>	<b>DNV Reference</b> <b>OS-D101 Ch. 2 Sec. 2 G,</b> <b>Sec. 6, Table G2</b>	<b>MODU Code</b> <b>Reference NONE</b>
Flanged, flareless, and compression fittings must conform to ASTM F 1387 (incorporated into 46CFR 56.01-2).			
<b>USCG Reference</b> <b>46CFR 56.30-27</b>	<b>Caulked Joints</b>	<b>DNV Reference</b> <b>OS-D101 Ch. 2 Sec. 2 G,</b> <b>Sec. 6, Table G2</b>	<b>MODU Code</b> <b>Reference NONE</b>
Caulked joints are prohibited.			
<b>USCG Reference</b> <b>46CFR 56.30-30</b>	<b>Brazed Joints</b>	<b>DNV Reference</b> <b>OS-D101 Ch. 2 Sec. 2 G,</b> <b>Sec. 6, Table G2</b>	<b>MODU Code</b> <b>Reference NONE</b>

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Brazed joints shall meet the requirements of 46 CFR 56.75. Brazed joints are prohibited in systems using flammable or combustible fluids in hazardous areas or with service temperatures above 425 degrees F.

<b>USCG Reference</b> <b>46CFR 56.30-35</b>	<b>Gasketed Mechanical Couplings</b>	<b>DNV Reference</b> <b>OS-D101 Ch. 2 Sec. 2 G, Sec. 6, Table G2</b>	<b>MODU Code</b> <b>Reference NONE</b>
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Gasketed mechanical couplings must conform to ASTM F 1476 and ASTM F 1548 (both incorporated into 46 CFR 56.01-2).

<b>USCG Reference</b> <b>46CFR 56.30-40</b>	<b>Flexible Pipe Couplings of the Compression or Slip-On Type</b>	<b>DNV Reference</b> <b>OS-D101 Ch. 2 Sec. 2 G, Sec. 6, Table G2</b>	<b>MODU Code</b> <b>Reference NONE</b>
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Flexible couplings of the slip-on or compression type may not be used as expansion joints or vibration dampers. Flexible couplings must comply with 46 CFR 56.60 and 46CFR 56.60-1(b) and be tested according to 46CFR 56.97-5. The location of flexible coupling use is restricted by 46 CFR 56.30-40(f).

<b>USCG Reference</b> <b>46CFR 56.35-1</b>	<b>Pipe Stress Calculations</b>	<b>DNV Reference</b> <b>OS-D101 Ch. 2 Sec. 2</b>	<b>MODU Code</b> <b>Reference NONE</b>
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CFR Replaces ASTM Code requirements.

<b>USCG Reference</b> <b>46CFR 56.35-10</b>	<b>Non Metallic Expansion Joints</b>	<b>DNV Reference</b> <b>OS-D101 Ch. 2 Sec. 2 G300</b>	<b>MODU Code</b> <b>Reference NONE</b>
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Non-metallic expansion joints that do not comply with 46CFR 50.25 shall comply with the standards specified in 46 CFR 56.60-1(b). Joint movements must not exceed the manufacturer's specified limits.

<b>USCG Reference</b> <b>46CFR 56.50</b>	<b>Specific Systems</b>	<b>DNV Reference</b> <b>OS-D101 Ch. 2 Sec. 3, Sec. 4, Sec. 5</b>	<b>MODU Code</b> <b>Reference NONE</b>
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USCG has special and additional requirements which modify ANSI B31.1 for the following systems/equipment: Gauging, steam & exhaust piping, pressure relief piping, safety and relief valve escape piping, boiler feed piping, condensate pumps, blowoff piping, circulating pumps, bilge & ballast piping, bilge pumps, systems containing oil, burner fuel oil service systems, diesel fuel systems, lube oil systems, tank vent piping, sounding devices, overboard discharges and shell connections, keel cooler installations, fixed oxy-acetylene distribution piping, instrument control & sampling piping, diving support systems, low temperature piping, and diving support systems. It is not the intention of this document to completely reproduce all the CFR requirements for the specific systems mentioned above, therefore careful reference must be made to 46CFR 56.1 to 46CFR 56.110 for the specific system in question.

**USCG Reference**  
**46CFR 56.50-55**

**Specific Systems – Bilge Pumps**

**DNV Reference**  
**OS-D101 Ch. 2 Sec. 3,**  
**Sec. 4, Sec. 5**

**MODU Code**  
**Reference NONE**

Bilge pumps. Multi-hulled vessels require two means for pumping in each hull.

**USCG Reference**  
**46CFR 56.50-65 (b) (1)**

**Specific Systems – Oil Fired Boilers**

**DNV Reference**  
**OS-D101 Ch. 2 Sec. 3,**  
**Sec. 4, Sec. 5**

**MODU Code**  
**Reference NONE**

All vessels having oil fired boilers must have at least two fuel service pumps, each of sufficient capacity to supply all the boilers at full power, and arranged so that one may be overhauled while the other is in service. At least two fuel oil heaters of approximately equal capacity must be installed and so arranged that any heater may be overhauled while the other(s) is (are) in service. Suction and discharge strainers must be of the duplex or other type capable of being cleaned without interrupting the oil supply.

**USCG Reference**  
**46CFR 56.50-85**

**Specific Systems – Tank Vents for Fuel Oil Tanks**

**DNV Reference**  
**OS-D101 Ch. 2 Sec. 3,**  
**Sec. 4, Sec. 5**

**MODU Code**  
**Reference NONE**

Tank vent air pipes for fuel oil tanks must not be less than 2 ½ in. (63.5 mm).

**USCG Reference**  
**46CFR 56.60**

**Materials**

**DNV Reference**  
**OS-B101**

**MODU Code**  
**Reference NONE**

Replaces requirements of ASTM. Tables 56.60 -1(A) and -1(B) indicate standards to be used.

**USCG Reference**  
**46CFR 56.60**

**Limitations On Materials**

**DNV Reference**  
**OS-B101**

**MODU Code**  
**Reference NONE**

CFR has additional requirements. Requirements for ferrous, steel, cast and malleable iron, ductile iron and nonferrous materials are quoted in 56.60-25. Non-metallic piping must be approved by USCG and comply with 46CFR56.60-25.

**USCG Reference**  
**46CFR 56.65 – 56.97**

**Fabrication, Assembly and Erection**

**DNV Reference**  
**OS-C401**

**MODU Code**  
**Reference NONE**

USCG has requirements and criteria in 46CFR 56.70 through 46CFR 56.97. USCG requirements must be applied for welding, brazing, bending, forming, heat treatment, assembly, inspection and testing. Pressure testing may not be waived for small bore pipes. Pipes must be hydrostatically tested regardless of radiographic examination. Pressure testing of non-standard piping system components shall meet 46 CFR 56.97 – 5.

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<b>USCG Reference</b> <b>46CFR 56.70</b>	<b>Welding</b>	<b>DNV Reference</b> <b>OS-C401</b>	<b>MODU Code</b> <b>Reference NONE</b>
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Welding procedures are to be in accordance with the details found in 46 CFR 56.70 and ASME Section IX ( alternatively EN 288), respectively.

<b>USCG Reference</b> <b>46CFR 57</b>	<b>Welding And Brazing</b>	<b>DNV Reference</b> <b>OS-C401</b>	<b>MODU Code</b> <b>Reference NONE</b>
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USCG requirements are as per ASME IX (modified by CFR).

<b>USCG Reference</b> <b>46CFR 58.01-55</b>	<b>Main and Auxiliary Machinery and Related Systems</b>	<b>DNV Reference</b> <b>OS-D101</b>	<b>MODU Code</b> <b>Reference 4</b>
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General requirements are similar. Applicable standards are referenced in the CFR.

<b>USCG Reference</b> <b>46CFR 58.01</b>	<b>Fuel Tanks</b>	<b>DNV Reference</b> <b>OS-D101 Ch. 2 Sec 4D</b>	<b>MODU Code</b> <b>Reference 4</b>
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USCG has additional requirements as to location of fuel tanks.

<b>USCG Reference</b> <b>46CFR 58.03</b>	<b>Standards</b>	<b>DNV Reference</b> <b>OS-C401</b>	<b>MODU Code</b> <b>Reference 4</b>
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USCG references applicable standards.

<b>USCG Reference</b> <b>46CFR 58.20</b>	<b>Refrigeration Machinery</b>	<b>DNV Reference</b> <b>Rules for Classification of</b> <b>Ships Pt. 4 Ch. 1 Sec 3, Pt</b> <b>5 Ch. 10</b>	<b>MODU Code</b> <b>Reference NONE</b>
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USCG has requirements for refrigeration machinery.

<b>USCG Reference</b> <b>46CFR 58.25</b>	<b>Steering Gear</b>	<b>DNV Reference</b> <b>OS-D101 Ch. 2 Sec. 5C,</b> <b>Ship Rules Pt. 3 Ch. 3</b>	<b>MODU Code</b> <b>Reference 5</b>
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USCG has additional requirements for steering gear. Additional USCG requirements found in 46CFR 58.25 shall be applied.



<b>USCG Reference</b> <b>46CFR 58.30</b>	<b>Fluid Power and Control Systems</b>	<b>DNV Reference</b> <b>OS-D101 Ch.2 Sec. 4H</b>	<b>MODU Code</b> <b>Reference 4</b>
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USCG has requirements for fluid power and control systems.

<b>USCG Reference</b> <b>46CFR 58.50</b>	<b>Independent Fuel Tanks</b>	<b>DNV Reference</b> <b>OS-D101 Ch.2 Sec. 4D</b>	<b>MODU Code</b> <b>Reference 4</b>
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USCG has additional requirements for independent fuel tanks particularly gasoline tanks.

<b>USCG Reference</b> <b>46CFR 58.60-11/13</b>	<b>Industrial Systems</b>	<b>DNV Reference</b> <b>OS-E101</b>	<b>MODU Code</b> <b>Reference 6</b>
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USCG indicates drilling facilities as industrial systems. Analyses, plans, diagrams, and specifications must be analyzed by a registered Professional Engineer for criteria adherence and manifest safety.

<b>USCG Reference</b> <b>46CFR 61.05</b>	<b>Periodic Inspections</b>	<b>DNV Reference</b> <b>OSS-101 Ch. 3 Sec. 2</b>	<b>MODU Code</b> <b>Reference 1.6</b>
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USCG has requirements for periodic inspections of boilers, stem piping, pressure vessels, and associated equipment, as well as requirements for periodic hydrostatic testing.

<b>USCG Reference</b> <b>46CFR 61.15</b>	<b>Periodic Test of Piping Systems</b>	<b>DNV Reference</b> <b>OSS-101 Ch. 3 Sec. 2</b>	<b>MODU Code</b> <b>Reference 1.6</b>
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USCG has additional requirements for periodic test and inspection of relief valves and piping systems. Liquefied petroleum gas piping for heating and cooking and non-metallic expansion joints are subject to specific regulations.

<b>USCG Reference</b> <b>46CFR 61.20</b>	<b>Steering Gear and Tailshaft Inspections</b>	<b>DNV Reference</b> <b>OSS-101 Ch. 3 Sec. 2F</b>	<b>MODU Code</b> <b>Reference 7, 8</b>
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USCG has requirements for inspection of tailshafts, and additionally quotes acceptable clearances.

<b>USCG Reference</b> <b>46CFR 61.35</b>	<b>Design Verification and Periodic Testing for Automatic Auxiliary Boilers</b>	<b>DNV Reference</b> <b>OSS-101 Ch. 3 Sec. 2, OS-D101 Ch .2 Sec. 5 B</b>	<b>MODU Code</b> <b>Reference 1.6</b>
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USCG has requirements for periodic inspections of automatic auxiliary boilers.

**USCG Reference  
46CFR 61.40**

**Design Verification and Periodic Testing of Vital System  
Automation**

**DNV Reference  
OS-D202**

**MODU Code  
Reference 1.6, 7, 8**

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

The systems to which these requirements apply include

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

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

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

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

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

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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.

<b>USCG Reference</b> <b>46 CFR 62.20 – 3 (a) (2)</b>	<b>Planned Maintenance for Unattended Machinery Space</b>	<b>DNV Reference</b> <b>OS-D202</b>	<b>MODU Code</b> <b>Reference 7, 8</b>
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A planned maintenance program is required for all vital systems. This is covered by the E0 notation (and by the ISM Code).

<b>USCG Reference</b> <b>46 CFR 62.25 – 20 (d) (4)</b>	<b>Engineers Alarms for Unattended Machinery Space</b>	<b>DNV Reference</b> <b>OS-D202</b>	<b>MODU Code</b> <b>Reference 7, 8</b>
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Flooding safety, fire, loss of power and engineer's assistance-needed alarms extended from the machinery spaces to a remote location must not have a duty crewmember selector.

<b>USCG Reference</b> <b>46CFR 62.30 – 5 (b) (2)</b>	<b>Alarm and Monitoring for Unattended Machinery Space</b>	<b>DNV Reference</b> <b>OS-D202</b>	<b>MODU Code</b> <b>Reference 7, 8</b>
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Independent sensors are not required except that sensors for primary speed, pitch or direction of rotation control in closed loop propulsion control systems must be independent and physically separate from required safety control, alarm or instrumentation sensors.

<b>USCG Reference</b> <b>46 CFR 62.35 – 5 (e)</b>	<b>Controls for Unattended Machinery Space</b>	<b>DNV Reference</b> <b>OS-D202</b>	<b>MODU Code</b> <b>Reference 7, 8</b>
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Control system details: Each operator control device must have a detent at the zero thrust position.

<b>USCG Reference</b> <b>46 CFR 62.35 – 15 (a)</b>	<b>Fire Pump Remote Control</b>	<b>DNV Reference</b> <b>OS-D202</b>	<b>MODU Code</b> <b>Reference 7, 8</b>
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All required fire pump remote control locations must include the controls necessary to charge the fire main and -

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

<b>USCG Reference</b> <b>46CFR 62.25</b>	<b>Automated Vital Systems</b>	<b>DNV Reference</b> <b>OS-D202</b>	<b>MODU Code</b> <b>Reference 7, 8</b>
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USCG has requirements for controls to be in accordance with CFR specifications.

<b>USCG Reference</b> <b>46CFR 62.25-30</b>	<b>Environmental Standards</b>	<b>DNV Reference</b> <b>OS-D202</b>	<b>MODU Code</b> <b>Reference 7, 8</b>
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USCG has requirements for environmental standards in 46 CFR 62.25-30 which must be complied with. Extensive fines may be imposed by parties involved in non-compliant activities or practices.

<b>USCG Reference</b> <b>46CFR 62.30</b>	<b>Reliability and Safety Criteria, All Automated Vital Systems</b>	<b>DNV Reference</b> <b>OS-D202</b>	<b>MODU Code</b> <b>Reference 7, 8</b>
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USCG has requirements for reliability and safety criteria with regard to redundancy. Independent sensors are not required except that sensors for primary speed, pitch, and direction of rotation control in closed loop propulsion control systems must be independent and physically separate from required safety control, alarm, or instrumentation sensors.

<b>USCG Reference</b> <b>46CFR 62.30</b>	<b>Specific Automated Vital Systems</b>	<b>DNV Reference</b> <b>OS-D202</b>	<b>MODU Code</b> <b>Reference 7, 8</b>
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USCG has requirements for remote propulsion control, controls with respect to flooding safety, fire safety, oil fired main boilers, starting systems for internal combustion engines, and fuel systems. Note that requirements for starting systems for propulsion machinery and ship service generator are to be in accordance with CFR specifications.

<b>USCG Reference</b> <b>46CFR 62.35-50</b>	<b>Specific Automated Vital Systems</b>	<b>DNV Reference</b> <b>OS-D202</b>	<b>MODU Code</b> <b>Reference 7, 8</b>
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Specification of automated vital systems must meet the CFR requirements in Table 46CFR 62.35-50.

<b>USCG Reference</b> <b>46CFR 62.50-20 and -30</b>	<b>Automated Self Propelled Vessel Manning</b>	<b>DNV Reference</b> <b>OSS-101 Ch. 2 Sec. 6M</b> <b>Rules for Classification of</b> <b>Ships Part 6 Ch. 3</b>	<b>MODU Code</b> <b>Reference 8</b>
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Units applying the USCG for minimally attended machinery plants in accordance with 46 CFR 65.50-20 shall satisfy the additional class notation E0, Ship Rules Pt.6 Ch.3 with the following additions:

- Navigating bridge propulsion control must be provided
- A personnel alarm must be provided and must annunciate on the bridge if not routinely acknowledged neither at the centralized control station nor in the machinery spaces
- For minimally attended machinery plants (ECO) all required audible alarms must annunciate throughout the engineering control center and machinery spaces.
- Fire detection and alarms. For minimally attended machinery plants (ECO) an approved automatic fire detection and alarm system must be provided to monitor all machinery spaces. The system must activate all alarms at the engineering control center, the navigating bridge, and throughout the

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machinery spaces and engineers' accommodations. The engineering control center and bridge alarms must visually indicate which machinery space is on fire, as applicable. Note: For purposes of this part, the specific location of fires that are not in machinery spaces need not be indicated.

- Control of the fire pumps such that:
  - The centralized control station must include control of the main machinery space fire pumps.
  - Remote control of a required fire pump must be provided from the navigating bridge.

Where one or more fire pumps is required to be independent of the main machinery space, at least one such pump must be controlled from the navigating bridge

- Electrical systems. For minimally attended machinery plants (ECO) the engineering control center must include the controls and instrumentation necessary to place the ship service and propulsion generators in service in 30 seconds. The main distribution and propulsion switchboards and generator controls must either be located at the engineering control center, if the engineering control center is within the boundaries of the main machinery space, or the controls and instrumentation must be duplicated at the engineering control center. Controls at the switchboard must be able to override those at the engineering control center, if separate.

NVIC 1-69, which deals with implication of manning issues as a result of having or not having automation, applies.

<b>USCG Reference</b> <b>46CFR 63.15</b>	<b>Automatic Auxiliary Boilers</b>	<b>DNV Reference</b> <b>OS-D101 Ch. 2 Sec. 5</b>	<b>MODU Code</b> <b>Reference 4.1.3</b>
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USCG references applicable standards. USCG has requirements for fuel system, strainers, alarms, inspections and tests, and control systems.

<b>USCG Reference</b> <b>46CFR 63.20-1</b>	<b>Automatic Auxiliary Boilers</b>	<b>DNV Reference</b> <b>OS-D101 Ch. 2 Sec. 5</b>	<b>MODU Code</b> <b>Reference 4.1.3</b>
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Primary safety control system. Following emergency safety trip control operation, the airflow to the boiler must not automatically increase. For this condition post-purge must be accomplished manually

Float chamber low water cut-off controls using stuffing boxes to transmit the motion of the float from the chamber to the external switches are prohibited.

<b>USCG Reference</b> <b>46CFR 63.25</b>	<b>Specific Types of Automatic Auxiliary Boilers</b>	<b>DNV Reference</b> <b>OS-D101 Ch. 2 Sec. 5</b>	<b>MODU Code</b> <b>Reference 4.1.3</b>
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USCG has detailed additional requirements in 46CFR 63.25 for different types of automatic auxiliary boilers, i.e. small automatic auxiliary boilers, electric hot water supply boilers, fired thermal fluid heaters, exhaust gas boilers, and incinerators. It is not the intention of this document to reproduce all the CFR requirements for the specific systems mentioned above, therefore careful reference must be made to 46CFR 63.25 for the specific type of boiler in question.

## SUBCHAPTER 1-A – MOBILE OFFSHORE DRILLING UNITS

### Part 108 - Design and Equipment

#### Subpart B – Construction and Arrangement

<b>USCG Reference</b> <b>46CFR108.113</b>	<b>Structural Standards</b>	<b>DNV Reference</b> <b>OS-C101/OS-C201</b>	<b>MODU Code</b> <b>Reference 2</b>
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USCG has requirements for Structural design to be in accordance with specific standards.

#### Structural Fire Protection

<b>USCG Reference</b> <b>46CFR108.131(f)</b>	<b>Accommodation Spaces</b>	<b>DNV Reference</b> <b>OS-D301 Ch. 1 Sec. 1</b> <b>C205</b>	<b>MODU Code</b> <b>Reference 9.1.4</b>
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Corridors are classed as accommodation spaces

<b>USCG Reference</b> <b>46CFR108.137</b>	<b>Bulkhead and Deck Separations of Accommodation Spaces</b>	<b>DNV Reference</b> <b>OS-D301 Ch. 2 Sec. 1</b> <b>C202</b>	<b>MODU Code</b> <b>Reference 9.1.4</b>
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Each boundary and deck that separates any accommodation space from a main pantry or any store must be Class A.

<b>USCG Reference</b> <b>46CFR108.143</b>	<b>Accommodation Spaces</b>	<b>DNV Reference</b> <b>OS-D301 Ch. 2 Sec. 1</b> <b>C202</b>	<b>MODU Code</b> <b>Reference 9.1.4</b>
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Each corridor in an accommodation space must be a class A or class B bulkhead.

No door in a corridor bulkhead in an accommodation space may have a louver except that a stateroom, lounge, or recreation room door may have a louver in its lower half.

<b>USCG Reference</b> <b>46CFR108.147</b>	<b>Certain Paint Products</b>	<b>DNV Reference</b> <b>OS-D301 Ch. 2 Sec. 1</b> <b>C310</b>	<b>MODU Code</b> <b>Reference 9.2.10</b>
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No nitrocellulose or other highly flammable or noxious fume producing paint or lacquer may be used on a unit

### Classified Locations

<b>USCG Reference</b> <b>46CFR108.170 - 108.175</b>	<b>Class I, Division 1 Locations</b>	<b>DNV Reference</b> <b>OS-A101 Sec. 4 B102</b>	<b>MODU Code</b> <b>Reference 6.2</b>
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Similar to Zone 0 and 1 as specified in DNV Rules and MODU Code.

An enclosed space that has an opening into a class I Division 1 location is classed as a Class I, Division 1 space except if the space has the following arrangements in which case it can be classed as non-hazardous:

- if the space has self closing gas tight doors that forms an air lock
- ventilation pressure is greater in the space
- the loss of ventilation pressure activates an alarm in a manned space

as provided by MODU code and DNV regulations.

NOTES: (1)see also 46CFR111.105

(2) For specific requirements for machinery and electrical installations on mobile offshore drilling units see Subchapters “F” and “J”

<b>USCG Reference</b> <b>46CFR108.170 - 108.175</b>	<b>Class I, Division 2 Location</b>	<b>DNV Reference</b> <b>OS-A101 Sec. 4 B102</b>	<b>MODU Code</b> <b>Reference 6.2</b>
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Similar to Zone 2 as specified in DNV Rules and MODU Code

An enclosed space that has an opening into a class I Division 2 location is classed as a Class I, Division 2 space except if the space has:-

- if the space has self closing gas tight doors that opens into the space and that has no hold backs
- ventilation pressure is greater in the space
- the loss of ventilation pressure activates an alarm in a manned space

As provided by MODU code and DNV regulations.

NOTES: (1)see also 46CFR111.105

(2) For specific requirements for machinery and electrical installations on mobile offshore drilling units see Subchapters “F” and “J”

<b>USCG Reference</b> <b>46CFR108.175</b>	<b>Contiguous Locations</b>	<b>DNV Reference</b> <b>OS-A101 Sec. 4 C103, OS-D201 Ch. 2 Sec. 11 C205</b>	<b>MODU Code</b> <b>Reference 6.2</b>
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An enclosed space that has a direct access into a Division 2 location can be classed as non hazardous if, in addition to meeting the requirements in the MODU code, the gas tight door has no hold back.

### Ventilation

<b>USCG Reference</b> <b>46CFR108.181 (c)</b>	<b>Ventilation for Enclosed Spaces</b>	<b>DNV Reference</b> <b>OS-A101 Sec. 4 C402</b>	<b>MODU Code</b> <b>Reference 6</b>
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Each fan in a ventilating system must have controls installed in accordance with 111.103

<b>USCG Reference</b> <b>46CFR108.185 (a)</b>	<b>Ventilation In Enclosed Classified Spaces</b>	<b>DNV Reference</b> <b>OS-A101 Sec. 4 C402</b>	<b>MODU Code</b> <b>Reference 6</b>
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Each unit must have alarms that are powered independently of the ventilation motor power and control circuitry and sound at a controlled station when the ventilation for the space is not working

<b>USCG Reference</b> <b>46CFR108.187</b>	<b>Ventilation motors</b>	<b>DNV Reference</b> <b>OS-D201 Ch. 2 Sec. 11</b>	<b>MODU Code</b> <b>Reference 6.6</b>
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Ventilation for brush type electric motors in classified locations are to comply with N.F.P.A. 496-1974 “Standard for Purged and Pressurized Enclosures for Electrical Equipment in Hazardous Locations”, except that visual and audible alarm may be used instead of shutting down, if shutting down of motors may cause unsafe conditions

### Helicopter Facilities

<b>USCG Reference</b> <b>46CFR108.237</b>	<b>Helicopter fuel storage</b>	<b>DNV Reference</b> <b>OS-D101 Ch. 2 Sec. 3F</b> <b>OS-D301 Ch. 2 Sec. 5</b> <b>D106</b>	<b>MODU Code</b> <b>Reference 9.11</b>
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Independent tanks must meet subpart 58.50 of this chapter. Marine portable fuel stowage tanks must meet part 64 of this chapter.

<b>USCG Reference</b> <b>46CFR108.239</b>	<b>Fuel transfer equipment</b>	<b>DNV Reference</b> <b>OS-D101 Ch. 2 Sec. 3F</b>	<b>MODU Code</b> <b>Reference 9.11</b>
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- Each hose must have a storage reel
- Each electric fuel transfer pump must have a control with a fuel transfer pump operation indicator light at the pump.
- Each hose must meet chapter 3 “aircraft fuelling hose” of national fire protection association standard for aircraft fuel servicing (NFPA 407-1975).

### Subpart D – Fire Extinguishing Systems

<b>USCG Reference</b> <b>46CFR108.403</b>	<b>Fire extinguishing systems</b>	<b>DNV Reference</b> <b>OS-D301 Ch. 2 Sec. 2B</b>	<b>MODU Code</b> <b>Reference 9.5</b>
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Each unit must have a USCG approved fixed gaseous type extinguishing system for:

- Paint locker
- Each enclosed ventilation system for electric motors or generators used for vital services including bilge pumps, fire pumps or propulsion



<b>USCG Reference</b> <b>46CFR108.403 (a)</b>	<b>Fire extinguishing Systems for Non-Vital Services</b>	<b>DNV Reference</b> <b>OS-D301</b>	<b>MODU Code</b> <b>Reference 9.5</b>
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Each enclosed ventilation system for electric motors or generators not used for vital services must have access into the system for fire fighting or be protected by a fixed fire protection system

<b>USCG Reference</b> <b>46CFR108.404</b>	<b>Selection of Fire Detection system</b>	<b>DNV Reference</b> <b>OS-D301</b>	<b>MODU Code</b> <b>Reference 9.5</b>
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- If a fire detector is in a space, it must provide effective detection of fires most likely to occur in the space.
- The fire detection system must be designed to minimize false alarms.

<b>USCG Reference</b> <b>46CFR108.405</b>	<b>Fire Detection System</b>	<b>DNV Reference</b> <b>OS-D301</b>	<b>MODU Code</b> <b>Reference 9.5</b>
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Each fire detection system and each smoke detection system on a unit must:

- Be approved by the Commandant, USCG Marine Safety Center.
- Have a visual alarm and an audible alarm in the pilothouse or at a normally manned control station for the system.
- Each fire detection system must be divided into zones to limit the area covered by any particular alarm signal.

Each visual alarm must:

- Have a chart or diagram next to the alarm that shows the location of the zones in the system and that contains the instructions for operating, and testing the system
- When activated show the zone in the system where fire has been detected
- Be in a noticeable location in the pilothouse or control station.

### **Fire Main System**

<b>USCG Reference</b> <b>46CFR108.417</b>	<b>Fire Pumps, Components and Associated Equipment</b>	<b>DNV Reference</b> <b>OS-D301 Ch. 2 Sec. 3</b> <b>B200</b>	<b>MODU Code</b> <b>Reference 9.4.5</b>
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- Each fire pump in a fire main system must have a relief valve on its discharge side that is set to relieve at 1.75 kilograms per square centimeter (approximately 25 pounds per square inch) in excess of the pump discharge pressure necessary to meet the pressure required in Sec. 108.415 for the pump or 8.6 kilograms per square centimeters (approximately 125 pounds per square inch), whichever is greater.
- Each pump in the mains system must have a pressure gauge on its discharge side.
- If a fire pump is used in a system other than the fire main system, except for branch lines connected to the fire main for deck washing, each pipe connecting the other system must be connected to the pump discharge through a shut off valve at a manifold near the pump. If the fire pump exceeds the

pressure in 108.417, the pipe leading from the discharge manifold to other portions of the fire main system must have a reducing station and a pressure gauge in addition to the pressure gauge required above.

- If the fire pump has a reducing station, the relief valve required for the pump and the additional pressure gauge required must not be located on the discharge side of the reducing station.
- An oil line must not be connected to a fire pump.

**USCG Reference**  
**46CFR108.423 (c)**

**Fire Hydrants and Associated Equipment**

**DNV Reference**  
**OS-D301 Ch. 2 Sec. 3**  
**B600**

**MODU Code**  
**Reference 9.4**

No outlet on a fire hydrant may point above the horizontal

**USCG Reference**  
**46CFR108.425**

**Fire Hoses and Associated Equipment**

**DNV Reference**  
**OS-D301 Ch. 2 Sec. 3**  
**B600**

**MODU Code**  
**Reference 9.4**

Each length of fire hose in fire main system must be:

- 1½ or 2½ inch nominal hose size diameter
- Lined commercial fire hose that meets the Standard 19 of the Underwriters' Laboratories Inc. or Federal Specification ZZ-H451f

Fire station hydrant connections shall be brass, bronze or other equivalent metal. Couplings shall meet National Standard fire hose coupling threads for the 1½ inch and 2½ inch hose sizes i.e. 9 threads per inch and 7½ threads per inch respectively.

Fire hoses nozzles are to be USCG approved under 46 CFR 162.027. Combination solid stream and water spray nozzles previously approved under 46 CFR 162.027 must have low velocity applicator also previously approved under subpart 162.027 when installed in machinery spaces containing oil-fired boilers, internal combustion machinery or oil fired fuel units.

**Carbon Dioxide Fire Extinguishing Systems**

**USCG Reference**  
**46CFR108.431**

**Carbon Dioxide System - General**

**DNV Reference**  
**OS-D301 Ch. 2 Sec. 3**  
**B800**

**MODU Code**  
**Reference 9.5**  
**(SOLAS II-2/5 & 13)**

- Sections 108.431 through 108.457 apply to high pressure carbon dioxide fire extinguishing systems.
- Low pressure systems, that is, those in which the carbon dioxide is stored in liquid form at low temperature, must be approved by the Commandant.
- Each carbon dioxide system cylinder must be fabricated, tested, and marked in accordance with Sec. Sec. 147.60 and 147.65 of this chapter.

**USCG Reference**  
**46CFR108.433**

**Quantity of CO2: General**

**DNV Reference**  
**OS-D301 Ch. 2 Sec. 3**  
**B800**

**MODU Code**  
**Reference 9.5**  
**(SOLAS II-2/5 & 13)**

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Each CO2 system must have enough gas to meet the quantity requirements of Sec. 108.439 for the space requiring the greatest amount of CO2.

<b>USCG Reference</b> <b>46CFR108.437</b>	<b>Pipe Size and Discharge Rates For enclosed Ventilation Systems for Rotating Electrical Equipment</b>	<b>DNV Reference</b> <b>OS-D301 Ch. 2 Sec. 2</b>	<b>MODU Code Reference 9.5</b> <b>(SOLAS II-2/5 &amp; 13)</b>
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Minimum pipe size should meet table 108.441 for the initial charge and the discharge of the required amount of CO2 must be completed within 2 minutes.

The pipe used for delayed discharge must be at least ½ inch (1.25 cm) standard pipe

The pipe used for the initial discharge must not be used for the delayed discharge, except systems having a volume less than 57 m<sup>3</sup>.

<b>USCG Reference</b> <b>46CFR108.439</b>	<b>Quantity of CO2</b>	<b>DNV Reference</b> <b>OS-D301 Ch. 2 Sec. 2</b>	<b>MODU Code Reference 9.5</b> <b>(SOLAS II-2/5 &amp; 13)</b>
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- The number of pounds of CO2 required to protect a space must be equal to the gross volume of the space divided by the appropriate factor from Table 108.439.
- If a machinery space includes a casing, the gross volume of the space may be calculated using the reductions allowed in 46 CFR 95.10-5(e).
- If fuel can drain from a space to an adjacent space or if two spaces are not entirely separate, the requirements for both spaces must be used to determine the amount of CO2 to be provided and the CO2 system must be arranged to discharge into both spaces simultaneously.

Table 108.439--CO2 Supply Factors  
[Gross volume of space in cubic feet]

Over	Not over	Factor
0	500	15
500	1,600	16
1,600	4,500	18
4,500	50,000	20
50,000	-	22

<b>USCG Reference</b> <b>46CFR108.441</b>	<b>Piping and Discharge Rates for CO2 systems</b>	<b>DNV Reference</b> <b>OS-D301 Ch. 2 Sec. 2</b>	<b>MODU Code Reference 9.5</b> <b>(SOLAS II-2/5 &amp; 13)</b>
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- The size of branch lines to spaces protected by a CO2 system must meet Table 108.441.
- Distribution piping within a space must be proportioned from the supply line to give proper distribution to the outlets without throttling.
- The number, type, and location of discharge outlets must distribute the CO2 uniformly throughout the space.

Table 108.441--CO2 System Pipe Size

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CO2 supply in system, kilograms (pounds)	Minimum pipe size, Millimeters (inches)
45 (100)	12.7 ( ½ )
104 (225)	19.05 ( ¾ )
136 (300)	25.4 (1)
272 (600)	31.75 (1 ¼)
450 (1,000)	38.10 (1 ½)
1,110 (2,450)	50.80 (2)
1,130 (2,500)	63.5 (2 ½)
2,023 (4,450)	76.2 (3)
3,229 (7,100)	88.9 (3 ½)
4,750 (10,000)	101.6 (4)
6,818 (15,000)	114.3 (4 ½)

The total area of all discharge outlets must be more than 35 percent and less than 85 percent of the nominal cylinder outlet area or the area of the supply pipe, whichever is smaller. The nominal cylinder outlet area in square centimeters is determined by multiplying the factor 0.0313 by the number of kilograms of CO2 required. (The nominal cylinder outlet area in square inches is determined by multiplying the factor 0.0022 by the number of pounds of CO2 required). The nominal cylinder outlet area must not be less than 71 square millimeters (0.110 square inches). (Note that 85% of the required amount of CO2 must be discharged within two minutes as required by the FSS Code referred to by SOLAS and thus by MODU Code).

**USCG Reference**  
**46CFR108.443**

**Controls and Valves**

**DNV Reference**  
**OS-D301 Ch. 2 Sec. 2**

**MODU Code**  
**Reference 9.5**  
**(SOLAS II-2/5 & 13)**

At least one control for operating a CO2 system must be outside the space or spaces that the system protects and in a location that would be accessible if a fire occurred in any space that the system protects. Control valves must not be located in a protected space unless the CO2 cylinders are also in the protected space.

A CO2 system that protects more than one space must have a manifold with a stop valve, the normal position of which is closed, that directs the flow of CO2 to each protected space.

A CO2 system that protects only one space must have a stop valve installed between the cylinder and the discharge outlets in the system, except on a system that has a CO2 supply of 136 kg (300 lbs) or less

At least one of the control stations in a CO2 system that protects a machinery space must be as near as practical to one of the main escapes from the space.

All distribution valves and controls must be of an approved type.

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Each CO2 system that has a stop valve must have a remote control that operates only the stop valve and must have a separate remote control for releasing the required amount of CO2 into the space protected by the system.

Each CO2 system that does not have a stop valve must be operated by a remote control that releases the required amount of CO2 into the space protected by the system.

Remote controls to each space must be in an enclosure.

Each system must have a manual control at its cylinder for releasing CO2 from the cylinder, except that if the system has a pilot cylinder, a manual control is not required for other than the pilot cylinders.

For CO2 systems that use more than two cylinders and rely on gas pressure for release, the system must have at minimum two pilot cylinders to release the CO2 from the remaining cylinders.

If the entrance to a space containing the CO2 supply or controls of a CO2 system has a lock, the space must have a key to the lock in a break-glass type box that is next to and visible from the entrance.

**USCG Reference**  
**46CFR108.445**

**Alarms and Means of Escape**

**DNV Reference**  
**OS-D301 Ch. 2 App. A**  
**C206**

**MODU Code**  
**Reference 9.3**  
**(SOLAS II-2/5 & 13)**

Each CO2 system that has a supply of more than 136 kilograms (300 pounds) of CO2, except a system that protects a tank, must have an alarm that sounds for at least 20 seconds before the CO2 is released into the space.

Each audible alarm for a CO2 system must have the CO2 supply for the system as its source of power and must be in a visible location in the spaces protected.

**USCG Reference**  
**46CFR108.447**

**Piping**

**DNV Reference**  
**OS-D301 Ch. 2 Sec. 2**

**MODU Code**  
**Reference 9**  
**(SOLAS II-2/5 & 13)**

Each pipe, valve, and fitting must have a bursting pressure of at least 6000 psi.

All piping for a CO2 of nominal size of 3/4" inside diameter or less must be at least Schedule 40 and all piping of nominal size over 3/4" inside diameter must be at least Schedule 80.

Each pipe, valve and fitting made of ferrous metal in a CO2 system must be protected inside and outside from corrosion.

Each CO2 system must have relief valves set to relieve the system between 2,400 and 2,800 psi in the distribution manifold or in a location that protects the piping when all branch lines shut off valves are closed.

The end of each branch line must extend at least 2 ins beyond the last discharge outlet and be closed with a cap or plug

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Pipes valves and fitting must be securely supported

Each system must have a dirt trap and drain located where dirt and moisture can accumulate

Discharge piping is not to be used for any means other than intended

Piping passing through accommodation must not have any drains or other opening within these spaces.

**USCG Reference**  
**46CFR108.449**

**Piping Tests**

**DNV Reference**  
**OS-D101 Ch. 2 Sec. 6**

**MODU Code**  
**Reference 4**

Each test prescribed below must be performed upon completion of the piping installation.

When tested with CO<sub>2</sub> or other inert gas under a pressure of 70 kilograms per square centimeter (1000 pounds per square inch), with no additional gas introduced into the system, the leakage in the piping from the cylinders to the stop valves in the manifold must not allow a pressure drop of more than 10.5 kilograms per square centimeter (150 pounds per square inch) per minute for a 2 minute period.

When tested with CO<sub>2</sub> or other inert gas under a pressure of 42 kilograms per square centimeter (600 pounds per square inch), with no additional gas introduced into the system, the leakage in each branch line must not allow a pressure drop of more than 10.5 kilograms per square centimeter (150 pounds per square inch) per minute for a 2-minute period. The distribution piping must be capped within the protected space.

Small independent systems protecting emergency generator rooms, lamp lockers and similar small spaces need not meet the tests prescribed in this section if they are tested by blowing out the piping with air at a pressure of at least 7 kilograms per square centimeter (100 pounds per square inch).

**USCG Reference**  
**46CFR108.451**

**CO<sub>2</sub> Storage**

**DNV Reference**  
**OS-D301 Ch. 2 App A**  
**Rules for Classification of**  
**Ships Pt. 4 Ch. 6 Sec. 3**

**MODU Code**  
**Reference 9**  
**SOLAS II-2.5**

Systems that contain CO<sub>2</sub> of 300lbs or less may be stored in the area they protect providing the space has a heat detection system that will activate the system automatically. This will be in addition to the remote and manual control discussed in 108.443

Cylinders may not be mounted in a position greater than 30 degrees from the vertical except when a cylinder has bent or flexible siphon tubes where it can be inclined up to 80 degrees from the vertical. The bottom of the cylinders must be at least 2 inches (5 cm) from the deck.

If the cylinder does not have a check valve on its independent cylinder discharge, it must have a plug or cap to close the outlet when the cylinder is moved.

**USCG Reference**  
**46CFR108.453**

**CO<sub>2</sub> Discharge Outlets**

**DNV Reference**  
**OS-D301**

**MODU Code**  
**Reference 9**  
**SOLAS II-2.5**

Each discharge outlet must be of a USCG approved type.

<b>USCG Reference</b> <b>46CFR108.455</b>	<b>Enclosure Openings</b>	<b>DNV Reference</b> <b>OS-D301</b>	<b>MODU Code</b> <b>Reference 9</b> <b>SOLAS II-2.5</b>
	<ul style="list-style-type: none"><li>• Mechanical ventilation for spaces protected by a CO2 system must be designed to shut down automatically when the system is activated.</li><li>• Each space that is protected by a CO2 system and that has natural ventilation must have a means for closing that ventilation.</li><li>• Each space protected by a CO2 system must have the following means for closing the openings to the space from outside the space:<ul style="list-style-type: none"><li>• Doors, shutters, or dampers for closing each opening in the lower portion of the space.</li><li>• Doors, shutters, dampers or temporary means such as canvas or other material normally on board a unit may be used for closing each opening in the upper portion of the space.</li></ul></li></ul>		

<b>USCG Reference</b> <b>46CFR108.457</b>	<b>Pressure Release</b>	<b>DNV Reference</b> <b>OS-D301 Ch. 2 Sec. 2</b>	<b>MODU Code</b> <b>Reference 9</b> <b>(SOLAS II-2/5 &amp; 13)</b>

Each air tight and vapour tight space such as a paint locker, that is protected by a CO2 system must have a means of relieving pressure if CO2 is discharged into the space.

### Foam Extinguishing Systems

<b>USCG Reference</b> <b>46CFR108.459</b>	<b>Number and Location of Outlets</b>	<b>DNV Reference</b> <b>OS-D301 Ch. 2 Sec. 2</b>	<b>MODU Code</b> <b>Reference 9.5</b> <b>(SOLAS II-2/9)</b>

A foam extinguishing system in a space must have enough outlets to spread a layer of foam of uniform thickness over the deck or bilge areas of the space.  
A foam extinguishing system in a space that has a boiler on a flat that is open to or can drain into a lower portion of the space must have enough outlets to spread a layer of foam of uniform thickness over the:

- Flat; and
- Deck or bilge areas of the space.

A foam extinguishing system for a tank must have enough outlets to spread a layer of foam of uniform thickness over the surface of the liquid in the tank.

<b>USCG Reference</b> <b>46CFR108.461</b>	<b>Coamings</b>	<b>DNV Reference</b> <b>OS-D301 Ch. 2 Sec. 2</b>	<b>MODU Code</b> <b>Reference 9.5</b> <b>(SOLAS II-2/9)</b>

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Each machinery flat in a space that has a foam extinguishing system must have coamings that are high enough to retain spilled oil and foam on the flat on all openings except deck drains.

**USCG Reference**  
**46CFR108.463**

**Foam Rate: Protein**

**DNV Reference**  
**OS-D301 Ch. 2 Sec. 2**

**MODU Code**  
**Reference 9.5**  
**(SOLAS II-2/9)**

If the outlets of a protein foam extinguishing system are in a space, the foam rate at each outlet must be at least 6.52 liters per minute for each square meter (.16 gallons per minute for each square foot) of area covered by the systems.

If the outlets of a protein foam extinguishing system are in a tank, the foam rate at each outlet must be at least 4.07 liters per minute for each square meter (.1 gallon per minute for each square foot) of liquid surface in the tank.

**USCG Reference**  
**46CFR108.467**

**Water Supply**

**DNV Reference**  
**OS-D301 Ch. 2 Sec. 2**

**MODU Code**  
**Reference 9.5**  
**(SOLAS II-2/9)**

The water supply of a foam extinguishing system must not be the water supply of the fire main system on the unit unless when both systems are operated simultaneously:

- The water supply rate to the foam production equipment meets the requirements of 46CFR 108.467; and
- Water supply rate to the fire hydrants required by 46CFR 108.415 of this subpart allows compliance with the pressure requirement in that section.

**USCG Reference**  
**46CFR108.469**

**Quantity of Foam Producing Materials**

**DNV Reference**  
**OS-D301 Ch. 2 Sec. 2**

**MODU Code**  
**Reference 9.5**  
**(SOLAS II-2/9)**

Except as provided in paragraph (b) of 46CFR108.469, each foam extinguishing system with outlets:

- In a tank must have enough foam producing material to discharge foam for at least 5 minutes at each outlet; and
- In a space must have enough foam producing material to discharge foam for at least 3 minutes at each outlet.

If a foam system has outlets in more than one tank or space, the system need have only enough foam producing material to cover the largest space that the system covers or, if the liquid surface of a tank covered by the system is larger, the tank with the largest liquid surface.

**USCG Reference**  
**46CFR108.471**

**Water Pump**

**DNV Reference**  
**OS-D301 Ch. 2 Sec. 2**

**MODU Code**  
**Reference 9.5**  
**(SOLAS II-2/9)**

Each water pump in a foam extinguishing system must be outside each machinery space in which the system has outlets and must not receive power from any of those spaces.



**USCG Reference**  
**46CFR108.473**

**Foam System Components**

**DNV Reference**  
**OS-D301 Ch. 2 Sec. 2**

**MODU Code**  
**Reference 9.5**  
**(SOLAS II-2/9)**

Each foam agent, each tank for a foam agent, each discharge outlet, each control, and each valve for the operation of a foam extinguishing system must be approved by the Commandant.  
Each foam agent tank and each control and valve for the operation of a foam extinguishing system with outlets in a space must be outside the space and must not be in a space that may become inaccessible if a fire occurs in the space.  
Each control for a foam extinguishing system with outlets in a space must be near a main escape from the space.

**USCG Reference**  
**46CFR108.474**

**Aqueous Film Forming Foam Systems**

**DNV Reference**  
**OS-D301 Ch. 2 Sec. 2**

**MODU Code**  
**Reference 9.5**  
**(SOLAS II-2/9)**

Aqueous Film Forming Foam Systems may be installed if approved by the Commandant, USCG Marine Safety Center.

**USCG Reference**  
**46CFR108.475**

**Piping**

**DNV Reference**  
**OS-D301 Ch. 2 Sec. 2**

**MODU Code**  
**Reference 9**  
**(SOLAS II-2/5 & 13)**

The foam system must have:

- Dirt traps to prevent accumulation of dirt
- Drains to remove liquid from the system

**USCG Reference**  
**46CFR108.477**

**Fire Hydrants**

**DNV Reference**  
**OS-D301 Ch. 2 Sec. 3**

**MODU Code**  
**Reference 9**  
**(SOLAS II-2/5 & 13)**

If a fixed foam extinguishing system has outlets in a main machinery space, at least 2 fire hydrants, in addition to the fire hydrants required by 46CFR108.423 of this subpart, must be installed outside the entrances to the space with each at a separate entrance.  
Each hydrant must have enough hose to spray any part of the space.  
Each hydrant must have a combination nozzle and applicator.

**Fire Protection For Helicopter Facilities**

**USCG Reference**  
**46CFR108.486**

**Helicopter Decks**

**DNV Reference**  
**OS-D301 Ch. 2 Sec. 3**

**MODU Code**  
**Reference 9**  
**(SOLAS II-2/5 & 13)**

At least two of the accesses to the helicopter landing deck must each have a fire hydrant on the unit's fire main system located next to them.

<b>USCG Reference</b> <b>46CFR108.487</b>	<b>Helicopter Deck Fuelling Operations</b>	<b>DNV Reference</b> <b>OS-D301 Ch. 2 Sec. 5 D</b>	<b>MODU Code</b> <b>Reference 9.11</b>
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Operating controls must be located at each of the hose locations and be protected from icing and freezing. The system must be capable of operation within 10 seconds after the activation of the controls.

<b>USCG Reference</b> <b>46CFR108.489</b>	<b>Helicopter Fueling Facilities</b>	<b>DNV Reference</b> <b>OS-D301 Ch. 2 Sec. 5 D</b>	<b>MODU Code</b> <b>Reference 9.11</b>
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If the fire protection system covers both the helicopter fuelling facility and landing deck, the quantity of agents provided must be sufficient to cover both areas.

### Hand Portable and Semi-portable Extinguishers

<b>USCG Reference</b> <b>46CFR108.491</b>	<b>General</b>	<b>DNV Reference</b> <b>OS-D301 Ch. 2 Sec. 5 D</b>	<b>MODU Code</b> <b>Reference 9</b>
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Each fire extinguisher must be approved under 162.028 and 162.039

<b>USCG Reference</b> <b>46CFR108.493</b>	<b>Locations</b>	<b>DNV Reference</b> <b>OS-D301 Ch. 2 Sec. 2 B</b>	<b>MODU Code</b> <b>Reference 9.6</b>
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Each unit must have extinguishers as prescribed in Table 108.495 (a) (see below). Each extinguisher must be visible and readily accessed.

Table 108.495(a) Hand Portable Fire Extinguishers and Semiportable Fire-Extinguishing Systems

Space	Classification (see table 108.495(b))	Quantity and location
<b>SAFETY AREAS</b>		
Wheelhouse and control room	C-I	2 in vicinity of exit
Stairway and elevator enclosure	-	None required.
Corridors	A-II	1 in each corridor not more than 150 ft (45 m) apart. (May be located in stairways)
Lifeboat embarkation and lowering stations	-	None required
Radio room	C-I	2 in vicinity of exit

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ACCOMMODATIONS		
Staterooms, toilet spaces, public spaces, offices, lockers, small storerooms, and pantries, open decks, and similar spaces.	-	None required
SERVICE SPACES		
Galleys	B-II or C-II	1 for each 2,500 ft <sup>2</sup> (232 m <sup>2</sup> ) or fraction thereof suitable for hazards involved
Paint and lamp rooms	B-II	1 outside each room in vicinity of exit
Storerooms	A-II	1 for each 2,500 ft <sup>2</sup> (232 m <sup>2</sup> ) or fraction thereof located in vicinity of exits, either inside or outside the spaces
Work shop and similar spaces	C-II	1 outside each space in vicinity of an exit
MACHINERY SPACES		
Oil-fired boilers: Spaces containing oil-fired boilers, either main or auxiliary, or their fuel oil units	B-II	2 required in each space
	B-V	1 required in each space
Internal combustion or gas turbine propelling machinery	B-II	1 for each 1,000 brake horsepower but not less than 2 nor more than 6 in each space.
	B-III	1 required in each space. See note 1.
Motors or generators of electric propelling machinery that do not have an enclosed ventilating system.	C-II	1 for each motor or generator
Motors and generators of electric propelling machinery that have enclosed ventilating systems	-	None required
AUXILIARY SPACES		
Internal combustion engines or gas turbine	B-II	Outside the space containing engines or turbines in vicinity of exit.
Electric emergency motors or generators	C-II	1 outside the space containing motors or generators in vicinity of exit.
Steam driven auxiliary machinery	-	None required
Trunks to machinery spaces	-	None required
Fuel tanks	-	None required
MISCELLANEOUS AREAS		
Helicopter landing decks	B-V	1 at each access route
Helicopter fueling facilities	B-IV	1 at each fuel transfer facility. See note 2.

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Drill floor	C-II	2 required
Cranes with internal combustion engines	B-II	1 required.

Notes:

1. Not required where a fixed gas extinguishing system is installed.
2. Not required where a fixed foam system is installed in accordance with Sec. 108.489 of 46CFR.

Table 108.495(b) Classification, type and size of extinguishers

	Classification: Type and size	Water liters (gallons)	Foam liters (gallons)	Carbon dioxide kilograms (pounds)	Dry chemical kilograms (pounds)	Halon 1211 kilograms (pounds)
A	II	9.5 (2½)	9.5 (2½)	-	2.25 (5) <sup>3</sup>	-
B	I	-	4.7 (1¼)	1.8 (4)	0.9 (2)	1.1 (2½)
B	II	-	9.5 (2½)	6.7 (15)	4.5 (10)	4.5 (10) <sup>5</sup>
B	III	-	45.5 (12)	15.8 (35)	9.0 (20)	-
B	IV	-	7.6 (20)	22.5 (50)	13.5 (30)	-
B	V	-	152 (40)	45 (100) <sup>4</sup>	22.5 (50) <sup>4</sup>	-
C	I	-	-	1.8 (4)	0.9 (2)	-
C	II	-	-	6.7 (15)	4.5 (10)	-
C	III	-	-	15.8 (35)	9.0 (20)	-
C	IV	-	-	22.5 (50)	13.5 (30)	-

Notes:

1. Fire extinguishers are designed by type as follows:
  - (a) "A" for fires in combustible materials such as wood.
  - (b) "B" for fires in flammable liquids and greases.
  - (c) "C" for fires in electrical equipment.
2. Fire extinguishers are designated by size where size "I" is the smallest and size "V" is the largest. Sizes "I" and "II" are hand-portable extinguishers and sizes "III", "IV", and "V" are semiportable extinguishers.
3. Must be specifically approved as a type A, B, or C extinguisher.
4. For outside use, double the quantity of agent that must be carried.
5. For outside use only.

Extinguishers with nameplates stating that they should be protected from freezing should be located in areas where freezing temperatures do not occur.

**USCG Reference**  
**46CFR108.496**

**Semi-Portable Fire Extinguishers**

**DNV Reference**  
**OS-D301 Ch. 2 Sec. 2 B**

**MODU Code**  
**Reference 9.6**

A framed support welded to the deck is required for each size III, IV and V fire extinguishers, except wheeled size V for the helicopter landing deck.

Each Type III, IV and V wheeled extinguisher, including the type V required for the Helicopter deck, not required by Table 108.495(a) (see table above) must be securely stowed to prevent them from rolling out of control under heavy sea conditions.

### Miscellaneous Firefighting Equipment

<b>USCG Reference</b> <b>46CFR108.497</b>	<b>Fireman's Outfits</b>	<b>DNV Reference</b> <b>OS-D301 Ch. 2 Sec. 5 B</b>	<b>MODU Code Reference</b> <b>9.9</b>
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Fireman's outfits on a unit must consist of :

- An oxygen and explosive meter with UL label or Factory Mutual label
- A Lifeline that is:
  - made of bronze wire rope, inherently corrosion resistant steel wire rope or galvanized or tinned steel wire rope
  - is made up of enough 50 foot or greater lengths to permit use of the outfit in any location on the unit
  - has each end fitted with a hook with a 5/8" throat opening for the keeper
  - has a minimum breaking strength of 680 kgs (1,500 lbs).

### Subpart E – Lifesaving Equipment

<b>USCG Reference</b> <b>46CFR108.500</b>	<b>General</b>	<b>DNV Reference</b> <b>NONE</b>	<b>MODU Code Reference</b> <b>10</b>
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Each unit, other than a drillship, must meet the requirements in 46CFR Subpart E.

Each drillship must meet the lifesaving system requirements in subchapter W for a tank vessel certificated to carry cargoes that have a flash point less than 60°C as determined under ASTM D 93 (incorporated by reference, see 46CFR 108.101).

The OCMI may require a unit to carry specialized or additional lifesaving equipment other than as required by 46CFR108.500, if the OCMI determines the conditions of the unit's service present uniquely hazardous circumstances which are not adequately addressed by existing requirements.

<b>USCG Reference</b> <b>46CFR108.503</b>	<b>Relationship to International Standard</b>	<b>DNV Reference</b> <b>NONE</b>	<b>MODU Code Reference</b> <b>10</b>
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A unit carrying a valid IMO MODU Safety Certificate including a listing of lifesaving equipment as required by the MODU Code Reference is considered to have met the requirements of this subpart if in addition to the requirements of the MODU Code Reference it meets the following requirements:

- **108.550(d):** *Survival Craft Launching and Recovery Arrangements*
- **108.649:** *Lifejackets, Immersion Suits and Lifebuoys*
- **108.650:** *EPIRBs and SARTs*
- **108.580(b):** *Personal Lifesaving Appliances*
- **108.649(g):** *Lifesaving, immersion Suits and Lifebuoys*
- **108.530(c)(3):** *Stowage of Survival Craft*
- **108.553 (d, f, e, h, and i):** *Survival Craft Launching and Recovery Arrangements Using Falls and a Winch*

<b>USCG Reference</b> <b>46CFR.108.530</b>	<b>Stowage of Survival Craft</b>	<b>DNV Reference</b> <b>NONE</b>	<b>MODU Code</b> <b>Reference 10.5</b>
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Each survival craft must not requiring lifting from its stowed position in order to launch except that a davit-launched liferaft may be lifted from its stowed position to it embarkation position.

Each lifeboat must be provided a means for recharging the lifeboat batteries from the unit’s power supply at a supply voltage not exceeding 50 volts

Liferafts must be stowed at a height in the lightest seagoing condition not greater than the maximum stowage height indicated on the liferaft. If there is no maximum height indicated, the height cannot exceed 59 feet above the waterline.

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

- Is outboard of the rails or bulwark
- Is on stanchions or on a platform adjacent to the rail or bulwark, or
- Has a gate or other suitable opening to allow the liferaft to be pushed directly overboard

Each davit launched liferaft must be stowed within reach of the lifting hook , unless some means of transfer is provided for that is not rendered inoperable:

- Within the limits specified in (a)(4)(ii)
- By unit motion
- By power failure

Rigid container for inflatable liferafts that are launched by launching appliances must be secured to prevent it from falling overboard during and after inflatable launch.

Note also the requirements of 46CFR199.290 which may be applicable to drillships.

<b>USCG Reference</b> <b>46CFR108.540</b>	<b>Survival Craft Muster and Embarkation Arrangements</b>	<b>DNV Reference</b> <b>NONE</b>	<b>MODU Code</b> <b>Reference 10.3</b>
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Means must be provided for bringing each davit-launched survival craft against the side of the unit and holding it alongside to allow persons to be:

- Safely embarked in the case of a survival craft intended to be boarded over the edge of the deck;
- Safely disembarked after a drill in the case of a survival craft not intended to be moved to the stowed position with a full complement of persons on board.

<b>USCG Reference</b> <b>46CFR108.550 (d)</b>	<b>Stowage of Survival Craft</b>	<b>DNV Reference</b> <b>NONE</b>	<b>MODU Code</b> <b>Reference 10.2, 10.5</b>
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Each lifeboat of aluminium construction in the hull or canopy and each aluminium launching appliance must be protected in its stowage position by a water spray system meeting the requirements of part 34, subpart 34.25

<b>USCG Reference</b> <b>46CFR108.553</b>	<b>Survival Craft Launching and Recovery Arrangements</b> <b>Using Falls and Winches</b>	<b>DNV Reference</b> <b>NONE</b>	<b>MODU Code</b> <b>NONE</b> <b>(ref to SOLAS</b> <b>III/48.1, .2, .6)</b>
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Survival craft launching and recovery arrangements, in addition to meeting the requirements in Sec. 108.550, must meet the following requirements:

- Each fall wire must be of rotation-resistant and corrosion-resistant steel wire rope.
- The breaking strength of each fall wire and each attachment used on the fall must be at least six times the load imparted on the fall by the fully-loaded survival craft.
- Each fall must be long enough for the survival craft to reach the water with the unit in its lightest seagoing condition, under unfavorable conditions of trim and with the unit listed not less than 20 degrees either way.
- Each unguarded fall must not pass near any operating position of the winch, such as hand cranks, payout wheels, and brake levers.
- Each winch drum must be arranged so the fall wire winds onto the drum in a level wrap, and a multiple drum winch must be arranged so that the falls wind off at the same rate when lowering, and onto the drums at the same rate when hoisting.
- Each fall, where exposed to damage or fouling, must have guards or equivalent protection. Each fall that leads along a deck must be covered with a guard that is not more than 300 millimeters (1 foot) above the deck.
- The lowering speed for a fully loaded survival craft must be not less than that obtained from the following formula:
  - $S = 0.4 + (0.02 H)$ , where S is the speed of lowering in meters per second, and H is the height in meters from the davit head to the waterline at the lightest seagoing condition, with H not greater than 30, regardless of the lowering height.
  - $S = 79 + (1.2 H)$ , where S is the speed of lowering in feet per minute, and H is the height in feet, with H not greater than 99.
- 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 paragraph (g) of this section.
- The lowering speed for a fully loaded survival craft must be not more than 1.3 meters per second (256 feet per minute).
- If a survival craft is recovered by electric power, the electrical installation, including the electric power-operated boat winch, must meet the requirements in subchapter J of this chapter. If a survival craft is recovered by any means of power, including a portable power source, safety devices must be provided which automatically cut off the power before the davit arms or falls reach the stops in order to avoid overstressing the falls or davits, unless the motor is designed to prevent such overstressing.
- Each launching appliance must be fitted with brakes that meet the following requirements:
  - The brakes must be capable of stopping the descent of the survival craft or rescue boat and holding it securely when loaded with its full complement of persons and equipment.
  - The brake pads must, where necessary, be protected from water and oil.
  - Manual brakes must be arranged so that the brake is always applied unless the operator, or a mechanism activated by the operator, holds the brake control in the off position.

**USCG Reference**  
**46CFR108.560**

**Rescue Boats**

**DNV Reference**  
**NONE**

**MODU Code**  
**Reference 10, SOLAS**  
**III/47**

Each unit must carry at least one rescue boat. Each rescue boat must be approved under USCG approval series 160.156. A lifeboat is accepted as a rescue boat if it also meets the requirements for a rescue boat.

**USCG Reference**  
**46CFR108.580 (b)**

**Personal Lifesaving Appliances - Lifejackets**

**DNV Reference**  
**NONE**

**MODU Code**  
**Reference 10.10,**  
**10.11, 10.12**

Lifejackets should be USCG approved in accordance with 160.155, 160.176, or 160.177.

Inflatable lifejackets, if carried, must be of the same design or similar design.  
Immersion suits should be approved under 160.171, anti-exposure suits under 160.153.

Each immersion suit and anti-exposure suit must have a lifejacket light attached to the front shoulder.

**USCG Reference**  
**46CFR108.597**

**Line Throwing Appliances**

**DNV Reference**  
**NONE**

**MODU Code**  
**Reference 10.15**

Must be approved by USCG under approval series 160.040, or 160.031 if unit is in international service.

Each line-throwing appliance must have an auxiliary line that is, if synthetic, a dark color or certified by the manufacturers to be resistant to deterioration from ultraviolet light and is:

- At least 1500 feet long, if the line throwing appliance is approved under approval series 160.040 or
- At least 500 feet long, if the line throwing appliance is approved under approval series 160.031.

**USCG Reference**  
**46CFR108.601**

**Cranes**

**DNV Reference**  
**OSS-101 Ch. 2 Sec. 6**

**MODU Code**  
**Reference 12**

Each crane and crane foundation on a unit must be designed in accordance with the American Petroleum Institute Specification for Offshore Cranes, API Spec. 2C, Second Edition, February, 1972 (with supplement 2).

In addition to the design requirements above, each crane must have the following:

- Each control marked to show its function.
- Instruments with built-in lighting.
- Fuel tank fills and overflows that do not run onto the engine exhaust.
- No gasoline engines.
- Spark arrestors fitted on engine exhaust pipes.



<b>USCG Reference</b> <b>46CFR108.645</b>	<b>Markings on Lifesaving Appliances</b>	<b>DNV Reference</b> <b>NONE</b>	<b>MODU Code</b> <b>Reference 10.2</b>
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Each side of a lifeboat and rescue boat bow must be marked in block capital letters and numbers with:

- The name of the unit and the boat number which must be clearly visible from above.
- The name of port which is to be the same as that on the unit to meet subpart 67.13

In addition, the following must be plainly marked:

- The number of persons the boat is equipped for, not to exceed the number shown on its nameplate.
- Type II retro-reflective material approved under approval series 164.018 must be placed on the boat in accordance with IMO A658 (16)

Each rigid liferaft must be marked as follow:

- The name of the unit
- The name of the port which is to be the same as that on the unit to meet subpart 67.13
- Length of painter must be marked on all rigid liferafts
- At the entrance to each rigid liferaft, the number of person the liferaft is equipped for, not exceeding the number shown on its nameplate, in 4 inch high letters and numbers, in a color contrasting to the liferaft.

<b>USCG Reference</b> <b>46CFR108.655</b>	<b>Operating Instructions</b>	<b>DNV Reference</b> <b>NONE</b>	<b>MODU Code</b> <b>Reference 10.17</b>
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Each unit must have posters and signs displayed in the vicinity of each survival craft and the survival craft's launching controls that:

- Illustrate the purpose of the controls
- Illustrate the procedures for operating the launching device
- Give relevant instructions or warnings
- Can be easily seen under emergency lighting conditions
- Display symbols in accordance with IMO Res. A.760(18)

<b>USCG Reference</b> <b>46CFR108.665</b>	<b>Appliances for Watertight Integrity</b>	<b>DNV Reference</b> <b>OS-C301 Ch 2 Sec 2 B202</b>	<b>MODU Code</b> <b>Reference 3.6.4.2</b>
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Each watertight door, scuttle, and hatch required for watertight integrity, which may be opened during normal operations must be marked in letters of contrasting color to the background "KEEP CLOSED".

## **Part 109 – Operations**

### **Subpart A – General**

Last revised 13<sup>th</sup> April 2006

**USCG Reference**  
**46CFR109.121**

**Operations Manual**

**DNV Reference**  
**NONE**

**MODU Code**  
**Reference 14.1**

The operations manual is also to include:

- Use of any cross flooding fitting for each operating condition and the location of any valve that may require closure to prevent progressive flooding
- General arrangement plans showing the location of;
  - Vents, Closures, and mechanical, ventilating and electrical emergency shutdowns
  - Flooding alarms and fire and gas detectors
  - Access to different compartments and decks

### **Subpart C – Operations and Stowage of Safety Equipment**

**USCG Reference**  
**46CFR109.301**

**Operational Readiness, Maintenance and Inspection of the  
Life Saving Equipment**

**DNV Reference**  
**NONE**

**MODU Code**  
**Reference 10.18**

- It should be verified that:
- Each lifesaving appliance must be in good working order and ready for immediate use at all times when the unit is in operation
- Maintenance
  - The manufacturer’s instructions for onboard maintenance of lifesaving appliances must be onboard and must include the following for each appliance:
    - Checklists for use when carrying out the inspections required under this section;
    - Maintenance and repair instructions;
    - A schedule of periodic maintenance;
    - A diagram of lubrication points;
    - A list of replaceable parts;
    - A list of sources of spare parts; and
    - A log for records of inspection and maintenance
  - The OCMI may accept a planned maintenance program that includes the items listed above.
- If lifeboats, rescue boats or rigid liferafts are maintained and repaired while the unit is in operation, there must be a sufficient number of lifeboats and liferafts remaining available for use to accommodate all persons on board
- Spare parts and repair equipment must be provided for each lifesaving appliance and component subject to excessive wear or consumption and that needs to be replaced regularly
- Weekly inspections and tests:
  - Each survival craft, rescue boat, and launching appliance must be readily inspected to ensure its readiness for use
  - Each lifeboat and rescue boat engine must be run ahead and astern for not less than 3 minutes, unless ambient temperature is below the minimum temperature required for starting the engine. During this time, demonstrations should indicate that the gear box and gear box train are engaging satisfactory
  - The general alarm system must be tested
- Each life-saving appliance, including lifeboat equipment, must be inspected monthly using the checklist required under paragraph (3) of this section to ensure it is complete and in good working order. A report of the inspection including a statements to the condition of the requirements must be recorded in

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the unit's official logbook:

- Each EPIRB and SART (not located in liferafts) must be tested monthly. The EPIRB must be tested using the integrated test circuit and output indicator to determine that it is operative
- Annual inspection and repair must include the following:
  - Each survival craft, except for inflatable liferafts, must be stripped, cleaned, inspected and repaired, as needed, at least once every year, including emptying and cleaning each fuel tank, and refilling it with fresh fuel
  - Each davit, winch, fall and other launching appliance must be thoroughly inspected and repaired. As needed, once a year
  - Each item of survival equipment with an expiration date must be replaced during the annual inspection and repair, if the expiration date has passed
  - Each battery clearly marked with an expiration date, that is used in an item of survival equipment must be replaced during the annual inspection and repair, if the expiration date has passed
  - Except for a storage battery used in a lifeboat or rescue boat, each battery without an expiration date that is used in an item of survival equipment must be replaced during the annual inspection and repair.
- Servicing of inflatable lifesaving appliances, inflated rescue boats and marine evacuation systems:
  - Each inflatable lifesaving appliance and marine evacuation system must be serviced
    - Within 12 month of its initial packing
    - Within 12 month of each subsequent servicing, except when servicing is delayed until the next scheduled inspection of the unit, provided the delay does not exceed 5 month
  - Each inflatable lifejacket must be serviced in accordance with servicing procedures meeting the requirements of Part 160.176 of this chapter. Each hybrid inflatable must be serviced in accordance with the owners manual and meet the requirements of Part 160.077
  - Each inflatable liferaft must be serviced-
    - Whenever the container of the raft is damaged, or the straps or seal broken
    - In accordance with servicing procedures meeting the requirements of subpart 160.151 if this chapter
  - Each inflated rescue boat must be repaired and maintained in accordance with the manufacturer's instructions. All repairs must be made at a servicing facility approved by the Commandant, except for emergency repairs carried out on board a unit
- Periodic servicing of hydrostatic release units – each unit, other than a disposable hydrostatic release unit, must be serviced-
  - Within 12 months of its manufacture and within 12 months of each subsequent servicing, except when servicing is delayed until the next scheduled inspection of the unit, provided the delay does not exceed 5 months
  - In accordance with the repair and testing procedures meeting the requirements of subpart 160.062 of this chapter.
- Periodic servicing of launching appliances and release gear
  - Launching instructions, or as set out in the shipboard planned maintenance program
  - Launching appliances must be thoroughly examined at intervals not exceeding 5 years and upon completion of the examination, the launching appliance must be subjected to a dynamic test of the winch brake.
  - Lifeboat and rescue release gear must be serviced at intervals recommended in the manufacture's instructions, or as set out in the planned maintenance programs
  - Lifeboat and rescue boat release gear must be subjected to a thorough examination by properly trained personnel familiar with the system at each inspection for certification
  - Lifeboat and rescue boat release gear must be operationally tested under a load of 1.1 times the total mass of the lifeboat when loaded with its full

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compliment of persons and equipment, whenever overhauled, or at least once every five years

- Maintenance of Falls
  - Each fall used in a launching appliance must be turned end-for-end at intervals of not more than 30 months and must be renewed when necessary due to deterioration or at intervals of not more than 5 years, whichever is earlier
  - As an alternative, each fall may be inspected annually and renewed whenever necessary due to the deterioration or at intervals of not more than 4 years, whichever is earlier.
- Rotational deployment of marine evacuation systems. In addition to or in conjunction with the servicing intervals of marine evacuation systems required, each marine evacuation system must be deployed from the unit on a rotational basis. Each marine evacuation system must be deployed at least once every 6 years

**USCG Reference**  
**46CFR109.435**

**Records of Fire and Fire Fighting Equipment Inspection**

**DNV Reference**  
**NONE**

**MODU Code**  
**Reference 9**

- It should be verified that
- A record of each test and inspection for fire fighting equipment required in 109.223 is maintained on board, until the unit is re-inspected or inspected for certification
- The record required in paragraph (a) of this section must show
  - The date of each test and inspection
  - The number or other identification of each item of equipment tested or inspected
  - The names of the persons, and the company he represents if any, who conducted the test or inspection

**USCG Reference**  
**46CFR109.437**

**Crane Record Book**

**DNV Reference**  
**NONE**

**MODU Code**  
**Reference 12.1.6**

It should be verified that the following certificates and records for each crane are maintained on the unit:

- Descriptive information which will identify each crane including
  - American Petroleum Institute nameplate data required by Section 11 of API Spec. 2C, 2<sup>nd</sup> Edition, February 1972
  - The rates load chart for each line reeving and boom length which may be utilized
- Information required by Section 3 of the American Petroleum Institute Recommended Practice for Operation and Maintenance of Offshore Cranes, API RP 2D, First Edition (October 1972) with supplement 1
- Dates and results of frequent inspections and tests required in this section
- Dates and results of periodic inspections and tests required in this section
- Dates and results of each load test
- Date and description of each replacement or renewal of wire rope, hooks, and other load components
- Date and description of each failure of the crane, or any component or safety feature
- Date and description of each repair to the crane structure, boom or equipment

**USCG Reference**  
**46CFR109.439**

**Crane Certificates**

**DNV Reference**  
**NONE**

**MODU Code**  
**Reference 12.1.5,**

**12.1.6**

It should be verified that the following certificates and records for each crane are maintained on the unit:

- Each Certificate issued by a crane certifying authority
- Each record and original certificate, or certified copy of a certificate, or manufacturers or testing laboratories, companies or organizations for:
  - Loose gear
  - Wire ropes
  - The annealing of wrought iron gear

**Subpart G – Miscellaneous**

<b>USCG Reference</b> <b>46CFR109.557</b>	<b>Flammable and Combustible Liquids: Carriage</b>	<b>DNV Reference</b> <b>NONE</b>	<b>MODU Code</b> <b>Reference 14.2</b>
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It should be verified that:

- Flammable and combustible liquids in bulk are not carried, except as allowed by the endorsement of the Certificate of Inspection
- Portable tanks are handled and stowed in accordance with subparts 98.30 and 98.33 of this chapter and the provisions of 49 CFR parts 107 through 179 that apply to portable tanks
- Grades B and lower liquids are:
  - Authorized by the Commandant, to be carried
  - Carried only in fixed independent or integral tanks

<b>USCG Reference</b> <b>46CFR109.559</b>	<b>Explosives and Radioactive Materials</b>	<b>DNV Reference</b> <b>NONE</b>	<b>MODU Code</b> <b>Reference 14.2</b>
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It should be verified that explosive or radioactive materials and equipment on a unit are not used unless authorized.

<b>USCG Reference</b> <b>46CFR109.565</b>	<b>Charts and Nautical Publications</b>	<b>DNV Reference</b> <b>NONE</b>	<b>MODU Code</b> <b>Reference 14.7</b>
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It should be verified that self propelled units have the following adequate, up to date and appropriate items of the intended voyage: Charts, Sailing Directions, Coast Pilots, Light Lists, Notice to Mariners, Tides Tables, Current Tables and all other nautical publications necessary

**SUBCHAPTER J – ELECTRICAL ENGINEERING**

<b>USCG Reference</b> <b>46CFR 110 – 113</b>	<b>Applicable Codes</b>	<b>DNV Reference</b> <b>OS-D201</b>	<b>MODU Code</b> <b>Reference</b> <b>NONE</b>
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USCG references applicable standards, in CFR.

**USCG Reference**  
**46CFR111.01-15**

**Temperature Ratings**

**DNV Reference**  
**OS-D201 Ch. 2 Sec. 2 A,**  
**Ch. 2 Sec. 3 B**

**MODU Code**  
**Reference**  
**NONE**

An ambient temperature of 40 degrees C is assumed except as otherwise stated

- 50 degrees C ambient temperature is assumed for all rotating electrical machinery...
- 45 degrees C is assumed for all cables and non-rotating electrical equipment...
- 55 degrees C ambient for all control and instrumentation

If the electrical equipment is utilized in a space in which the equipment's rated ambient temperature is below the assumed ambient temperature of the space, its load must be derated.

**USCG Reference**  
**46CFR111.05-27**

**Grounded Neutral Alternating Current Systems**

**DNV Reference**  
**OS-D201 Ch. 2 Sec. 2**  
**A103**

**MODU Code**  
**Reference**  
**NONE**

Grounded neutral and high-impedance grounded neutral alternating current systems must have a suitably sensitive ground detection system which indicates current in the ground connection, is able to withstand the maximum available fault current without damage, and provides continuous indication of current status to ground. A provision must be included to compare indications under fault conditions with those under normal conditions.

**USCG Reference**  
**46CFR111.12-1(c)**

**Prime Movers**

**DNV Reference**  
**OS-D201 Ch. 2 Sec. 5 A**

**MODU Code**  
**Reference**  
**NONE**

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

**USCG Reference**  
**46CFR111.12-9**

**Generator Cables**

**DNV Reference**  
**OS-D201 Ch. 2 Sec. 9**

**MODU Code**  
**Reference**  
**NONE**

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

- Less than 115 percent of the continuous generator rating or
- Less than 115 percent of the overload for a machine with a 2 hour or greater overload rating

Generator cables must not be in the bilges.

**USCG Reference**  
**46CFR111.15-2**

**Battery Construction**

**DNV Reference**  
**OS-D201 Ch. 2 Sec. 2**

**MODU Code**  
**Reference**  
**NONE**

A battery cell, when inclined at 40 degrees from the vertical must not spill electrolyte.

<b>USCG Reference</b> <b>46CFR111.15-5</b>	<b>Battery Installation</b>	<b>DNV Reference</b> <b>OS-D201 Ch. 2 Sec. 2</b>	<b>MODU Code Reference</b> <b>NONE</b>
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USCG has detailed requirements for installation of large, moderate, and small batteries. DNV OSS requirements are similar.

<b>USCG Reference</b> <b>46CFR111.15-10</b>	<b>Ventilation</b>	<b>DNV Reference</b> <b>OS-D201 Ch. 2 Sec. 2</b> <b>D103</b>	<b>MODU Code Reference</b> <b>NONE</b>
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The power ventilation system must be interlocked with the battery charger so that the battery cannot be charged without ventilation. Number of air exchanges for large battery installations is given by :

$$q=3.89 (i)(n) \text{ ft}^3/\text{hr}$$

where q = Quantity of air expelled; i = Max. charging current or ¼ of the maximum charging current of the charger whichever is greater; n = Number of cells. Ventilation requirements for other battery systems are detailed in the CFR.

<b>USCG Reference</b> <b>46CFR111.30-25</b>	<b>Alternating-Current Ship's Service Switchboard</b>	<b>DNV Reference</b> <b>OS-D201 Ch. 2 Sec. 4</b>	<b>MODU Code Reference</b> <b>NONE</b>
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For each generator that is not excited from a variable voltage or rotary amplifier that is controlled by a voltage regulator unit acting on the exciter field, each switchboard must have:

- A generator field rheostat
- A double-pole field switch
- Discharge clips and
- Discharge resistor

<b>USCG Reference</b> <b>46CFR111.30-29</b>	<b>Emergency Switchboards</b>	<b>DNV Reference</b> <b>OS-D201 Ch. 2 Sec. 2 C</b>	<b>MODU Code Reference</b> <b>NONE</b>
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There must be a test switch at the emergency switchboard to simulate a failure of the normal power source and cause the emergency loads to be supplied from the emergency generator.

For each emergency generator that is not excited from a variable voltage or rotary amplifier exciter that is controlled by a voltage regulator unit acting on the exciter field, each emergency switchboard must have:

- A generator field rheostat
- A double-pole field switch
- Discharge clips and
- Discharge resistor

<b>USCG Reference</b> <b>46CFR111.33</b>	<b>Semiconductor Rectifier Systems</b>	<b>DNV Reference</b> <b>OS-D201 Ch. 2 Sec. 2</b>	<b>MODU Code Reference</b> <b>NONE</b>
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USCG has additional requirements for semiconductor rectifier systems. DNV OSS has similar requirements.

<b>USCG Reference</b> <b>46CFR111.35-1</b>	<b>Electric Propulsion Installations</b>	<b>DNV Reference</b> <b>OS-D201 Ch. 2 Sec. 2</b>	<b>MODU Code Reference</b> <b>NONE</b>
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USCG requires that electric propulsion meets the requirements of specific standards noted in the CFR.

<b>USCG Reference</b> <b>46CFR111.52-5</b>	<b>Short Circuit Calculations – Systems 1500 kW or above</b>	<b>DNV Reference</b> <b>OS-D201 Ch. 2 Sec. 2 G</b>	<b>MODU Code Reference</b> <b>NONE</b>
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Short circuit calculations must be submitted for the systems with an aggregate generating capacity of 1500kW or more by utilizing one of the following methods:

- Exact calculation using actual impedance and reactance values of system components
- Estimated calculations using
  - Naval Sea Systems Command Design Data Sheet DDS 300-2
  - IEC 363
  - Commercially established analysis procedure for utility or industrial applications

<b>USCG Reference</b> <b>46CFR111.54-1</b>	<b>Circuit Breakers</b>	<b>DNV Reference</b> <b>OS-D201 Ch. 2 Sec. 2</b> <b>G200</b>	<b>MODU Code Reference</b> <b>NONE</b>
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Each circuit breaker located in an engine room, boiler room or machinery space must be calibrated for a 50 degree C ambient temperature. If the breaker is located in an environmentally controlled machinery control room where provisions are made for ensuring an ambient temperature of 40 degrees C or less, a circuit breaker must have at least the standard 40 degrees C ambient temperature calibration

<b>USCG Reference</b> <b>46CFR111.60-1(e)</b>	<b>Cable Construction and Testing</b>	<b>DNV Reference</b> <b>OS-D201 Ch. 2 Sec. 9</b>	<b>MODU Code Reference</b> <b>NONE</b>
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Medium voltage electric cable must meet the requirements of IEEE Std 45 and UL 1072 where applicable for cables rated above 5000 volts

<b>USCG Reference</b> <b>46CFR111.60-2</b>	<b>Specialty Cable for Communication and RF Applications</b>	<b>DNV Reference</b> <b>OS-D201 Ch. 2 Sec. 9 F</b>	<b>MODU Code Reference</b> <b>NONE</b>
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Specialty cable that cannot pass the flammability test contained in IEEE Std45, IEEE Std 1202, ANSI/UL 1581 test VW-1 or IEC 332-3 Category A due to unique construction properties, such as certain coaxial cables, must:

- Be installed physically separate from all other cables
- Have fire stops installed
  - at least every 21.5 feet (7 m) vertically up to a maximum of two deck heights
  - at least every 46 feet (15m) horizontally
  - at each penetration of an A or B Class boundary
  - at each location where the cable enters equipment or
  - in a cableway that has an A-60 fire rating

**USCG Reference**  
**46CFR111.60-4**

**Minimum Cable Conductor Size**

**DNV Reference**  
**OS-D201 Ch. 2 Sec. 2 J**

**MODU Code Reference**  
**NONE**

Each cable conductor must be #18 AWG (0.82mm<sup>2</sup> or larger except:

- Each power and lighting cable conductor must be #14 AWG (2.10mm<sup>2</sup>) or larger
- Each thermocouple, pyrometer or instrumentation cable conductor must be #22 AWG (0.33 mm<sup>2</sup>)

**USCG Reference**  
**46CFR111.60-7**

**Demand Loads**

**DNV Reference**  
**OS-D201 Ch. 2 Sec. 2 B**

**MODU Code Reference**  
**NONE**

Demand Loads. 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 Table 111.60-7

Table 111.60-7—Demand Loads

Type of circuit	Demand load
Generator cables	115 percent of continuous generator rating
Switchboard bus-tie, except ship's service emergency switchboard bus-tie	75 percent of generating capacity of the larger switchboard
Emergency switchboard bus-tie	115 percent of continuous rating of emergency switchboard
Motor feeders	Article 430, National Electric Code
Galley equipment feeder	100 percent of either the first 50 KW or one-half the connected load, whichever is the larger, plus 50 percent of the rating of the spare switches or circuit breakers on the distribution panels.
Lighting feeder	100 percent of the load plus the average active circuit load for the spare switches or circuit breakers on the distribution panels
Grounded neutral or dual voltage	100 percent of the capacity of the ungrounded conductors when

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leader	grounded neutral is not protected by a circuit breaker overcurrent trip, or not less than 50 percent of the capacity of the ungrounded conductors when the grounded neutral is protected by a circuit breaker overcurrent trip or overcurrent alarm.
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**USCG Reference**  
**46CFR111.60-19**

**Cable Splices**

**DNV Reference**  
**OS-D201 Ch. 2 Sec. 10**  
**C800**

**MODU Code Reference**  
**NONE**

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

**USCG Reference**  
**46CFR111.60-23**

**Metal-clad Cable**

**DNV Reference**  
**OS-D201 Ch. 2 Sec. 2 J**

**MODU Code Reference**  
**NONE**

USCG has additional requirements towards MC cable, including required certification. .

**USCG Reference**  
**46CFR111.70-7**

**Motor Circuits – Remote Control, Interlock and Indicator Circuits**

**DNV Reference**  
**OS-D201 Ch. 2 Sec. 2**  
**H200**

**MODU Code Reference**  
**NONE**

The controller must be designed to prevent an accidental ground in a remote control circuit from causing the stop switches to fail to operate or causing the motor to start.

**USCG Reference**  
**46CFR111.75-5 (b)**

**Lighting Branch Circuits - Connected Load**

**DNV Reference**  
**OS-D201 Ch. 2 Sec. 2**

**MODU Code Reference**  
**NONE**

The connected load on a lighting branch circuit must not be more than 80 percent of the rating of the overcurrent protective device, computed on the basis of the fixture ratings and in accordance with IEEE Std 45, section 21.6.

**USCG Reference**  
**46CFR111.75-17, 75-18**

**Navigation and Signaling Lights**

**DNV Reference**  
**NONE**

**MODU Code Reference**  
**14.7**

USCG has requirements for navigation and signaling lights which are covered under COLREG (referred to by MODU Code). Navigation lights are to be independently laboratory tested for compliance with UL 1104 or an equivalent standard (equivalency to be determined by USCG).

**USCG Reference**  
**46CFR111.77-1**

**Appliances and Appliance Circuits – Over current protection**

**DNV Reference**  
**OS-D201 Ch. 2 Sec. 2**  
**G200**

**MODU Code Reference**  
**NONE**

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If a circuit supplies only one appliance or device, the rating or setting of the branch circuit overcurrent device must not be more than 150 percent of the rating of the appliance or device or 15 amperes, whichever is greater.

<b>USCG Reference</b> <b>46CFR111.77-3</b>	<b>Appliances</b>	<b>DNV Reference</b> <b>OS-D201 Ch. 2 Sec. 10 B</b>	<b>MODU Code Reference</b> <b>NONE</b>
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All electrical appliances including but not limited to cooking equipment, dishwashers, refrigerators, and refrigerated drinking water coolers must meet UL safety and construction standards or equivalent standards under CFR 110.20-1 of this chapter. Also, this equipment must be suitably installed for the location and service intended.

<b>USCG Reference</b> <b>46CFR111.95-1</b>	<b>Electric Powered-operated Boat Winches</b>	<b>DNV Reference</b> <b>NONE</b>	<b>MODU Code Reference</b> <b>10.6</b>
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The electric installation of each electric power-operated boat winch must meet the requirements in this subpart, except that limit switches must be adapted to the installation if there are no gravity davits. The provisions of this subpart supplement the requirements for boat winches in other parts of this chapter under which vessels are certified and in subchapter Q, Equipment approvals

<b>USCG Reference</b> <b>46CFR111.95-3</b>	<b>General requirements</b>	<b>DNV Reference</b> <b>NONE</b>	<b>MODU Code Reference</b> <b>10.6</b>
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Each main line emergency disconnecting switch, if accessible to an unauthorized person, must have a means to lock the switch in the open-circuit position with a padlock or its equivalent. The switch must not lock in the closed-circuit position.

<b>USCG Reference</b> <b>46CFR111.95-7</b>	<b>Wiring of Boat Winch Components</b>	<b>DNV Reference</b>	<b>MODU Code Reference</b> <b>10.6</b>
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- If the motor controller of a boat winch power unit is next to the winch, the main line emergency switch must disconnect all parts of the boat winch power unit, including the motor controller and limit switches, from all sources of potential. Other power circuit's switches must be connected in series with the main line emergency switch and must be ahead of the motor controller. The main line emergency switch must be the motor and controller disconnect required by Subpart 111.70 and must have a horsepower rating of at least that of the winch motor.
- If the motor controller of a boat winch power unit is remote from the winch, there must be a switch at the controller that can disconnect the entire winch electric installation from all sources of potential. The switch must be in series with and on the supply side of the main line emergency switch
- Each davit arm limit switch, whether connected in the power circuit or in the control circuit, must disconnect all ungrounded conductors of the circuit controlled.
- If one motor is used with two winches, there must be a main line emergency switch, a clutch interlock switch and a master switch for each winch, except that a single main line emergency switch located as required by paragraph (e) of this section may be used for both winches. The main line emergency switches must be connected in series ahead of the motor controller. The master switches must be connected in parallel and each, in series with the corresponding clutch interlock switch for that winch. Each clutch interlock switch must open the circuit to its master switch, except when the power unit is clutched to the associated winch. There must be a means to prevent the power unit from being clutched to both winches simultaneously

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- The main line emergency disconnect switch must be adjacent to the master switch, within reach of the winch operator, accessible to the person in charge of the boat stowage, and for gravity installations, in a position from which the movement of the boat davit arms can be observed as they approach the final stowed position

**USCG Reference**  
**46CFR111.97-7**

**Electric Power Operated Watertight Door Systems**

**DNV Reference**  
**OS-D201 Ch. 2 Sec. 10**  
**B200**

**MODU Code**  
**Reference**  
**3.6.4**

Each distribution panel board for a watertight door system must be above the uppermost continuous deck and must have means of locking  
Each feeder supplying a watertight door operating system must be above the uppermost continuous deck  
Each watertight door operating system must have a separate branch circuit

**USCG Reference**  
**46CFR111.105**

**Hazardous Locations**

**DNV Reference**  
**OS-A101 Sec. 4 B102**

**MODU Code**  
**Reference 6.2**

Detailed requirements for the following are found in this section: power ventilation systems except machinery space ventilation systems, machinery space ventilation, ventilation stop stations, machinery stop stations, system integrity, approved equipment, explosion proof and flame proof equipment, intrinsically safe systems, additional methods of protection, wiring methods for hazardous locations, switches, ventilation, belt drives, mobile offshore drilling units, battery rooms, paint stowage or mixing spaces, industrial systems. Note that for MODUs, locations considered to be Class 1 Div 1 and Class 1 Div 2 areas are defined in 111.105-33

NOTE: The requirements of Subchapter I-A (and J where referred) must be followed for this section as U.S. requirements differ from non-U.S. requirements. All hazardous location plans and equipment must be reviewed by the USCG Marine Safety Center.

**USCG Reference**  
**46CFR112.05-3**

**Main Emergency Bus-tie**

**DNV Reference**  
**OS-D201 Ch. 2 Sec. 2**  
**C105**

**MODU Code**  
**Reference**  
**5.3**

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

- Disconnect automatically upon loss of potential at the emergency switchboard
- Be arranged to prevent parallel operation of an emergency power source with any other source of electric power, except for the interlock systems for momentary transfer of loads and
- If arranged for feedback operation, open automatically upon overload of the emergency power source before the emergency power source is tripped off the line from the overload.

**USCG Reference**  
**46CFR112.05-5**

**Emergency Power Source**

**DNV Reference**  
**OS-D201 Ch. 2 Sec. 2 C**

**MODU Code**  
**Reference**  
**5.3**

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

DNV requires the facility to stop the emergency generator remotely from the bridge and the engine control room.

<b>USCG Reference</b> <b>46CFR112.15-1 &amp; -5</b>	<b>Emergency Loads</b>	<b>DNV Reference</b> <b>OS-D201 Ch. 2 Sec. 2 C</b>	<b>MODU Code Reference</b> <b>5.3</b>
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Final (including temporary) emergency loads.

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

- Illumination to allow safe operation of each power operated watertight door.
- At least one light in each space where a person may be maintaining, repairing or operating equipment, stowing or drawing stores or equipment, or transiting, such as public spaces, work spaces, machinery spaces, workshops, galleys, bow thruster rooms, storage areas, underdeck passageways in cargo areas, windlass rooms, accessible duct keels with valve operators, cargo handling rooms and holds of roll on/roll-off vessels.
- All lighting relative to helicopter operations and landing if installed, unless provided by another source power (such as independent batteries separately charged by solar cells).
- Each general emergency alarm system required by SOLAS 74.
- Each charging panel for:
  - Temporary emergency batteries;
  - Starting batteries for diesel engines or gas turbines that drive emergency generators; and
  - General alarm batteries.
- If necessary, the lube oil pump for each propulsion turbine and reduction gear, propulsion diesel reduction gear, and ship's service generator turbine which needs external lubrication.
- Each rudder angle indicator.
- Each general emergency flashing light required.
- Each blow-out-preventer control system.
- Any permanently installed diving equipment that is dependent upon the vessel's power.
- Each emergency generator starting compressor.
- Each vital system automation load required.
- Motor-operated valves for each cargo oil and fuel oil system, if the emergency power source is the source of power.
- Each ship's stabilizer wing, unless a separate source of emergency power is supplied.
- Each indicator that shows the position of the stabilizer wings.
- Each smoke extraction fan (not including smoke detector sampling).

<b>USCG Reference</b> <b>46CFR112.20-5</b>	<b>Transitional Source of Power</b>	<b>DNV Reference</b> <b>OS-D201 Ch. 2 Sec. 2 C</b>	<b>MODU Code Reference</b> <b>5.3</b>
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On vessels which are required to install a transitional source of power, the consumers listed in 46CFR 112.20-5 shall, if there is a reduction of potential of the normal or emergency source by 15 to 40 percent, be automatically supplied from the temporary emergency power source.  
For systems in which a reduction of frequency of the normal source or final emergency power source adversely affects the emergency system and emergency loads, there must be means to transfer the consumer loads required under (a) to the temporary emergency power source upon a reduction in the frequency of the normal source or final emergency power source.

**USCG Reference**  
**46CFR112.20-15**

**Transfer of emergency loads.**

**DNV Reference**  
**OS-D201 Ch. 2 Sec. 2 C**

**MODU Code**  
**Reference**  
**5.3**

When the potential of the final emergency power source reaches 85 to 95 percent of normal value, the emergency loads under 112.15 - 5 must transfer automatically to the final emergency power source and, on a passenger vessel, this transfer must be accomplished in no more than 45 seconds after failure of the normal source of power.

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.

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

**USCG Reference**  
**46CFR112.43-7 (b)**

**Emergency Lighting**

**DNV Reference**  
**OS-A101 Sec. 5 F101**

**MODU Code**  
**Reference**  
**5.3, 5.5**

An emergency lighting system must not have a switch except in a distribution panel

The following emergency lights must be supplied from distribution panels located in the control room

- Navigation lights
- Flood lights at lifeboat and life raft embarkation points
- Signaling lights
- Emergency lights on open deck
- Emergency lights in the control room
- Emergency lights in the Chart room
- Emergency lights in the fire control room

Flood lights at liferaft and lifeboat embarkation points must be fed from a dedicated branch circuit.

Flood lights at adjacent life rafts and lifeboat embarkation points must be fed from different branch circuits.

Each emergency light must be marked with the letter “E” that is colored red and at least 0.5 inches (12.7mm) high.

Emergency escape lights must have a telltale indicator to show when the batteries are being discharged.

Fused switches or circuit breakers for each branch circuit are required.

<b>USCG Reference</b> <b>46CFR112.50-1(g)</b>	<b>Emergency Diesel and Gas Turbine Engine Driven Generator Sets</b>	<b>DNV Reference</b> <b>OS-D201 Ch. 2 Sec. 2 C302</b>	<b>MODU Code Reference</b> <b>5.3</b>
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The generator set must shut down automatically upon loss of lubricating oil pressure, overspeed or operation of fixed fire extinguishing systems in the emergency generator room.. Each generator prime mover must have an overspeed regulator as detailed in 46CFR 111.12-1 (b), i.e. “Each generator prime mover must have an overspeed device that is independent of the normal operating governor and adjusted so that the speed cannot exceed the maximum rated speed by more than 15 percent.”

<b>USCG Reference</b> <b>46CFR112.55-5</b>	<b>Emergency Lighting Loads</b>	<b>DNV Reference</b> <b>OS-D201 Ch. 2 Sec. 2</b>	<b>MODU Code Reference</b> <b>5.5</b>
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When supplying emergency lighting loads, the storage battery initial voltage must not exceed the standard system voltage by more than 5 percent

<b>USCG Reference</b> <b>46CFR112.55-10(d)</b>	<b>Storage Battery Charging</b>	<b>DNV Reference</b> <b>OS-D201 Ch. 2 Sec. D102</b>	<b>MODU Code Reference</b> <b>5.3</b>
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There must be instruments to show the rate of charge

<b>USCG Reference</b> <b>46CFR113.25</b>	<b>General Emergency Alarm System</b>	<b>DNV Reference</b> <b>OS-D201 Ch. 2 Sec. 2 C Table C1</b>	<b>MODU Code Reference</b> <b>10.16.1</b>
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Requirements for the GA are outlined in this section. These requirements are directed at ensuring operability, availability and redundancy of design. Manually-operated contact makers must be installed at:

- Main control room;
- Drilling console;
- Feeder distribution panel;
- Navigating bridge (if installed);
- Another routinely-occupied space as far away as practicable from other contact makers.

<b>USCG Reference</b> <b>46CFR113.25</b>	<b>Public Address System</b>	<b>DNV Reference</b> <b>OS-A101 Sec. 5 F101</b>	<b>MODU Code Reference</b> <b>10.16.2</b>
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Requirements for the PA are outlined in this section. These requirements are directed at ensuring operability, availability and redundancy of design.

**USCG Reference**  
**46CFR113.30-5**

**Internal Communication Requirements**

**DNV Reference**  
**OS-A101 Sec. 5 F101**

**MODU Code**  
**Reference**  
**10.16.2**

Requirements for communication equipment, gyrocompass, radar, radio and radio direction finder, emergency lockers, fire/smoke detection systems, lookouts, and engine room control stations, as well as particular requirements for non-self propelled MODUs, are outlined in this section.  
Requirements for Public Address systems are also outlined in this section.

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

**USCG Reference**  
**46CFR46 CFR 113.35 – 3**

**Engine Room Telegraph**

**DNV Reference**  
**OS-D202**

**MODU Code**  
**Reference 7, 8**

An engine room telegraph if fitted is to comply with the following:

- a separate engine room telegraph is to be provided for each engine
- on a double-ended vessel that has two navigating bridges, this system is to be between the engine room and each navigating bridge.

**USCG Reference**  
**46 CFR 113.35 – 5**

**Electric Engine Order Telegraph Systems.**

**DNV Reference**  
**OS-D202**

**MODU Code**  
**Reference 7, 8**

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

Each engine room indicator must be capable of acknowledgement of orders.

There must be an audible signal at each instrument. The signal at both locations must sound continuously when the transmitter and the indicator do not show the same order.

Each telegraph instrument must meet the protection requirements in Pt.4 Ch.9 Sec.5.

Each system must have an alarm which—

- Automatically sounds and visually signals a loss of power to the system
- Is on the navigating bridge; and
- Has a means to reduce the audible signal from 100 percent to not less than 50 percent.

**USCG Reference**  
**46 CFR 113.35 – 7**

**Electric Engine Order Telegraph Systems - Operation.**

**DNV Reference**  
**OS-D202**

**MODU Code**  
**Reference 7, 8**

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, the transmitters must:

- Operate in synchronism as required in paragraph (b) of this section; or
- Operate under the control of a transmitter transfer control in accordance with paragraph (c) of this section.

All transmitter handles and pointers must operate in synchronism. Where the transmitters are mechanically interlocked to effect synchronous operation, the requirements of Sec. 113.35 – 13 must be met.



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.

<b>USCG Reference</b> <b>46 CFR 113.35 – 9</b>	<b>Mechanical Engine Order Telegraph Systems.</b>	<b>DNV Reference</b> <b>OS-D202</b>	<b>MODU Code</b> <b>Reference 7, 8</b>
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Each mechanical engine order telegraph system is to consist of transmitters and indicators mechanically connected to each other, as by means of chains and wires.

Each transmitter and each indicator is to 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 acknowledgement of an order. The audible signal device is to not be dependent upon any source of power for operation other than that of the movement of the transmitter or indicator handle.

<b>USCG Reference</b> <b>46CFR113.35 – 13</b>	<b>Mechanical Engine Order Telegraph Systems - Operation</b>	<b>DNV Reference</b> <b>OS-D202</b>	<b>MODU Code</b> <b>Reference 7, 8</b>
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If more than one transmitter operates a common indicator in the engine room, all the transmitters is to be mechanically interlocked and operate in synchronism. A failure of the transmission wire or chain at any transmitter is to not interrupt or disable any other transmitter

<b>USCG Reference</b> <b>46CFR113.35 – 15</b>	<b>Mechanical Engine Order Telegraph Systems – Length of Cables</b>	<b>DNV Reference</b> <b>OS-D202</b>	<b>MODU Code</b> <b>Reference 7, 8</b>
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If a mechanical engine order telegraph system is installed on any vessel to provide the communication required by this subpart, the length of cables or other mechanical limitations is to not prevent the efficient operation of the system.

<b>USCG Reference</b> <b>46CFR113.35 – 17</b>	<b>Bridge Control of Propulsion Machinery</b>	<b>DNV Reference</b> <b>OS-D202</b>	<b>MODU Code</b> <b>Reference 7, 8</b>
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Where ships are arranged with bridge control of propulsion machinery, each telegraph transmitter should be arranged such that it prevents movement to the “Navigating Bridge Control” position without positive action by the operator.

<b>USCG Reference</b> <b>46CFR113.43-1,3,5</b>	<b>Steering Failure Alarm System</b>	<b>DNV Reference</b> <b>OS-D201 Ch. 2 Sec. 2 G, H</b>	<b>MODU Code</b> <b>Reference</b> <b>7.5</b>
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This subpart applies to each vessel of 1600 gross tons and over that has power driven main or auxiliary steering gear

Alarm Systems.

Each vessel must have a steering failure alarm system that actuates an audible and visible alarm in the pilothouse when the actual position of the rudder differs by more than 5 degrees from the rudder position ordered by the follow-up control systems, required by part 58, subpart 58.25 of this chapter for more than

- 30 seconds for ordered rudder position changes of 70 degrees
- 6.5 seconds for ordered rudder position changes of 5 degrees and
- The time period calculated by the following formula for ordered rudder positions changes between 5 degrees and 70 degrees:

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

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

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

## SUBCHAPTER S – SUBDIVISION AND STABILITY

<b>USCG Reference</b> <b>46CFR 170.185</b>	<b>Stability Test Preparation</b>	<b>DNV Reference</b> <b>OS-C301 Ch.2 Sec. 1</b> <b>C100</b> <b>Class Note 20.2</b>	<b>MODU Code</b> <b>Reference</b> <b>3.1</b>
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USCG provides specific requirements for test procedures to be submitted for approval

<b>USCG Reference</b> <b>46CFR 174.040</b>	<b>Stability Requirements - General</b>	<b>DNV Reference</b> <b>OS-C301 Ch.2 Sec. 1</b>	<b>MODU Code</b> <b>Reference</b> <b>3.2.4</b>
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Each unit must be designed to have at least 2 inches (50mm) of positive metacentric height in the upright equilibrium position for the full range of drafts, whether at the operating draft for navigation, towing, or drilling afloat, or at a temporary draft when changing drafts.

<b>USCG Reference</b> <b>46CFR 174.045</b>	<b>Intact Stability Requirements for Restricted Service and Severe Storm Conditions</b>	<b>DNV Reference</b> <b>OS-C301 Ch.2 Sec. 1 D</b>	<b>MODU Code</b> <b>Reference</b> <b>3.2.4</b>
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Restricted service. The USCG has no provision for a “Restricted Service” (50 knot winds) standard. Severe Storm Conditions. The unit must be able to change from any normal operation condition to severe storm condition within a minimum period of time as specified in the Operations Manual. DNV and IMO require that the ballast system design is capable of bringing the unit from a maximum operating draft to a severe storm draft within 3 hours.

<b>USCG Reference</b> <b>46CFR 174.050</b>	<b>Stability on Bottom</b>	<b>DNV Reference</b> <b>OS-C301 Ch.2 Sec. 1</b>	<b>MODU Code</b> <b>Reference</b> <b>3.2.4</b>
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Each bottom bearing unit must be designed so that, while supported on the sea bottom with footings or a mat, it continually exerts a downward force on each footing or the mat when subjected to the forces of wave and current and to wind blowing at the velocities described in 46CFR 174.055(b)(3).

<b>USCG Reference</b> <b>46CFR 174.065</b>	<b>Damage Stability Requirements</b>	<b>DNV Reference</b> <b>OS-C301 Ch.2 Sec. 1</b>	<b>MODU Code</b> <b>Reference</b> <b>3.2.4</b>
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Each unit must be designed so that, while in each of its normal operating conditions and severe storm conditions, its final equilibrium waterline would remain below the lowest edge of any opening through which additional flooding could occur if the unit were subjected simultaneously to:

- Damage causing flooding described in 46CFR 174.075 through 46CFR 174.085; and
- A wind heeling moment calculated in accordance with 46CFR 174.055(b) using a wind velocity of 50 knots (25.8 meters per second).

Each unit must have a means to close off each pipe, ventilation system, and trunk in each compartment described in 46CFR 174.080 or 46CFR 174.085 if any portion of the pipe, ventilation system, or trunk is within 5 feet (1.5 meters) of the hull.

**USCG Reference**  
**46CFR174.080**

**Flooding of Self-Elevating Units**

**DNV Reference**  
**OS-C301 Ch.2 Sec. 1**  
**E300**

**MODU Code**  
**Reference**  
**3.5.5**

On a surface type unit or self-elevating unit, all compartments within 5 feet (1.5 meters) of the hull of the unit between two adjacent main watertight bulkheads, the bottom shell, and the uppermost continuous deck or first superstructure deck where superstructures are fitted must be assumed to be subject to simultaneous flooding.

On the mat of a self-elevating unit, all compartments of the mat must be assumed to be subject to individual flooding.

**USCG Reference**  
**46CFR174.100**

**Appliances for Watertight and Weathertight Integrity**

**DNV Reference**  
**OS-C301 Ch.2 Sec. 2**

**MODU Code**  
**Reference**  
**3.6.4 & 3.6.5**

If a unit is equipped with sliding watertight doors, each sliding watertight door must:

- Be designed, constructed, marked and tested in accordance with ASTM F-1196
- Have controls in accordance with ASTM F-1197, except that a remote manual means of closure, as specified in paragraphs 7.1 and 7.5.2 and a remote mechanical indicator, as specified in paragraph 7.5.2. will not be required
- If installed in a subdivision bulkhead, meet Supplemental Requirements Nos. S1 and S3 of ASTM F-1196 unless the watertight doors are built in accordance with plans previously approved by the USCG, in which case only Supplemental Requirements Nos. S1 and S3.1.4 of ASTM F-1196 must be met. In either case, control systems for watertight doors must have power supplies, power sources, installation tests and inspection and additional remote operating consoles in accordance with Supplemental Requirements Nos. S1 through S4 of ASTM F-1197

**USCG Reference**  
**46CFR174.220**

**Hatches and Coamings**

**DNV Reference**  
**OS-C301 Ch.2 Sec. 2**

**MODU Code**  
**Reference**  
**3.6.4 & 3.6.5**

Each hatch exposed to the weather must be watertight, except that the following hatches may be only weathertight:

- Each hatch on a watertight trunk that extends at least 430 millimeters (17 inches) above the weather deck.
- Each hatch in a cabin top.

Each hatch cover must:

- Have securing-devices; and
- Be attached to the hatch frame or coaming by hinges, captive chains, or other devices to prevent its loss.

Each hatch that provides access to quarters or to accommodation spaces for crew members or offshore workers must be capable of being opened and closed from either side.

Except as provided by paragraph (e) of this section, a weathertight door with a permanent watertight coaming at least 380 millimeters (15 inches) high must be installed for each opening in a deckhouse or companionway that--

- Gives access into the hull; and

- Is in an exposed place.

If an opening in a deckhouse or companionway has a Class-1 watertight door installed, the height of the watertight coaming need only accommodate the door.

## SUBCHAPTER V – MARINE OCCUPATIONAL SAFETY AND HEALTH STANDARDS

<b>USCG Reference</b> <b>46CFR197 Subpart B</b>	<b>Diving Systems</b>	<b>DNV Reference</b> <b>DNV Rules for</b> <b>Certification of Diving</b> <b>Systems</b>	<b>MODU Code</b> <b>Reference</b> <b>14.6</b>
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Diving support systems must meet the following requirements:

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

## SUBCHAPTER W – LIFESAVING APPLIANCES AND ARRANGEMENTS

<b>USCG Reference</b> <b>46CFR 199.60</b>	<b>Communications</b>	<b>DNV Reference</b> <b>NONE</b>	<b>MODU Code</b> <b>Reference 11.7</b>
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On board communications and alarm systems. Each vessel must meet the requirements for onboard communications between emergency control stations, muster and embarkation stations and strategic positions on board. Each vessel must also meet the emergency alarm system requirements in subchapter J of this chapter, which must be supplemented by either a public address system or other suitable means of communication

<b>USCG Reference</b> <b>46CFR199.70</b>	<b>Personal Life Saving Appliances</b>	<b>DNV Reference</b> <b>NONE</b>	<b>MODU Code</b> <b>Reference 10.10</b>
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Immersion suits approved under approval series 160.171 or anti-exposure suits approved under approval series 160.153 of suitable size for each person assigned to the rescue boat crew and each person assigned to a marine evacuation system crew

<b>USCG Reference</b> <b>46CFR199.110 (f) (2)</b>	<b>Survival Craft Muster and Embarkation Instructions</b>	<b>DNV Reference</b> <b>NONE</b>	<b>MODU Code</b> <b>Reference 10.3</b>
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Provided that there is at least one embarkation ladder on each side of the vessel, the OCMI may permit additional embarkation ladders to be other approved devices that provide safe and rapid access to survival craft in the water. The OCMI may accept other safe and effective means of embarkation for use with a liferaft required under 199.261(e)

<b>USCG Reference</b> <b>46CFR199.140</b>	<b>Stowage of Rescue Boats</b>	<b>DNV Reference</b> <b>NONE</b>	<b>MODU Code</b> <b>Reference 10.7</b>
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- General. Rescue boats must be stowed--
  - To be ready for launching in not more than 5 minutes.
  - In a position suitable for launching and recovery;
  - In a way that neither the rescue boat nor its stowage arrangements will interfere with the operation of any survival craft at any other launching station; and
  - If it is also a lifeboat, in compliance with the requirements of Sec. 199.130.
- Each rescue boat must have a means provided for recharging the rescue boat batteries from the vessel's power supply at a supply voltage not exceeding 50 volts.
- Each inflated rescue boat must be kept fully inflated at all times.

<b>USCG Reference</b> <b>46CFR199.150</b>	<b>Survival Craft Launching and Recovery Arrangements:</b> <b>General</b>	<b>DNV Reference</b> <b>NONE</b>	<b>MODU Code</b> <b>Reference 10.6</b>
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Unless expressly provided otherwise in this part, each survival craft must be provided with a launching appliance or marine evacuation system, except those survival craft that are carried in excess of the survival craft for 200 percent of the total number of persons on board the vessel and that have a mass of not more than 407 lbs (185 kg); are carried in excess of the survival craft for 200 percent of the total number of persons on board the vessel and that are stowed for launching directly from the stowed position under unfavourable conditions or trim of 10 degrees and a list of 20 degrees either way; or are provided for use in conjunction with a marine evacuation system and that are stowed for launching directly from the stowed position under unfavourable conditions of trim of 10 degrees and a list of 20 degrees either way.

During preparation and launching, the survival craft, its launching appliance and the area of water into which it is to be launched are to be illuminated by lighting supplied from the vessel's emergency source of electrical power.

If there is any danger of the survival being damaged by the vessel's stabilizer wings, the stabilizer wings must be able to be brought inboard using power from the emergency source of electrical power. Indicators operated by the vessel's emergency power system must be provided on the navigating bridge to show the position of the stabilizer wings.

<b>USCG Reference</b> <b>46CFR199.175</b>	<b>Survival Craft and Rescue Boat Equipment</b>	<b>DNV Reference</b> <b>NONE</b>	<b>MODU Code</b> <b>Reference 10</b>
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USCG has specific details of equipment to be stowed in survival craft and rescue boats.

<b>USCG Reference</b> <b>46CFR199.178</b>	<b>Marking of Stowage Locations</b>	<b>DNV Reference</b> <b>NONE</b>	<b>MODU Code</b> <b>Reference 10.5</b>
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Each liferaft stowage location should be marked with the capacity of the liferaft stowed there.

**USCG Reference**  
**46CFR199.180**

**Training and Drills**

**DNV Reference**  
**NONE**

**MODU Code**  
**Reference 14.11**

On a vessel engaged on a voyage when the passengers or special personnel are scheduled to be on board for more than 24 hours, musters of the passengers and special personnel must take place within 24 hours after their embarkation. Passengers and special personnel must be instructed in the use of the lifejackets and the action to take in an emergency.

Whenever new passengers or special personnel embark, a safety briefing must be given immediately before sailing or immediately after sailing. The briefing must include the instructions required by 199.80 and must be made by means of an announcement in one or more languages likely to be understood by the passengers and special personnel. The announcement must be made on the vessel's public address system or by other equivalent means likely to be heard by the passengers and special personnel who have not yet heard it during the voyage. The briefing may be included in the muster required in this section if the muster is held immediately upon departure. Information cards or posters or video programs displayed on the vessel's video display, may be used to supplement the briefing, but may not be used to replace the announcement.

Abandon ship drills should also include conducting a mock search and rescue of passengers or special personnel trapped in their staterooms, and giving instructions in the use of radio lifesaving appliances.

**USCG Reference**  
**46CFR199.190**

**Operation Readiness, Maintenance and Inspection of  
Lifesaving Equipment**

**DNV Reference**  
**NONE**

**MODU Code**  
**Reference 10.18**

USCG has specific details of requirements for operational readiness, and maintenance and inspections to be performed.

**MISCELLANEOUS**

**USCG Reference**  
**NVIC 9-97**

**Steel Ducting (Gauge of Steel)**

**DNV Reference**  
**OS-D301 Ch. 2 Sec. 1**  
**B304, 305**

**MODU Code**  
**Reference**  
**9.2.11-9.2.20**

NVIC 9-97 (NOT A REGULATION BUT AN ADDITIONAL GUIDELINE) recommends the use of 22 USSG steel ducting (0.73mm) to avoid additional arrangements for penetrations such as the use of dampers or sleeves. IMO will allow any gauge ducting in areas where thicker ducting is not required, so long as it is non-combustible.

**SECTION II: SUPPLEMENTAL REQUIREMENTS NOT ADDRESSED BY DNV RULES OR IMO MODU CODE**

**SUBCHAPTER O – POLLUTION**

**USCG Reference**                      **Marine Sanitation Devices**  
**33CFR 159**

USCG states specific requirements in 33 CFR 159.

**SUBCHAPTER P – PORTS AND WATERWAYS SAFETY**

**USCG Reference**                      **Navigation Safety Regulations**  
**33CFR 164.35 (h)**

Each vessel must have an echo depth sounding device.

**SUBCHAPTER F – MARINE ENGINEERING**

**USCG Reference**                      **Fuel Oil**  
**46CFR 58.01**

USCG has requirements as to flashpoint of fuel oil.

**USCG Reference**                      **Noise**  
**46CFR 58.01-50**

USCG has requirements as to permissible noise levels in machinery spaces.

**USCG Reference**                      **Liquefied Petroleum Gas for Cooking and Heating**  
**46CFR 58.16**

USCG has requirements for LPG installations. .

**USCG Reference**                      **Repairs to Boilers, Pressure Vessels, and Appurtenances**  
**46CFR 59**

USCG has detailed requirements for repairs to boilers, pressure vessels, and appurtenances.

**USCG Reference**                      **Tests and Inspections of Fired Thermal Heaters**  
**46CFR 61.30**









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- “Public facility” means a toilet, washing or shower space that is not private or semi-private

The following requirements apply with regards to wash spaces, toilet spaces, and shower spaces:

- Each private facility must have one toilet, one shower, and one washbasin, all of which may be in a single space.
- Each semi-private facility must have one toilet, one shower, which may be in a single space.
- Each room adjoining a semi-private facility must have at least one toilet and one shower, which may be in a single space
- Each unit must have enough public facilities to provide at least one toilet, one shower, and one washbasin for each eight persons who occupy sleeping spaces that do not have private or semi-private facilities
- Urinals may be installed in toilet rooms, but no toilet required in this section may be replaced by a urinal.
- Each public toilet space and washing space must be convenient to the sleeping space that it serves
- No public facility may open up into any sleeping space
- Each washbasin, shower and bathtub must have hot and cold running water
- Adjacent toilets must be separated by a partition that is open at the top and bottom for ventilation and cleaning
- Public toilet facilities and showers facilities must be separated
- Each public toilet facility that is a toilet space must have at least one washbasin unless the only access to the toilet is through a washing space
- Each toilet must have an open front seat
- 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
- Washbasins may be located in sleeping spaces

**USCG Reference**  
**46CFR108.207**

**Messrooms**

The following requirements apply to messroom design and outfit:

- Each messroom that is not adjacent to galley that serves it must be equipped with a steam table
- Each messroom must seat the number of persons expected to eat in the messroom at one time

**USCG Reference**  
**46CFR108.209**

**Hospital Spaces**

The following requirements apply to hospital spaces:

- Each unit carrying twelve or more persons on a voyage of more than three days must have a hospital space
- Each hospital space must be suitably separated from other spaces
- No hospital space may be used for any other purpose, when used for the care of the sick
- An entrance to each hospital space must be wide enough and arranged to readily admit a person on a stretcher
- Each berth in the hospital must be made of metal
- Each upper berth must be hinged and arranged so that it can be secured clear of the lower berth
- Each hospital must have at least one berth that is accessible from both sides
- Each hospital space must have one berth for every 12 persons or portion thereof on board, who are not berthed in single occupancy rooms, but the number of need not exceed six.
- Each hospital space must have a toilet, washbasin, and bathtub or shower accessible from the hospital space

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- Each hospital space must have clothes lockers, a table and seats

**USCG Reference**  
**46CFR108.210**

**Hospital spaces not required**

The hospital space required under CFR108.209 is not required on a unit if one single or double occupancy sleeping space, designated and equipped as a treatment or isolation room or both is available for immediate medical use, and has:

- An entrance that is wide enough and arranged to readily admit a person on a stretcher
- A single berth or examination table that is accessible from both sides and
- A washbasin in or immediately adjacent to it

**USCG Reference**  
**46CFR108.211**

**Misc. Accommodation Spaces**

The following requirements apply to miscellaneous accommodation spaces:

- Each unit must have enough facilities for personnel to wash their own clothes, including at least one tub or sink that has hot and cold water running
- Each unit must have enough equipment or space for the personnel to dry their own clothes
- Each unit must have an accommodation space that can be used for recreation

**USCG Reference**  
**46CFR108.213**

**Heating Requirements**

Each accommodation space must be heated by a system that can maintain at least 20°C.

Radiators and other heating apparatuses must be constructed, located or shielded as to avoid risk of:

- Fire
- Danger and
- Discomfort to the occupants of each accommodation space.

Each exposed pipe in an accommodation space, leading to a radiator or other heating apparatus must be insulated

**USCG Reference**  
**46 CFR108.215**

**Insect Screens**

Accommodation spaces must be protected against the admission of insects. Insect screens must be installed when natural ventilation is provided.

**USCG Reference**  
**46CFR108.217**

**Guardrails and bulwarks**

Removable guardrails may be used installed where the operating conditions warrant their use





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- Each marine evacuation system must be arranged so that liferafts may be securely attached to the platform and released from the platform by a person either in the liferaft or on the platform.
- Each marine evacuation system must be capable of being deployed from the unit under unfavorable conditions of list of up to 20 degrees.
- If the marine evacuation system has an inclined slide, the angle of the slide from horizontal must be within a range of 30 to 35 degrees when the unit is upright and in the lightest seagoing condition.
- Each marine evacuation system platform must be capable of being restrained by a bowing line or other positioning system that is designed to deploy automatically, and if necessary, be capable of being adjusted to the position required for evacuation.

Each marine evacuation system must be stowed as follows:

- There must not be any openings between the marine evacuation system's embarkation station and the unit's side at the unit's waterline in the lightest seagoing condition.
- The marine evacuation system must be protected from any projections of the unit's structure or equipment.
- The marine evacuation system's passage and platform, when deployed, its stowage container, and its operational arrangement must not interfere with the operation of any other lifesaving appliance at any other launching station.
- Where appropriate, the marine evacuation system's stowage area must be protected from damage by heavy seas.

Stowage of associated liferafts. Inflatable liferafts used in conjunction with the marine evacuation system must be stowed as follows:

- Each inflatable liferaft used in conjunction with the marine evacuation system must be close to the system container, but capable of dropping clear of the deployed chute and boarding platform.
- Each inflatable liferaft used in conjunction with the marine evacuation system must be capable of individual release from its stowage rack.
- Each inflatable liferaft used in conjunction with the marine evacuation system must be stowed in accordance with Sec. 108.530.
- Each inflatable liferaft used in conjunction with the marine evacuation system must be provided with pre-connected or easily connected retrieving lines to the platform.

**USCG Reference**  
**46CFR108.623**

**General Alarms Bell Switch**

Each general alarm bell switch must be marked "GENERAL ALARM" on a plate or other firm non-corrosive backing

**USCG Reference**  
**46CFR108.625**

**General Alarm Bell**

Each general alarm must be identified by marking "GENERAL ALARM - WHEN BELL RINGS GO TO YOUR STATION" next to the bell

**USCG Reference**  
**46CFR108.627**

**Carbon Dioxide Alarm**

Each carbon dioxide alarm must be identified by marking "WHEN ALARM SOUNDS VACATE AT ONCE. CARBON DIOXIDE BEING RELEASED" next to each alarm









**USCG Reference**  
**46CFR108.661**

**Unit Markings: Draft Marks**

Each unit must have draft marks for each foot of immersion:

- If the unit is a surface unit, on both the port and starboard sides of the stem and the stern or rudderpost or at any other place at the stern of the unit as may be necessary for easy observance.
- If the unit is a self-elevating unit, near each corner of the hull but not more than 4 required and
- If the unit is a column stabilized unit, on each corner column, continuing to the footing or lower displacement hull

The bottom of each mark must be at the draft indicated by that mark. The mark must be:

- In numerals 6 inches high
- In contrasting color to the background

For the purpose of this section, “draft” means the distance from the bottom of the keel or the lower shell plate on the outer surface of the unit to the surface of the water, except that where a unit has a permanent appendage extending below the bottom of the keel, “draft” means the distance from the lowest part of the appendage to the surface of the water.

In cases where draft marks are obscured due to operational constraints or by protrusions, the vessel must be fitted with a reliable draft indicating system from which the draft can be determined.

**USCG Reference**  
**46CFR108.701**

**Sounding Equipment**

Each self-propelled unit must have a mechanical or electronic sounding apparatus.

**USCG Reference**  
**46CFR108.801**

**Navigation Bridge Visibility**

Each self-propelled mobile offshore drilling unit which is 100 meters (328 feet) or more in length and contracted for on or after September 7, 1990, must meet the following requirements:

- The field of vision from the navigation bridge, whether the vessel is in a laden or unladen condition, must be such that:
  - From the conning position, the view of the sea surface is not obscured forward of the bow by more than the lesser of two ship lengths or 500 meters (1,640 feet) from dead ahead to 10 degrees on either side of the vessel. Within this arc of visibility any blind sector caused by cargo, cargo gear, or other permanent obstruction must not exceed 5 degrees.
  - From the conning position, the horizontal field of vision extends over an arc from at least 22.5 degrees abaft the beam on one side of the vessel, through dead ahead, to at least 22.5 degrees abaft the beam on the other side of the vessel. Blind sectors forward of the beam caused by cargo, cargo gear, or other permanent obstruction must not exceed 10 degrees each, nor total more than 20 degrees, including any blind sector within the arc of visibility described in paragraph (a)(1) of this section.
  - From each bridge wing, the field of vision extends over an arc from at least 45 degrees on the opposite bow, through dead ahead, to at least dead astern.
  - From the main steering position, the field of vision extends over an arc from dead ahead to at least 60 degrees on either side of the vessel.







**USCG Reference**  
**46CFR109.433**

**Logbook Entries**

It should be verified that the following applicable entries are made in the log book requested by this subpart:

- The date of each test of the steering gear, whistle, general alarm and communication equipment and the condition of the equipment;
- The time and date of each opening and closing, while the unit is afloat, of each required appliance for watertight integrity not fitted with a remote operating control arm or alarm system and the reasons for the action;
- The date of each test of emergency lighting and power systems and the condition and performance of the equipment;
- The logbook must include information on emergency training drills required in 109.213(h);
- Prior to getting underway, the fore and aft drafts, the position of the Load line marks in relation to the surface of the water and the density of the water in which the vessel is floating, if in fresh or brackish water.;
- After loading and prior to getting underway and at all other times necessary to assure the safety of the vessel, a statement verifying vessel compliance with applicable stability requirements as required by 109.227;
- The date of each inspection of accommodation space.

The date of each inspection required in 109.573 if performed by the master or person in charge.

**USCG Reference**  
**46CFR109.521 - 555**

**Duties of Master or Person in Charge with respect to Cranes and Propulsion Boilers**

It should be verified that cranes are operated and maintained in accordance with API RP 2D, and that the safe working load and boom angle chart is posted conspicuously at the crane. He shall also designate in writing operator(s) for cranes and ensure that only designated operators operate the cranes. He shall further ensure that operators are familiar with API RP 2D.

The Master or Person in Charge has a responsibility to ensure that propulsion boilers are not used with steam pressure exceeding that allowed by the COI, and that safety relief valves are not tampered with or rendered inoperable once set.

**USCG Reference**  
**46CFR109.563**

**Posting of Documents**

It should be verified that the following are posted under glass in the pilot house or control center:

- General arrangement plans of each deck showing:
  - Each fire retardant bulkhead
  - Each fire detecting bulkhead
  - Each fire door
  - Each means of ingress to compartments
  - Each ventilation system, including the location of each damper, fan and remote means of stopping the fans
  - For units constructed on or after September 30, 1997, and for existing units which have their plans redrawn, the symbols used to identify the aforementioned details shall be in accordance with the IMO Assembly resolution A.654 (16). The identical symbols can be found in ASTM Adjunct F 1626





