

46 CFR Chapter I Subchapter C. Part 28 “FISHING VESSEL SAFETY ACT”

Code of Federal Regulations

Title 46. Shipping

Chapter I. Coast Guard, Department of Homeland Security

Subchapter C. Uninspected Vessels

Part 28. Requirements for Commercial Fishing Industry Vessels

Subpart A General Provisions

§ 28.10 Authority.

The regulations in this part are prescribed by the Commandant of the Coast Guard, pursuant to a delegation of authority by the Secretary of Transportation set forth in 49 CFR 1.46(b), to carry out the intent and purpose of 46 U.S.C. 3316 which authorizes the Secretary to rely on reports, documents, and certificates issued by the American Bureau of Shipping (ABS) or a similar United States classification society, or an agent of the ABS or similar society; sections 4502 and 4506 which require safety equipment and operational stability for certain vessels in the commercial fishing industry; section

§ 28.30 Applicability.

(a) Except as provided in paragraph (b) of this section, this part is applicable to all United States flag vessels not inspected under this chapter that are commercial fishing, fish processing, or fish tender vessels. This includes vessels documented under the provisions of subchapter G of this chapter and vessels numbered by a State or the Coast Guard under the provisions of 33 CFR subchapter S. Certain regulations in this part apply only to limited categories of vessels. Specific applicability statements are provided at the beginning of those regulations.

(b) This part does not apply to a small boat or auxiliary craft that is deployed from a fishing industry vessel for the purpose of handling fishing gear.

6104 which requires the Secretary of Transportation to compile statistics concerning marine casualties compiled from vessel insurers and to delegate that authority to compile statistics from insurers to a qualified person; and section 10603 which requires seamen on commercial fishing industry vessels to give notice of illness, injury, or disability to their employer.

§ 28.20 OMB control numbers.

(a) This section collects and displays the control numbers assigned to information collection and recordkeeping requirements in this part by the Office of Management and Budget (OMB) pursuant to the Paperwork Reduction Act of 1980 (44 U.S.C. 3501 et seq.). This section complies with the requirements of 44 U.S.C. 3507(f) which requires that agencies display a current control number assigned by the Director of the OMB for each approved agency information collection requirement.

§ 28.40 Incorporation by reference.

(a) Certain material is incorporated by reference into this part with the approval of the Director of the Federal Register in accordance with 5 U.S.C. 552(a). To enforce any edition other than that specified in paragraph (b) of this section, the Coast Guard must publish notice of change in the Federal Register and make the material available to the public. All approved material is on file at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html and at the U.S. Coast Guard, Office of Design and Engineering Standards (G-MSE), 2100 Second Street SW., Washington, DC 20593-0001 and is available from the sources indicated in paragraph (b) of this section.

ence in this part and the sections affected are:

(b) The material approved for incorporation by reference is the material published by the American Boat and Yacht Council (ABYC),

3069 Solomons Island Road, Edgewater, MD 21037:

E-1-1972--Bonding of Direct Current Systems	28.345
E-8-1985--Alternating Current (AC) Electrical Systems on Boats	28.345
E-9-1981--Recommended Practices and Standards Covering Direct Current (DC) Electrical Systems on Boats	28.345
H-2-1989--Ventilation of Boats Using Gasoline	28.340
H-25-1986--Portable Fuel Systems for Flammable Liquids	28.335
H-33-1989--Diesel Fuel Systems	28.335
P-1-1986--Installation of Exhaust Systems for Propulsion and Auxiliary Engines	28.380

American Society for Testing and Materials (ASTM),

100 Barr Harbor Drive, West Conshohocken, PA 19428-2959;

ASTM F 1321-92, Standard Guide for Conducting a Stability Test (Lightweight Survey and Inclining Experiment) to Determine the Light Ship Displacement and Centers of Gravity of a Vessel	28.535
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International Maritime Organization (IMO),

Publications Section, 4 Albert Embankment, London SE1 7SR, United Kingdom:

Resolution A.658(16) "Use and Fitting of Retro-Reflective Materials on Life-Saving Appliances", dated November 1989	28.135
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National Fire Protection Association (NFPA),

1 Batterymarch Park, Quincy, MA 02269:

	70-1990--National Electrical Code (also known as ANSI/NFPA 70-1990)	28.350; 28.370; 28.865
	302-1989--Pleasure and Commercial Motor Craft	28.335; 28.340; 28.345
	17-1985--Dry Chemical Extinguishing Systems	28.330
	17A-1986--Wet Chemical Extinguishing Systems	28.330
Society of Automotive Engineers (SAE),		
400 Commonwealth Drive, Warrendale, PA 15096;		
	SAE J 1475-1984--Hydraulic Hose Fitting for Marine Applications	28.880
	SAE J 1942-1989--Hose and Hose Assemblies for Marine Applications	28.405
Underwriters Laboratories, Inc. (UL),		
12 Laboratory Drive, Research Triangle Park, NC 27709-3995:		
	UL 217-1985--Single and Multiple Station Smoke Detectors	28.325; 28.830
	UL 710-1990--Exhaust Hoods for Commercial Cooking Equipment	28.330

§ 28.50 Definition of terms used in this part.

Accepted organization means an organization which has been designated by the Commandant for the purpose of examining commercial fishing industry vessels under the provisions of § 28.73.

Accommodations include:

- (1) A messroom.
- (2) A lounge.
- (3) A sitting area.
- (4) A recreation room.
- (5) Quarters.

- (6) A toilet space.
- (7) A shower room.
- (8) A galley.
- (9) Berthing facilities.
- (10) A clothing changing room.

Alcohol concentration means either grams of alcohol per 100 milliliters of blood, or grams of alcohol per 210 liters of breath.

Aleutian trade means the transportation of cargo, including fishery related products, for hire on board a fish tender vessel to or from a place in Alaska west of 153 degrees West longitude and east of 172 degrees East longitude if that place receives weekly common carrier

service by water, to or from a place in the United States, except a place in Alaska.

Approved means approved by the Commandant unless otherwise stated.

Auxiliary Craft means a vessel that is carried onboard a commercial fishing vessel and is normally used to support fishing operations.

Boundary lines means the lines described in part 7 of this chapter. In general, they follow the trend of the seaward high water shorelines and cross entrances to small bays, inlets, and rivers. In some areas, they are along the 12-mile line that marks the seaward limits of the territorial sea and, in other areas, they come ashore.

Buoyant Apparatus means a buoyant apparatus approved by the Commandant.

Coast Guard Boarding Officer means a commissioned, warrant, or petty officer of the Coast Guard having authority to board any vessel under the Act of August 4, 1949, 63 Stat. 502, as amended (14 U.S.C. 89).

Coast Guard Representative means a person employed at the cognizant U.S. Coast Guard Sector Office or Marine Inspection Office, or an accepted organization, or a similarly qualified organization approved in examining commercial fishing industry vessels. Contact Office of Vessel Activities, Fishing Vessels Safety Division, Commandant (CG-5433), U.S. Coast Guard, 2100 Second Street SW, Washington, DC 20593-0001 for a current list of accepted organizations or similarly qualified organizations.

Coastal Service Pack means equipment provided in life-rafts approved by the Commandant for coastal service.

Coastal waters means coastal waters as defined in 33 CFR 175.105.

Coastline means the territorial sea baseline as defined in 33 CFR 2.20.

Cold water means water where the monthly mean low water temperature is normally 59 °F (15 °C) or less.

Commandant means the Commandant of the Coast Guard or an authorized representative of the Comman-

dant of the Coast Guard.

Commercial fishing industry vessel means a fishing vessel, fish tender vessel, or a fish processing vessel.

Currently corrected means corrected with changes contained in all Notice to Mariners published by the Defense Mapping Agency Hydrographic/Topographic Center.

Custom engineered means, when referring to a fixed gas fire extinguishing system, a system that is designed for a specific space requiring individual calculations for the extinguishing agent volume, flow rate, and piping, among other factors, for the space.

District Commander means an officer of the Coast Guard designated as such by the Commandant to command all Coast Guard activities within a district.

Documented vessel means a vessel for which a Certificate of Documentation has been issued under the provisions of 46 CFR part 67.

Equipment Packs means equipment provided in life-rafts approved by the Commandant.

Especially hazardous condition means a condition which may be life threatening or lead to serious injury if continued.

Fish means finfish, mollusks, crustaceans, and all other forms of marine animal and plant life, except marine mammals and birds.

Fish processing vessel means a vessel that commercially prepares fish or fish products other than by gutting, decapitating, gilling, skinning, shucking, icing, freezing, or brine chilling.

Fish tender vessel means a vessel that commercially supplies, stores, refrigerates, or transports fish, fish products, or materials directly related to fishing or the preparation of fish to or from a fishing, fish processing or fish tender vessel or a fish processing facility.

Fishing vessel means a vessel that commercially engages in the catching, taking, or harvesting of fish or an activity that can reasonably be expected to result in the catching, taking, or harvesting of fish.

Fishing Vessel Drill Conductor means an individual who meets the training requirements of 46 CFR 28.270(c) for conducting drills and providing instruction once a month to each individual on board those vessels to which Subpart C of this section applies.

Fishing Vessel Safety Instructor means an individual or organization that has been accepted by the local Officer-in-Charge, Marine Inspection to train Fishing Vessel Drill Conductors to conduct drills and provide instruction on those vessels to which subpart C of this part applies.

Gasoline as used in this part includes gasoline-alcohol blends and any other fuel having a flash point of 110 °F (43.3 °C) or lower.

Inflatable Buoyant Apparatus means an inflatable buoyant apparatus approved by the Commandant.

Inflatable Liferaft means an inflatable liferaft that is approved by the Commandant.

Length means the length listed on the vessel's Certificate of Documentation or Certificate of Number.

Lifeboat means a lifeboat approved by the Commandant.

Liferaft means a liferaft approved by the Commandant.

Major conversion means a conversion of a vessel that--

- (1) Substantially changes the dimensions or carrying capacity of the vessel;
- (2) Changes the type of the vessel;
- (3) Substantially prolongs the life of the vessel; or
- (4) Otherwise so changes the vessel that it is essentially a new vessel, as determined by the Commandant.

Mile means a nautical mile.

North Pacific Area means all waters of the North Pacific Ocean and Bering Sea north of 48°30' north latitude including waters in contiguous bays, inlets, rivers, and

sounds.

Officer in Charge, Marine Inspection (OCMI) means an officer of the Coast Guard who commands a Marine Inspection Zone described in 33 CFR part 3 or an authorized representative of that officer.

Open to the atmosphere means a space that has at least 15 square inches (9680 square millimeters) of open area directly exposed to the atmosphere for each cubic foot (0.0283 cubic meters) of net volume of the space.

Operating station means the principal steering station on the vessel from which the vessel is normally navigated.

Pre-engineered means, when referring to a fixed gas fire extinguishing system, a system that is designed and tested to be suitable for installation as a complete unit in a space of a set volume, without modification, regardless of the vessel on which installed.

Similarly qualified organization means an organization which has been designated by the Commandant for the purpose of classing or examining commercial fishing industry vessels under the provisions of § 28.76.

Switchboard means an electrical panel which receives power from a generator, battery, or other electrical power source and distributes power directly or indirectly to all equipment supplied by the power source.

Warm water means water where the monthly mean low water temperature is normally more than 59° F. (15° C.).

Watertight means designed and constructed to withstand a static head of water without any leakage, except that "watertight" for the purposes of electrical equipment means enclosed so that equipment does not leak when a stream of water from a hose with a nozzle one inch (25.4 millimeters) in diameter that delivers at least 65 gallons (246 liters) per minute is played on the enclosure from any direction from a distance of 10 feet (3 meters) for five minutes.

Weather deck means the uppermost deck exposed to the weather to which a weathertight sideshell extends.

Weathertight means that water will not penetrate into

the unit in any sea condition.

§ 28.60 Exemption letter.

(a) Types of exemptions.

(1) Specific exemption means an exemption for an individual commercial fishing industry vessel.

(2) Class exemption means an exemption for a class or fleet of commercial fishing industry vessels.

(b) Exemption procedure. A request for an exemption of either type must be in writing, have specific reasons for the request, and be sent to the Coast Guard District Office having jurisdiction over the waters where the vessel(s) will be operating. Coast Guard District geographical areas are described in 33 CFR part 3. The District Commander will review the request to determine that:

(1) Good cause exists for granting an exemption; and

(2) The safety of the vessel and those on board will not be adversely affected.

(c) The District Commander will either approve or deny the request in writing. In granting a request, the District Commander will specify the terms under which the exemption is granted and distribute the letter describing these terms to the party or parties requesting the exemption.

(d) Exemption letter. Exemption letters, or suitable copies, describing the terms under which the exemption is granted shall be maintained at all times on board each vessel to which any exemption applies.

(e) Right of appeal. Any person directly affected by a decision or action taken under this part may appeal in accordance with § 1.03 of this chapter.

(f) Rescinding an exemption letter. Exemptions granted may be rescinded by the District Commander if it is subsequently determined that the safety of the vessel and those onboard is adversely affected.

§ 28.65 Termination of unsafe operations.

(a) A Coast Guard Boarding Officer may direct the master or individual in charge of a vessel, with the concurrence of the District Commander, or staff authorized by the District Commander, to immediately take reasonable steps necessary for the safety of individuals on board the vessel if the Boarding Officer observes the vessel being operated in an unsafe manner and determines that an especially hazardous condition exists. This may include directing the master or individual in charge of the vessel to return the vessel to a mooring and remain there until the situation creating the especially hazardous condition is corrected or other specific action is taken.

(b) Hazardous conditions include, but are not limited to, operation with--

(1) An insufficient number of lifesaving equipment on board, to include serviceable Personal Flotation Devices (PFDs), serviceable immersion suits, or adequate survival craft capacity.

(2) An inoperable Emergency Position Indicating Radio Beacon (EPIRB) or radio communication equipment when required by regulation. There should be at least one operable means of communicating distress. When both are required, then at least one must be in operable condition to avoid termination of the voyage;

(3) Inadequate firefighting equipment on board;

(4) Excessive volatile fuel (gasoline or solvents) or volatile fuel vapors in bilges;

(5) Instability resulting from overloading, improper loading or lack of freeboard;

(6) Inoperable bilge system;

(7) Intoxication of the master or individual in charge of a commercial fishing vessel. An individual is intoxicated when he/she is operating a commercial fishing vessel and has an alcohol concentration of .04 percent, or the intoxicant's effect on the person's manner, disposition, speech, muscular movement, general appearance or behavior is apparent by observation;

(8) A lack of adequate operable navigation lights dur-

ing periods of reduced visibility;

(9) Watertight closures missing or inoperable;

(10) Flooding or uncontrolled leakage in any space; or

(11) A missing or expired certificate of class, as required by 46 U.S.C. 4503(1), for a fish processing vessel.

(c) A Coast Guard Boarding Officer may direct the individual in charge of a fish processing vessel that is missing a Load Line Certificate, or that does not comply with the provisions of the Load Line Certificate issued by the American Bureau of Shipping or a similarly qualified organization, to return the vessel to a mooring and to remain there until the vessel obtains such a certificate.

§ 28.70 Approved equipment and material.

(a) Equipment and material that is required by this subchapter to be approved or of an approved type, must have been manufactured and approved in accordance with the design and testing requirements in Subchapter Q of this chapter or as otherwise specified by the Commandant.

(b) A listing of current and formerly approved equipment and materials may be found on the internet at: <http://cgmix.uscg.mil/equipment>. Each OCMI may be contacted for information concerning approved equipment.

§ 28.73 Accepted organizations.

An organization desiring to be designated by the Commandant as an accepted organization must request such designation in writing. As a minimum the organization must verify that it is an organization--

(a) With a Code of Ethics;

(b) Whose surveyors are familiar with the requirements of this chapter related to commercial fishing industry vessels;

(c) Whose surveyors are familiar with the operations

and equipment on board commercial fishing industry vessels;

(d) Whose only interest in the fishing industry is in ensuring the safety of commercial fishing industry vessels and surveying commercial fishing industry vessels;

(e) That has grievance procedures;

(f) That has procedures for accepting and terminating membership of an individual, including minimum professional qualifications for surveyors;

(g) That maintains a roster of present and past accepted members and surveyors; and

(h) That has an Apprentice/Associate program for surveyors.

§ 28.76 Similarly qualified organizations.

An organization desiring to be designated by the Commandant as a similarly qualified organization must request such designation in writing. As a minimum the organization must verify that it--

(a) Publishes standards for vessel design and construction which are as widely available as and which are of similar content to the standards published by the ABS;

(b) Performs periodic surveys in a wide range of localities during and after construction to ensure compliance with published standards, including drydock examinations, in a manner similar to the ABS;

(c) Issues certificates testifying to compliance with the published standards;

(d) Has as its primary concern the survey and classification of vessels;

(e) Has no interest in owning or operating fishing, fish processing, or fish tender vessels; and

(f) Maintains records of surveys and makes such records available to the Coast Guard upon request in a manner similar to the ABS.

§ 28.80 Report of casualty.

(a) Except for a casualty which is required to be reported to the Coast Guard on Form CG 2692 in accordance with part 4 of this chapter, the owner, agent, operator, master, or individual in charge of a vessel involved in a casualty must submit a report in accordance with paragraph (c) of this section, as soon as possible after the casualty, to the underwriter of primary insurance for the vessel or to an organization listed in paragraph (d) of this section whenever the casualty involves any of the following.

(1) Loss of life.

(2) An injury that requires professional medical treatment (treatment beyond first aid) and that renders the individual unfit to perform his or her routine duties.

(3) Loss of a vessel.

(4) Damage to or by a vessel, its cargo, apparel or gear, except for fishing gear while not on board a vessel, or that impairs the seaworthiness of the vessel, or that is initially estimated at \$2,500.00 or more.

(b) Each underwriter of primary insurance for a commercial fishing industry vessel must submit a report of each casualty involving that vessel to an organization listed in paragraph (d) of this section within 90 days of receiving notice of the casualty and whenever it pays a claim resulting from the casualty. Initial reports must be in accordance with paragraph (c) of this section. Subsequent reports must contain sufficient information to identify the casualty and any new or corrected casualty data.

(c) Each report of casualty must include the following information:

(1) The name and address of the vessel owner and vessel operator, if different than the vessel owner;

(2) The name and address of the underwriter of primary insurance for the vessel;

(3) The name, registry number, call sign, gross tonnage, year of build, length, and hull material of the vessel;

(4) The date, location, primary cause, and nature of the casualty;

(5) The specific fishery, intended catch, and length of fishery opening when applicable;

(6) The date that the casualty was reported to the underwriter of primary insurance for the vessel, or to an organization acceptable to the Commandant;

(7) The activity of the vessel at the time of the casualty;

(8) The weather conditions at the time of the casualty, if the weather caused or contributed to the cause of the casualty;

(9) The damages to or by the vessel, its apparel, gear, or cargo;

(10) The monetary amounts paid for damages;

(11) The name, birth date, social security number, address, job title, length of disability, activity at the time of injury, type of injury, and medical treatment required for each individual incapacitated for more than 72 hours, or deceased as a result of the casualty;

(12) The name, registry number, and call sign of every other vessel involved in the casualty; and

(13) The monetary amount paid for an injury or a death.

(d) A casualty to a commercial fishing industry vessel must be reported to an organization that has knowledge and experience in the collection and processing of statistical insurance data and that has been accepted by the Commandant to receive and process casualty data under this part. The Commandant has accepted for this purpose:

(1) Marine Index Bureau (a division of ISO Claim Search), Floor 22-8, 545 Washington Boulevard, Jersey City, NJ, 07310-1686.

(2) [Reserved]

Note: The Coast Guard intends to treat information

collected under this section from underwriters of primary insurance as exempt from disclosure under the Freedom of Information Act because it is commercial and financial information which, if disclosed, would be likely to cause substantial harm to the competitive position of the underwriter.

§ 28.90 Report of injury.

Each individual employed on a commercial fishing industry vessel must notify the master, individual in charge of the vessel, or other agent of the employer of each illness, disability, or injury suffered while in service to the vessel not later than seven days after the date on which the illness, disability, or injury arose.

§ 28.95 Right of appeal.

Any person directly affected by a decision or action taken under this part, by or on behalf of the Coast Guard, may appeal therefrom in accordance with part 1, subpart 1.03 of this chapter.

§ 28.100 Applicability.

Each commercial fishing industry vessel must meet the requirements of this subpart, in addition to the requirements of parts 24, 25, and 26 of this chapter.

§ 28.105 Lifesaving equipment--general requirements.

(a) In addition to the requirements of this subpart, each commercial fishing industry vessel must comply with

Table 28.110.--Personal Flotation Devices and Immersion Suits

Applicable waters	Vessel type	Devices required	Other regulations
Seaward of the Boundary Line and North of 32°N or South of 32°S; and Lake Superior	Documented Vessel	Immersion suit or exposure suit.	28.135; 25.25-9(a); 25.25-13; 25.25-15.
Coastal Waters on the West Coast of the United States north of Point Reyes, CA; Beyond Coastal Waters, cold water; and Lake Superior	All vesselsdo	Do.
All other waters (Includes all Great Lakes except Lake Superior)	40 feet (12.2 meters) or more in length	Type I, Type V commercial hybrid, immersion suit, or exposure suit. ^[FN1]	28.135; 25.25-5(e); 25.25-5(f); 25.25-9(a); 25.25-13; 25.25-15.

^[FN1] Certain Type V personal flotation devices are approved for substitution for Type I, II, or III personal flotation

the requirements of part 25, subpart 25.25 of this chapter.

(b) Except as provided in § 28.120(d), each item of life-saving equipment carried on board a vessel to meet the requirements of this part must be approved by the Commandant. Equipment for personal use which is not required by this part need not be approved by the Commandant.

§ 28.110 Life preservers or other personal flotation devices.

(a) Except as provided by § 28.305 of this chapter, each vessel must be equipped with at least one immersion suit, exposure suit, or wearable personal flotation device of the proper size for each individual on board as specified in table 28.110 and part 25, subpart 25.25 of this chapter. Notwithstanding the provisions of paragraphs (c) and (d) of § 25.25-1 of this chapter, each commercial fishing industry vessel propelled by sail or a manned barge employed in commercial fishing activities must meet the requirements of this paragraph.

(b) Each wearable personal flotation device must be stowed so that it is readily accessible to the individual for whom it is intended, from both the individual's normal work station and berthing area. If there is no location accessible to both the work station and the berthing area, an appropriate device must be stowed in both locations.

devices when used in accordance with the conditions stated in the Coast Guard approval table.

than 65 feet (19.8 meters) in length; or

§ 28.115 Ring life buoys.

(a) Except as provided in paragraph (b) of this section and § 28.305, each vessel must be equipped with a throwable flotation device or a ring life buoy as specified in table 28.115. If the vessel is equipped with a ring life buoy, at least one ring life buoy must be equipped with a line which is at least:

(1) 60 feet (18.3 meters) in length for a vessel less

(2) 90 feet (27.4 meters) in length for a vessel 65 feet (19.8 meters) or more in length.

(b) For each vessel less than 65 feet (19.8 meters) in length, an approved 20 inch (0.51 meters) or larger ring life buoy which is in serviceable condition and which was installed on board before September 15, 1991, may be used to meet the requirements of paragraph (a) of this section.

Table 28.115.--Throwable Flotation Devices

Vessel length		Devices required
Less than 16 feet (4.9 meters)	None.	
16 feet (4.9 meters) or more, but less than 26 feet (7.9 meters)	1	buoyant cushion, or ring life buoy (Type IV PFD).
26 feet (7.9 meters) or more, but less than 65 feet (19.8 meters)	1	ring life buoy approval number starting with 160.009 or 160.050; orange; at least 24 inch (0.61 meters) size.
65 feet (19.8 meters) or more	3	ring life buoys, approval number 160.050; orange; at least 24 inch (0.61 meters) size.

Note: Certain Type V PFDs are approved for use in substitution for Type IV PFDs, when used in accordance with the conditions stated in the Coast Guard approval label.

§ 28.120 Survival craft.

(a) Except as provided in paragraphs (b) through (h) of this section and 28.305, each vessel must carry the survival craft specified in Table 28.120(a), Table 28.120(b), or Table 28.120(c), as appropriate for the vessel, in an aggregate capacity to accommodate the total number of individuals on board.

(b) The requirements of this section do not apply to vessels less than 10.97 meters (36 feet) in length with 3 or fewer individuals on board which operate within 12 miles of the coastline.

(c) A buoyant apparatus may be substituted instead of the requirements in this section for vessels 10.97 meters (36 feet) or more in length with 3 or fewer individuals

on board which operate within 12 miles of the coastline.

(d) Each survival craft installed on board a vessel before September 15, 1991, may continue to be used to meet the requirements of this section provided the survival craft is--

(1) Of the same type as required in Tables 28.120(a), 28.120(b), or 28.120(c), as appropriate for the vessel type; and

(2) Maintained in good and serviceable condition.

(e) Each inflatable liferaft installed on board a vessel before September 15, 1991, may continue to be used to meet the requirements for an approved inflatable liferaft, provided the existing liferaft is--

(1) Maintained in good and serviceable condition as required by Table 28.140; and

(2) Equipped with the equipment pack required by

Tables 28.120(a), 28.120(b), or 28.120(c), as appropriate for the vessel type. Where no equipment pack is specified in Tables 28.120(a), 28.120(b), or 28.120(c), a coastal service pack is the minimum required.

(f) A lifeboat may be substituted for any survival craft required by this section, provided it is arranged and equipped in accordance with part 199 of this chapter.

(g) The capacity of an auxiliary craft carried on board a vessel that is integral to and necessary for normal fishing operations will satisfy the requirements of this section for survival craft, except for an inflatable liferaft, provided the craft is readily accessible during an emer-

gency and is capable of safely holding all individuals on board the vessel. If the auxiliary craft is equipped with a Coast Guard required capacity plate, the boat must not be loaded so as to exceed the rated capacity.

(h) A vessel less than 10.97 meters (36 feet) in length that meets the flotation provisions of 33 CFR part 183 is exempt from the requirement for survival craft in paragraph (a) of this section for operation on--

(1) Any waters within 12 miles of the coastline.

(2) Rivers.

Table 28.120(a).--Survival Craft for Documented Vessels

Area	Vessel type	Survival craft required
Beyond 50 miles of coastline	All	Inflatable liferaft with SOLAS A pack.
Between 20-50 miles of coastline, cold waters	All	Inflatable liferaft with SOLAS B pack.
Between 20-50 miles of coastline, warm waters	All	Inflatable liferaft.
Beyond Boundary Line, between 12-20 miles of coastline, cold waters	All	Inflatable liferaft.
Beyond Boundary Line, within 12 miles of coastline, cold waters	10.97 meters (36 ft) or more in length	Inflatable Buoyant apparatus. See note 2.
Beyond Boundary Line, within 12 miles of coastline, cold waters	Less than 10.97 meters (36 ft) in length	Buoyant apparatus. See note 2.
Beyond Boundary Line, within 20 miles of coastline, warm waters	All	Life float. See note 2.
Inside Boundary Line, cold waters; or Lakes, bays, sounds, cold waters; or Rivers, cold waters	10.97 meters (36 ft) or more in length	Inflatable buoyant apparatus. See note 2.

Inside Boundary Line, cold waters; or Lakes, bays, sounds, cold waters; or Rivers, cold waters	Less than 10.97 meters (36 ft) in length	Buoyant apparatus. See note 2.
Inside Boundary Line, warm waters; or Lakes, bays, sounds, warm waters; or Rivers, warm waters	All	None.
Great Lakes, cold waters	10.97 meters (36 ft) or more in length	Inflatable buoyant apparatus. See note 2.
Great Lakes, cold waters	Less than 10.97 meters (36 ft) in length	Buoyant apparatus. See note 2.
Great Lakes, beyond 3 miles of coastline, warm waters	All	Buoyant apparatus. See note 2.
Great Lakes, within 3 miles of coastline, warm waters	All	None.

Note: 1. The hierarchy of survival craft in descending order is lifeboat, inflatable liferaft with SOLAS A pack, inflatable liferaft with SOLAS B pack, inflatable liferaft with coastal service pack, inflatable buoyant apparatus, life float, buoyant apparatus. A survival craft higher in the hierarchy may be substituted for any survival craft required in this table.

2. If a vessel carries 3 or fewer individuals within 12 miles of the coastline, see § 28.120(b) and (c) for carriage substitution.

Table 28.120(b).--Survival Craft for Undocumented Vessels With Not More Than 16 Individuals on Board

Area	Vessel type	Survival craft required
Beyond 20 miles of coastline	All	Inflatable buoyant apparatus.
Beyond Boundary Line, between 12-20 miles of coastline, cold waters	All	Inflatable buoyant apparatus.
Beyond Boundary Line, within 12 miles of coastline, cold waters	10.97 meters (36 ft) or more in length	Buoyant apparatus.
Beyond Boundary Line, within 12 miles of coastline, cold waters	Less than 10.97 meters (36 ft) in length	Buoyant apparatus. See note 2.
Beyond Boundary Line, within 20 miles of coastline, warm waters	All	Life float. See note 2.
Inside Boundary Line, cold waters; or	10.97 meters (36 ft) or more in length	Buoyant apparatus.

Lakes, bays, sounds, cold waters; or
Rivers, cold waters

Inside Boundary Line, cold waters; or
Lakes, bays, sounds, cold waters; or
Rivers, cold waters Less than 10.97 meters (36 ft) in length Buoyant apparatus. See note 2.

Inside Boundary Line, warm waters; or
Lakes, bays, sounds, warm waters; or
Rivers, warm waters All None.

Great Lakes, cold waters All Buoyant apparatus. See note 2.

Great Lakes, beyond 3 miles of coast-
line, warm waters All Buoyant apparatus. See note 2.

Great Lakes, within 3 miles of coast-
line, warm waters All None.

Note: 1. The hierarchy of survival craft in descending order is lifeboat, inflatable liferaft with SOLAS A pack, inflatable liferaft with SOLAS B pack, inflatable liferaft with coastal service pack, inflatable buoyant apparatus, life float, buoyant apparatus. A survival craft higher in the hierarchy may be substituted for any survival craft required in this table.

2. If a vessel carries 3 or fewer individuals within 12 miles of the coastline, see § 28.120(b) and (c) for carriage substitution.

Table 28.120(c).--Survival Craft for Undocumented Vessels With More Than 16 Individuals on Board

Area	Vessel type	Survival craft required
Beyond 50 miles of coastline	All	Inflatable liferaft with SOLAS A pack.
Beyond 20-50 miles of coastline, cold waters	All	Inflatable liferaft with SOLAS B pack.
Beyond 20-50 miles of coastline, warm waters	All	Inflatable liferaft.
Beyond Boundary Line, between 12-20 miles of coastline, cold waters	All	Inflatable liferaft.
Beyond Boundary Line, within 12 miles of coastline, cold waters	10.97 meters (36 ft) or more in length	Inflatable buoyant apparatus.

Beyond Boundary Line, within 12 miles of coastline, cold waters	Less than 10.97 (36 ft) in length	Buoyant apparatus.
Beyond Boundary Line, within 20 miles of coastline, warm waters	All	Life float.
Inside Boundary Line, cold waters; or Lakes, bays, sounds, cold waters; or Rivers, cold waters	10.97 meters (36 ft) or more in length	Inflatable buoyant apparatus.
Inside Boundary Line, cold waters; or Lakes, bays, sounds, cold waters; or Rivers, cold waters	Less than 10.97 meters (36 ft) in length	Buoyant apparatus.
Inside Boundary Line, warm waters; or Lakes, bays, sounds, warm waters; or Rivers, warm waters	All	None.
Great Lakes, cold waters	10.97 meters (36 ft) or more in length	Inflatable buoyant apparatus.
Great Lakes, cold waters	Less than 10.97 meters (36 ft) in length	Buoyant apparatus.
Great Lakes, beyond 3 miles of coastline, warm waters	All	Buoyant apparatus.
Great Lakes, within 3 miles of coastline, warm waters	All	None.

Note: 1. The hierarchy of survival craft in descending order is lifeboat, inflatable liferaft with SOLAS A pack, inflatable liferaft with SOLAS B pack, inflatable liferaft with coastal service pack, inflatable buoyant apparatus, life float, buoyant apparatus. A survival craft higher in the hierarchy may be substituted for any survival craft required in this table.

§ 28.125 Stowage of survival craft.

(a) Each inflatable liferaft required to be equipped with a SOLAS A or a SOLAS B equipment pack must be stowed so as to float free and automatically inflate in the event the vessel sinks.

(b) Each inflatable liferaft, inflatable buoyant apparatus, and any auxiliary craft used in their place, must be kept readily accessible for launching or be stowed so as to float free in the event the vessel sinks.

(c) Each hydrostatic release unit used in a float-free arrangement must be approved under part 160, subpart 160.062 of this chapter.

(d) Each float-free link used with a buoyant apparatus or with a life float must be certified to meet part 160, subpart 160.073 of this chapter.

§ 28.130 Survival craft equipment.

(a) General. Each item of survival craft equipment must be of good quality, effective for the purpose it is intended to serve, and secured to the craft.

(b) Inflatable liferafts. Each inflatable liferaft must have one of the following equipment packs as shown by the markings on its container:

- (1) Coastal Service;

(2) SOLAS B Pack (formerly “Limited Service”); or

(3) SOLAS A Pack (formerly “Ocean Service”).

(c) Each life float and buoyant apparatus must be fitted with a lifeline, pendants, a painter, and a floating electric water light approved under part 161 subpart 161.010 of this chapter.

(d) Other survival craft. A vessel must not carry survival craft other than inflatable liferafts, life floats, inflatable buoyant apparatus, or buoyant apparatus, such as lifeboats or rigid liferafts, unless the survival craft and launching equipment comply with the requirements for installation, arrangement, equipment, and maintenance contained in 46 CFR part 199.

§ 28.135 Lifesaving equipment markings.

(a) Except as provided in paragraph (d) of this section,

Table 28.135.--Lifesaving Equipment Markings

Item	Markings Required	
	Name of vessel	Retroreflective material
Wearable personal flotation device (Type I, II, III, or wearable Type V); Immersion suit or exposure suit	See § 28.135(d)	Type I or Type II.
Ring life buoy	X	Type II.
Inflatable liferaft	See note	See note.
Inflatable buoyant apparatus	See note	See note.
Life float	X	Type II.
Buoyant apparatus	X	Type II.
Auxiliary craft	X	Type II.
EPIRB	X	Type II.

Note: No marking other than that provided by the manufacturer and the servicing facility is required.

§ 28.140 Operational readiness, maintenance, and inspection of lifesaving equipment.

(a) The master or individual in charge of a vessel must ensure that each item of lifesaving equipment must be in good working order, ready for immediate use, and readily accessible before the vessel leaves port and at all times when the vessel is operated.

(b) Each item of lifesaving equipment, including unap-

proved equipment carried aboard a vessel pursuant to the requirements of this subpart or part 25, subpart 25.25 of this chapter must be marked as specified in table 28.135.

(b) Lettering used in lifesaving equipment markings must be in block capital letters.

(c) Retroreflective markings required by this section must be with material approved under part 164, subpart 164.018 of this chapter. The arrangement of the retroreflective material must meet IMO Resolution A.658(16).

(d) A wearable personal flotation device must be marked with the name of either the vessel, the owner of the device, or the individual to whom it is assigned.

proved equipment, must be maintained and inspected in accordance with:

- (1) Table 28.140 in this section;
- (2) The servicing procedure under the subpart of this chapter applicable to the item's approval; and
- (3) The manufacturer's guidelines.

(c) An inflatable liferaft or inflatable buoyant apparatus must be serviced no later than the month and year on its servicing sticker affixed under 46 CFR 160.151-57(n),

and whenever the container is damaged or the container straps or seals are broken. It must be serviced at a facility specifically approved by the Commandant for the particular brand.

(d) An escape route from a space where an individual may be employed or an accommodation space must not be obstructed.

Table 28.140.--Scheduled Maintenance and Inspection of Lifesaving Equipment

Item	Interval		Regulation
	Monthly	Annually	
(1) Inflatable wearable personal flotation device (Type V commercial hybrid)		Servicing	28.140
(2) Personal flotation devices, exposure suits and immersion suits		Inspect, clean and repair as necessary	28.140
(3) Buoyant apparatus and life floats		Inspect, clean and repair as necessary	28.140
(4) Inflatable liferaft		Servicing ^[FN1]	28.140
(5) Inflatable buoyant apparatus		Servicing ^[FN1]	28.140
(6) Hydrostatic release		Servicing ^[FN1]	28.140
(7) Disposable hydrostatic release		Replace on or before expiration date	28.140
(8) Undated batteries		Replace	28.140
(9) Dated batteries ^[FN2] and other items		Replace on or before expiration date	25.26-50, 28.140
(10) EPIRB	Test		25.26-50

^[FN1] For a new liferaft or inflatable buoyant apparatus, the first annual servicing may be deferred to two years from the date of first packing if so indicated on the servicing sticker.

^[FN2] Water activated batteries must be replaced whenever they are used.

§ 28.145 Distress signals.

equipped with the distress signals specified in table 28.145.

Except as provided by 28.305, each vessel must be

Table 28.145.--Distress Signals

Area	Devices required
Ocean, more than 50 miles from coastline	3 parachute flares, approval series 160.136; plus 6 hand flares, approval series 160.121; plus 3 smoke signals, approval series 160.122.
Ocean, 3-50 miles from the coastline; or more than 3 miles from the coastline on the Great Lakes	3 parachute flares, approval series 160.136, or 160.036; plus 6 hand flares, approval series 160.121 or 160.021; plus 3 smoke signals, approval series 160.122, 160.022, or

Coastal waters, excluding the Great Lakes; or within 3 miles of the coastline on the Great Lakes

160.037.

Night visual distress signals consisting of one electric distress light, approval series 161.013 or 3 approved flares; plus Day visual distress signals consisting of one distress flag, approval series 160.072, or 3 approved flares, or 3 approved smoke signals.^[FNI]

^[FNI] If flares are carried, the same 3 flares may be counted toward meeting both the day and night requirement.

§ 28.150 Emergency Position Indicating Radio Beacons (EPIRBs).

Each vessel must be equipped with an emergency position indicating radio beacon (EPIRB) as required by 46 CFR part 25, subpart 25.26.

Note: Each vessel which uses radio communication equipment must have a Ship Radio Station License issued by the Federal Communications Commission, as set forth in 47 CFR part 80.

§ 28.155 Excess fire detection and protection equipment.

Installation of fire detection and protection equipment in excess of that required by the regulations in this subchapter is permitted provided that the excess equipment

does not endanger the vessel or individuals on board in any way. The excess equipment must, at a minimum, be listed and labeled by an independent, nationally recognized testing laboratory and be in accordance with an appropriate industry standard for design, installation, testing, and maintenance.

§ 28.160 Portable fire extinguishers.

(a) Each vessel must meet the requirements of part 25, subpart 25.30 of this chapter.

(b) Each vessel 65 feet (19.8 meters) or more in length must be equipped with the minimum number, location, and type of portable fire extinguishers specified in table 28.160.

Table 28.160.--Portable Fire Extinguishers for Vessels 65 Feet (19.8 Meters) or More in Length

Space	Classification	Quantity and location
Safety areas, communicating corridors	A-II	1 in each main corridor not more than 150 feet (49.2 meters) apart. (May be located in stairways.)
Pilothouse	C-I	2 in vicinity of exit.
Service spaces, galleys	B-II or C-II	1 for each 2,500 square feet (269.1 sq. meters) or fraction thereof suitable for hazards involved.
Paint lockers	B-II	1 outside space in vicinity of exit.
Accessible baggage and storerooms	A-II	1 for each 2,500 square feet (269.1 sq. meters) or fraction thereof located in the vicinity of exits, either inside or outside the spaces.
Work shops and similar spaces	A-II	1 outside the space in vicinity of exit.
Machinery spaces; Internal combustion propelling machinery	B-II	1 for each 1,000 brake horsepower or fraction thereof but not less than 2 nor more than 6.
Electric propulsion motors or generator unit of open type	C-II	1 for each propulsion motor generator unit.
Auxiliary spaces	B-II	1 outside the space in the vicinity of exit.

Internal combustion machinery	B-II	1 outside the space in the vicinity of exit.
Electric emergency motors or generators	C-II	1 outside the space in the vicinity of exit.

§ 28.165 Injury placard.

Each vessel must have posted in a highly visible location accessible to the crew a placard measuring at least 5 inches by 7 inches (127 millimeters by 178 millimeters) which reads:

Notice

Report All Injuries

United States law, 46 United States Code 10603, requires each seaman on a fishing vessel, fish processing vessel, or fish tender vessel to notify the master or individual in charge of the vessel or other agent of the employer regarding any illness, disability, or injury suffered by the seaman when in service to the vessel not later than seven days after the date on which the illness, disability, or injury arose.

§ 28.200 Applicability.

Each documented commercial fishing industry vessel must meet the requirements of this subpart in addition to the requirements of subparts A and B of this part if it:

- (a) Operates beyond the Boundary Lines;
- (b) Operates with more than 16 individuals on board; or
- (c) Is a fish tender vessel engaged in the Aleutian trade.

§ 28.205 Fireman's outfits and self-contained breathing apparatus.

- (a) Each vessel that operates with more than 49 individuals on board must be equipped with at least two fireman's outfits stowed in widely separated locations.
- (b) Each vessel that uses ammonia as a refrigerant must be equipped with at least two self-contained breathing apparatuses.

(c) A fireman's outfit must consist of one self-contained breathing apparatus with lifeline attached, one flashlight, a rigid helmet, boots, gloves, protective clothing, and one fire axe.

(d) At least one spare air bottle must be provided for each self-contained breathing apparatus.

(e) Each self-contained breathing apparatus must be approved by the Mine Safety and Health Administration (MSHA) and by the National Institute for Occupational Safety and Health (NIOSH), have as a minimum a 30 minute air supply, and a full facepiece.

§ 28.210 First aid equipment and training.

(a) Each vessel must have on board a complete first aid manual and medicine chest of a size suitable for the number of individuals on board in a readily accessible location.

(b) First aid and cardiopulmonary resuscitation (CPR) course certification. Certification in first aid and CPR must be as described in this paragraph.

(1) First aid--a certificate indicating completion of a first aid course from:

(i) The American National Red Cross "Standard First Aid and Emergency Care" or "Multi-media Standard First Aid" course; or

(ii) A course approved by the Coast Guard under § 10.205(h)(1)(ii) of this chapter.

(2) CPR--A certificate indicating completion of course from:

(i) The American National Red Cross;

(ii) The American Heart Association; or

(iii) A course approved by the Coast guard under § 10.205(h)(2)(iii) of this chapter.

(c) Each vessel that operates with more than 2 individuals on board must have at least 1 individual certified in first aid and at least 1 individual certified in CPR. An individual certified in both first aid and CPR will satisfy both of these requirements.

(d) Each vessel that operates with more than 16 individuals on board must have at least 2 individuals certified in first aid and at least 2 individuals certified in CPR. An individual certified in both first aid and CPR may be counted for both requirements.

(e) Each vessel that operates with more than 49 individuals on board must have at least 4 individuals certified in first aid and at least 4 individuals certified in CPR. An individual certified in both first aid and CPR may be counted for both requirements.

§ 28.215 Guards for exposed hazards.

(a) Each space on board a vessel must meet the requirements of this section.

(b) Suitable hand covers, guards, or railing must be installed in way of machinery which can cause injury to personnel, such as gearing, chain or belt drives, and rotating shafting. This is not meant to restrict necessary access to fishing equipment such as winches, drums, or gurdies.

(c) Each exhaust pipe from an internal combustion engine which is within reach of personnel must be insulated or otherwise guarded to prevent burns.

§ 28.225 Navigational information.

(a) Each vessel must have at least the following navigational information on board:

(1) Marine charts of the area to be transited, published by the National Ocean Service, the National Imagery and Mapping Agency, U.S. Army Corps of Engineers, or a river authority that--

(i) Are of a large enough scale and have enough detail to make safe navigation of the area possible; and

(ii) Are currently corrected.

(2) For the area to be transited, a currently corrected copy of, or applicable currently corrected extract from, each of the following publications:

(i) U.S. Coast Pilot; and

(ii) Coast Guard Light List.

(3) For the area to be transited, the current edition of, or applicable current extract from, each of the following publications:

(i) Tide tables promulgated by the National Ocean Service; and

(ii) Tidal current tables promulgated by the National Ocean Service, or a river current publication issued by the U.S. Corps of Engineers or a river authority.

(b) Each vessel of 39.4 feet (12 meters) or more in length that operates shoreward of the COLREG Demarcation Lines, as set forth in 33 CFR part 80, must carry on board and maintain for ready reference a copy of the Inland Navigation Rules, as set forth in 33 CFR chapter I, subchapter E.

§ 28.230 Compasses.

Each vessel must be equipped with an operable magnetic steering compass with a compass deviation table at the operating station.

§ 28.235 Anchors and radar reflectors.

(a) Each vessel must be fitted with an anchor(s) and chain(s), cable, or rope appropriate for the vessel and the waters of the intended voyage.

(b) Except for a vessel rigged with gear that provides a radar signature from a distance of 6 miles, each nonmetallic hull vessel must have a radar reflector.

§ 28.240 General alarm system.

(a) Except as provided in paragraph (f) of this section, each vessel with an accommodation space or a work

space which is not adjacent to the operating station, must have an audible general alarm system with a contact-maker at the operating station suitable for notifying individuals on board in the event of an emergency.

(b) The general alarm system must be capable of notifying an individual in any accommodation space or work space where they may normally be employed.

(c) In a work space where background noise makes a general alarm system difficult to hear, a flashing red light must also be installed.

(d) Each general alarm bell and flashing red light must be identified with red lettering at least 1/2 inch (13 millimeters) high as follows:

Attention

General Alarm--When Alarm Sounds Go to Your Station.

(e) A general alarm system must be tested prior to operation of the vessel and at least once each week thereafter.

(f) A public address system or other means of alerting all individuals on board may be used in lieu of a general alarm system provided it complies with paragraphs (b), (c), and (e) of this section and can be activated from the operating station.

§ 28.245 Communication equipment.

(a) Except as provided in paragraphs (b) through (e) of this section, each vessel must be equipped as follows.

(1) Each vessel must be equipped with a VHF radiotelephone capable of transmitting and receiving on the frequency or frequencies within the 156-162 MHz band necessary to communicate with a public coast station or U.S. Coast Guard station serving the area in which the vessel is operating.

(2) Each vessel that operates more than 20 miles from the coastline, in addition to the VHF radiotelephone required by paragraph (a)(1) of this section, must be equipped with a radiotelephone transceiver capable of transmitting and receiving on frequencies in the 2-4 MHz band necessary to communicate with a public

coast station or U.S. Coast Guard station serving the area in which the vessel is operating.

(3) Each vessel that operates more than 100 miles from the coastline, in addition to the communication equipment required by paragraph (a)(1) of this section must be equipped with a radiotelephone transceiver capable of transmitting and receiving on frequencies in the 2-27.5 MHz band necessary to communicate with a public coast station or U.S. Coast Guard station serving the area in which the vessel is operating.

(4) Each vessel that operates in waters contiguous to Alaska where no public coast station or U.S. Coast Guard station is within communications range of a VHF radio transceiver operating on the 156-162 MHz band or the 2-4 MHz band, in addition to the VHF radio communication equipment required by paragraph (a)(1) of this section, must be equipped with a radiotelephone transceiver capable of transmitting and receiving on frequencies in the 2-27.5 MHz band necessary to communicate with a public coast station or a U.S. Coast Guard station serving the area in which the vessel is operating.

(b) A single radio transceiver capable of meeting the requirements of paragraphs (a) (2) and (3), or paragraphs (a) (2), (3), and (4) of this section, is acceptable.

(c) Satellite communication capability with the system servicing the area in which the vessel is operating is acceptable as an alternative to the requirements of paragraphs (a)(2), (a)(3), or (a)(4) of this section.

(d) A cellular telephone capable of communicating with a public coast station or a U.S. Coast Guard station serving the area in which the vessel is operating is acceptable as an alternative to the requirements of paragraphs (a)(2), (a)(3), or (a)(4) of this section.

(e) A radiotelephone transceiver installed on board a vessel before September 15, 1991, capable of transmitting and receiving on frequencies on the 4-20 MHz band may continue to be used to satisfy the requirements of paragraphs (a)(3) and (a)(4) of this section.

(f) The principle operating position of the communication equipment must be at the operating station.

(g) Communication equipment must be installed to ensure safe operation of the equipment and to facilitate repair. It must be protected against vibration, moisture, temperature, and excessive currents and voltages. It must be located so as to minimize the possibility of water intrusion from windows broken by heavy seas.

(h) Communication equipment must comply with the technical standards and operating requirements issued by the Federal Communications Commission, as set forth in 47 CFR part 80.

Note: Each vessel which uses radio equipment to meet the communication requirements of this section must have a Ship Radio Station License issued by the Federal Communications Commission, as set forth in 47 CFR part 80.

(i) All communication equipment must be provided with an emergency source of power that complies with § 28.375.

§ 28.250 High water alarms.

On a vessel 36 feet (11.8 meters) or more in length, a visual and audible alarm must be provided at the operating station to indicate high water level in each of the following normally unmanned spaces:

(a) A space with a through-hull fitting below the deepest load waterline, such as the lazarette;

(b) A machinery space bilge, bilge well, shaft alley bilge, or other space subject to flooding from sea water piping within the space; and

(c) A space with a non-watertight closure, such as a space with a non-watertight hatch on the main deck.

§ 28.255 Bilge pumps, bilge piping, and dewatering systems.

(a) Each vessel must be equipped with a bilge pump and bilge piping capable of draining any watertight compartment, other than tanks and small buoyancy compartments, under all service conditions. Large spaces, such as engine rooms must be fitted with more than one suction line.

(b) In addition to the requirements of paragraph (a) of

this section, a space used in the sorting or processing of fish in which water is used must be fitted with dewatering system capable of dewatering the space under normal conditions of list and trim at the same rate as water is introduced. Pumps used as part of the processing of fish do not count for meeting this requirement. The dewatering system must be interlocked with the pump(s) supplying water to the space, so that in the event of failure of the dewatering system, the water supply is inactivated.

(c) Except as provided by paragraph (f) of this section, each vessel 79 feet (24 meters) or more in length must be equipped with a fixed, self-priming, powered, bilge pump connected to a bilge manifold.

(d) If a bilge pump required by paragraph (a) of this section is portable, it must be provided with a suitable suction hose of adequate length to reach the bilges of each watertight compartment it must serve and with a discharge hose of adequate length to ensure overboard discharge. A portable pump must be capable of dewatering each space it serves at a rate of at least 2 inches (51 millimeters) of water depth per minute.

(e) Except for a fire pump required by § 28.315, a bilge pump may be used for other purposes.

(f) Except where an individual pump is provided for a separate space or for a portable pump, each individual bilge suction line must be led to a manifold. Each bilge suction line must be provided with a stop valve at the manifold and a check valve at some accessible point in the bilge line to prevent unintended flooding of a space.

(g) Each bilge suction line and dewatering system suction must be fitted with a suitable strainer to prevent clogging of the suction line. Strainers must have an open area of not less than three times the open area of the suction line.

(h) Each vessel must comply with the oil pollution prevention requirements of 33 CFR parts 151 and 155.

§ 28.260 Electronic position fixing devices.

Each vessel 79 feet (24 meters) or more in length must be equipped with an electronic position fixing device capable of providing accurate fixes for the area in which the vessel operates.

§ 28.265 Emergency instructions.

(a) Except as provided in paragraphs (b) and (c) of this section, each vessel must have emergency instructions posted in conspicuous locations accessible to the crew.

(b) The instructions identified in paragraphs (d)(6), (d)(7), (d)(8), and (d)(9) of this section, may be kept readily available as an alternative to posting.

(c) On a vessel which operates with less than 4 individuals on board, the emergency instructions may be kept readily available as an alternative to posting.

(d) The emergency instructions required by this section must identify at least the following information, as appropriate for the vessel:

(1) The survival craft embarkation stations aboard the vessel and the survival craft to which each individual is assigned;

(2) The fire and emergency signal and the abandon ship signal;

(3) If immersion suits are provided, the location of the suits and illustrated instructions on the method for donning the suits;

(4) Procedures for making a distress call, such as:

(i) Make sure your communication equipment is on.

(ii) Select 156.8 MHz (VHF channel 16), 2182 kHz, or other distress frequency used in your area of operation.

Note: VHF channel 16 and 2182 kHz on SSB are for emergency and calling purposes only.

(iii) Press microphone button and speaking slowly--clearly--calmly say:

“Mayday--Mayday--Mayday”

(iv) Say: “This is the M/V (Insert name of your vessel), (Insert name of your vessel), (Insert name of your vessel), Over.”

(v) Release the microphone button briefly and listen for acknowledgment. If no one answers, repeat steps in paragraphs (d)(4) (iii) and (iv) of this section.

(vi) If there is still no answer, or if the Coast Guard or another vessel responds, say: “Mayday--This is the M/V (Insert Name of Your Vessel).”

(vii) Describe your position using latitude and longitude coordinates, LORAN coordinate, or range and bearing from a known point.

(viii) State the nature of the distress.

(ix) Give number of individuals aboard and the nature of any injuries.

(x) Estimate the present seaworthiness of your vessel.

(xi) Describe your vessel: (Insert length, color, hull type, trim, masts, power, and any additional distinguishing features).

(xii) Say: “I will be listening on Channel 16/2182 (or other channel monitored).”

(xiii) End message by saying: “This is (insert vessel's name and call sign).”

(xiv) If your situation permits, stand by the radio to await further communication with the Coast Guard or another vessel. If no answer, repeat, then try another channel.

(5) Essential action that must be taken in an emergency by each individual, such as:

(i) Making a distress call.

(ii) Closing of hatches, airports, watertight doors, vents, scuppers, and valves for intake and discharge lines which penetrate the hull, stopping of fans and ventilation systems, and operation of all safety equipment.

(iii) Preparing and launching of survival craft and rescue boats.

- (iv) Fighting a fire.
- (v) Mustering of personnel including--
 - (A) Seeing that they are properly dressed and have put on their lifejackets or immersion suits; and
 - (B) Assembling personnel and directing them to their appointed stations.
- (vi) Manning of fire parties assigned to deal with fires.
- (vii) Special duties required for the operation of fire fighting equipment.
- (6) The procedures for rough weather at sea, crossing hazardous bars, flooding, and anchoring of the vessel, such as:
 - (i) Close all watertight and weathertight doors, hatches and airports to prevent taking water aboard or further flooding in the vessel.
 - (ii) Keep bilges dry to prevent loss of stability due to water in bilges. Use power driven bilge pump, hand pump, and buckets to dewater.
 - (iii) Align fire pumps to use as bilge pumps, if possible.
 - (iv) Check all intake and discharge lines which penetrate the hull for leakage.
 - (v) Personnel should remain stationary and evenly distributed.
 - (vi) Personnel should don lifejackets and immersion suits if the going becomes very rough, the vessel is about to cross a hazardous bar, or when otherwise instructed by the master or individual in charge of the vessel.
- (7) The procedures for anchoring the vessel.
- (8) The procedures to be used in the event an individual falls overboard, such as:

- (i) Throw a ring life buoy as close to the individual as possible;
 - (ii) Post a lookout to keep the individual in the water in sight;
 - (iii) Launch the rescue boat and maneuver it to pick up the individual in the water;
 - (iv) Have a crewmember put on a lifejacket or immersion suit, attach a safety line to the crewmember, and have the crewmember standby to jump into the water to assist in recovering the individual in the water if necessary;
 - (v) If the individual overboard is not immediately located, notify the Coast Guard and other vessels in the vicinity; and
 - (vi) Continue searching until released by the Coast Guard.
- (9) Procedures for fighting a fire, such as:
- (i) Shut off air supply to the fire--close hatches, ports, doors, ventilators, and similar openings.
 - (ii) Deenergize the electrical systems supplying the affected space, if possible.
 - (iii) Immediately use a portable fire extinguisher or use water for fires in ordinary combustible materials. Do not use water on electrical fires.
 - (iv) If the fire is in a machinery space, shut off the fuel supply and ventilation system and activate the fixed extinguishing system, if installed.
 - (v) Maneuver the vessel to minimize the effect of wind on the fire.
 - (vi) If unable to control the fire, immediately notify the Coast Guard and other vessels in the vicinity.
 - (vii) Move personnel away from the fire, have them put on lifejackets, and if necessary, prepare to abandon the vessel.

§ 28.270 Instruction, drills, and safety orientation.

(a) Drills and instruction. The master or individual in charge of each vessel must ensure that drills are conducted and instruction is given to each individual on board at least once each month. Instruction may be provided in conjunction with drills or at other times and places provided it ensures that each individual is familiar with their duties and their responses to at least the following contingencies:

- (1) Abandoning the vessel;
- (2) Fighting a fire in different locations on board the vessel;
- (3) Recovering an individual from the water;
- (4) Minimizing the effects of unintentional flooding;
- (5) Launching survival craft and recovering lifeboats and rescue boats;
- (6) Donning immersion suits and other wearable personal flotation devices;
- (7) Donning a fireman's outfit and a self-contained breathing apparatus, if the vessel is so equipped;
- (8) Making a voice radio distress call and using visual distress signals;
- (9) Activating the general alarm; and
- (10) Reporting inoperative alarm systems and fire detection systems.

(b) Participation in drills. Drills must be conducted on board the vessel as if there were an actual emergency and must include participation by all individuals on board, breaking out and using emergency equipment, testing of all alarm and detection systems, donning protective clothing, and donning immersion suits, if the vessel is so equipped.

(c) Training. No individual may conduct the drills or provide the instructions required by this section unless that individual has been trained in the proper procedures for conducting the activity.

(d) The viewing of videotapes concerning at least the contingencies listed in paragraph (a) of this section, whether on board the vessel or not, followed by a discussion led by an individual familiar with these contingencies will satisfy the requirement for instruction but not the requirement for drills in paragraph (b) of this section or for the safety orientation in paragraph (e) of this section.

(e) Safety orientation. The master or individual in charge of a vessel must ensure that a safety orientation is given to each individual on board that has not received the instruction and has not participated in the drills required by paragraph (a) of this section before the vessel may be operated.

(f) The safety orientation must explain the emergency instructions required by § 28.265 and cover the specific evolutions listed in paragraph (a) of this section.

Note: The individual conducting the drills and instruction need not be the master, individual in charge of the vessel, or a member of the crew.

§ 28.275 Acceptance criteria for instructors and course curricula.

(a) A Fishing Vessel Safety Instructor shall submit a detailed course curriculum that relates directly to the contingencies listed in § 28.270(a), or a letter certifying the use of the "Personal Survival and Emergency Drills Course," a national standard curriculum, to the cognizant OCMI. This document can be ordered through the U.S. Marine Safety Association (USMSA), 5050 Industrial Road, Farmingdale, NJ 07727; telephone: (732) 751-0102; fax: (732) 751-0508; or e-mail: usmsa@usmsa.org. For the criteria of Fishing Vessel Safety Instructor, the following documentation shall be provided to the cognizant OCMI:

(1) Proof of at least 1 year of experience in a marine related field and experience that relates directly to the contingencies listed in § 28.270(a) including--

(i) Experience as an instructor; or

(ii) Training received in instructional methods; or

(2) A valid license or officer endorsement issued by the Coast Guard authorizing service as master of un-

inspected fishing industry vessels and proof of experience that relates directly to the contingencies listed in § 28.270(a) including--

(i) Experience as an instructor; or

(ii) Training received in instructional methods; or

(3) A valid license or officer endorsement issued by the Coast Guard authorizing service as a master of inspected vessels of 100 gross tons or more and proof of experience that relates directly to the contingencies listed in § 28.270(a) including--

(i) Experience as an instructor; or

(ii) Training received in instructional methods.

(b) Each OCMI will issue a letter of acceptance to all qualified individuals and will maintain a list of accepted instructors in his/her zone.

(c) Letters of acceptance shall be valid for a period of 5 years.

(d) Fishing Vessel Safety Instructors or the organization providing training shall issue documents to Fishing Vessel Drill Conductors upon successful completion of all required training.

§ 28.300 Applicability and general requirements.

Each commercial fishing industry vessel which has its keel laid or is at a similar stage of construction, or which undergoes a major conversion completed on or after September 15, 1991, and that operates with more than 16 individuals on board, must comply with the requirements of this subpart in addition to the requirements of subparts A, B, and C of this part.

§ 28.305 Lifesaving and signaling equipment.

Each vessel to which this subpart applies must meet the requirements for life preservers, immersion suits, ring life buoys, distress signals, and survival craft in §§ 28.110, 28.115, 28.145 and table 28.120 (a), (b), or (c), as appropriate for the vessel type, on the date that its construction or major conversion is completed.

§ 28.310 Launching of survival craft.

A gate or other opening must be provided in the deck rails, lifelines, or bulwarks adjacent to the stowage location of each survival craft which weighs more than 110 pounds (489 Newtons), to allow the survival craft to be manually launched.

§ 28.315 Fire pumps, fire mains, fire hydrants, and fire hoses.

(a) Each vessel 36 feet (11.8 meters) or more in length must be equipped with a self-priming, power driven fire pump connected to a fixed piping system.

(1) A fire pump on a vessel 79 feet (24 meters) or more in length must be capable of delivering water simultaneously from the two highest hydrants, or from both branches of the fitting if the highest hydrant has a siamese fitting, at a pitot tube pressure of at least 50 psi (0.345 Newtons per square millimeter) and a flow rate of at least 80 gpm (303 liters per minute).

(2) Each vessel with a power driven fire pump must be equipped to permit energizing the fire main from the operating station and from the pump.

(b) Fire main, hydrants, hoses and nozzles.

(1) A vessel required to have a fixed fire main system must have a sufficient number of fire hydrants to reach any part of the vessel using a single length of fire hose.

(2) A fire hose must be connected to each fire hydrant at all times the vessel is operating.

(3) A fire hose on a vessel less than 79 feet (24 meters) in length must be at least 5/8 inch (16 millimeters) nominal diameter, be of good commercial grade and be fitted with a nozzle of corrosion resistant material capable of providing a solid stream and a spray pattern.

(4) A fire hose on a vessel 79 feet (24 meters) or more in length must be lined commercial fire hose and be fitted with a nozzle made of corrosion resistant material capable of providing a solid stream and a spray pattern.

§ 28.320 Fixed gas fire extinguishing systems.

(a) Requirements for vessels 79 feet (24 meters) or more in length. A vessel 79 feet (24 meters) or more in length must be fitted with a fixed gas fire extinguishing system in the following enclosed spaces:

- (1) A space containing an internal combustion engine of more than 50 horsepower;
- (2) A space containing an oil fired boiler;
- (3) An incinerator and;
- (4) A space containing a gasoline storage tank.

(b) System types and alternatives.

- (1) A pre-engineered fixed gas fire extinguishing system may be installed only in a normally unoccupied machinery space, paint locker, or space containing flammable liquid stores that has a gross volume of not more than 33.98 cubic meters (1200 cubic feet).
- (2) A fixed gas fire extinguishing system that is capable of automatic discharge upon heat detection may be installed only in a normally unoccupied space with a gross volume of not more than 169.92 cubic meters (6000 cubic feet).
- (3) A space with a gross volume exceeding 169.92 cubic meters (6000 cubic feet) must be fitted with a manually actuated and alarmed fixed gas fire extinguishing system.

(c) General requirements.

- (1) A fixed gas fire extinguishing system aboard a vessel must be approved by the Commandant and be custom engineered, unless the system meets the requirements for a pre-engineered fixed gas fire extinguishing system in paragraph (d) of this section.
- (2) System components must be listed and labeled by an independent, nationally recognized testing laboratory for the system being installed.
- (3) System design and installation must be in accordance with the Manufacturer's Marine Design, Installation, Operation, and Maintenance Manual approved for the system by the Commandant.

dance with the Manufacturer's Marine Design, Installation, Operation, and Maintenance Manual approved for the system by the Commandant.

(4) A fixed gas fire extinguishing system may protect more than one space. The quantity of extinguishing agent must be at least sufficient for the largest space protected by the system.

(d) Pre-engineered fixed gas fire extinguishing systems.

(1) A pre-engineered fixed gas fire extinguishing system must:

- (i) Be approved by the Commandant;
 - (ii) Be capable of manual actuation from outside the space in addition to any automatic actuation devices; and
 - (iii) Automatically shut down all power ventilation systems serving the protected space and all engines that draw intake air from within the protected space.
- (2) A vessel on which a pre-engineered fixed gas fire extinguishing system is installed must have the following equipment at the operating station:
- (i) A visual alarm to indicate the discharge of the extinguishing agent;
 - (ii) An audible alarm to sound upon discharge of the extinguishing agent; and
 - (iii) A means to reset devices used to automatically shut down ventilation systems and engines as required by paragraph (d)(1)(iii) of this section.

§ 28.325 Fire detection systems.

(a) Each accommodation space must be equipped with an independent modular smoke detector or a smoke actuated fire detecting unit installed in accordance with 46 CFR part 76, subpart 76.33.

(b) An independent modular smoke detector must meet UL 217 and be listed as a "Single Station Smoke Detector--Also suitable for use in Recreational Vehicles."

§ 28.330 Galley hood and other fire protection equipment.

(a) Each vessel must be fitted with a grease extraction hood complying with UL 710 above each grill, broiler, and deep fat fryer.

(b) Each grease extraction hood must be equipped with a pre-engineered dry or wet chemical fire extinguishing system meeting the applicable sections of NFPA 17 or 17A and must be listed by an independent laboratory.

(c) A vessel 79 feet (24 meters) or more in length must have at least one fire axe located in or adjacent to the operating station.

§ 28.335 Fuel systems.

(a) Applicability. Except for the components of an outboard engine or portable bilge pump, each vessel must meet the requirements of this section.

(b) Portable fuel systems. Portable fuel systems including portable tanks and related fuel lines and accessories are prohibited except where used for outboard engines or portable bilge pumps. The design, construction, and stowage of portable tanks and related fuel lines and accessories must meet the requirements of ABYC H-25.

(c) Fuel restrictions. Except for outboard engines, the use of fuel other than bunker C or diesel is prohibited. An installation using bunker C must comply with the requirements of subchapter F of this chapter.

(d) Vent pipes for integral fuel tanks. Each integral fuel tank must meet the requirements of this paragraph.

(1) Each fuel tank must be fitted with a vent pipe connected to the highest point of the tank terminating in a 180 degree (3.14 radians) bend on a weather deck and fitted with a flame screen.

(2) Except where provision is made to fill a tank under pressure, the net cross-sectional area of the vent pipe for a fuel tank must not be less than 0.484 square inches (312.3 square millimeters).

(3) Where provision is made to fill a tank under pressure, the net cross-sectional area of the vent pipe must not be less than that of the fill pipe.

(e) Fuel piping. Except as permitted in paragraph (e)(1) and (e)(2) of this section, each fuel line must be seamless and must be of steel, annealed copper, nickel-copper, or copper-nickel. Each fuel line must have a wall thickness of not less than that of 0.035 inch (0.9 millimeters) except that:

(1) Aluminum piping is acceptable on an aluminum hull vessel provided it is installed outside the machinery space and is at least Schedule 80 in thickness; and

(2) Nonmetallic flexible hose is acceptable but must--

(i) Not be used in lengths of more than 30 inches (0.82 meters);

(ii) Be visible, easily accessible, and must not penetrate a watertight bulkhead;

(iii) Be fabricated with an inner tube and a cover of synthetic rubber or other suitable material reinforced with wire braid.

(iv) Be fitted with suitable, corrosion resistant, compression fittings; and

(v) Be installed with two clamps at each end of the hose, if designed for use with clamps. Clamps must not rely on spring tension and must be installed beyond the bead or flare or over the serrations of the mating spud, pipe, or hose fitting.

(f) A fuel line subject to internal head pressure from fuel in the tank must be fitted with a positive shutoff valve located at the tank which is operable from a safe location outside the space in which the valve is located.

(g) A vessel less than 79 feet (24 meters) in length may comply with one of the following standards in lieu of the requirements of paragraphs (e) and (f) of this section.

(1) ABYC H-33.

(2) Chapter 5 of NFPA 302.

(3) 33 CFR Chapter I, subchapter S (Boating Safety).

§ 28.340 Ventilation of enclosed engine and fuel tank spaces.

(a) Applicability. Each vessel with a gasoline outboard engine or gasoline storage tank must comply with the requirements of this section.

(b) Ventilation of spaces containing gasoline. Each space that contains a gasoline engine, a gasoline storage tank, or gasoline piping connected to an integral gasoline tank must be open to the atmosphere and so arranged as to prevent the entrapment of vapors or be ventilated by a mechanical exhaust system with a non-sparking fan. The fan motor must comply with 46 CFR 111.105-23.

(c) Alternative standards. A vessel less than 65 feet in length with ventilation installations in accordance with NFPA 302, chapter 2, section 2-2, or ABYC H-2 and 33 CFR part 183, subpart K, will be considered as meeting the requirements of this section.

§ 28.345 Electrical standards for vessels less than 79 feet (24 meters) in length.

(a) A vessel less than 79 feet (24 meters) in length with an alternating current electrical distribution system may comply with the requirements of ABYC E-8 and either paragraph (c) or (d) of this section, as applicable, in lieu of meeting the requirements of §§ 28.350 through 28.370.

(b) A vessel less than 79 feet (24 meters) in length with a direct current system may comply with the requirements of ABYC E-1, ABYC E-9, and either paragraph (c) or (d) of this section, as applicable, in lieu of meeting the requirements of §§ 28.350 through 28.370.

(c) In addition to paragraph (a) or (b) of this section, the vessel may comply with the requirements of NFPA 302, chapters 7 and 8.

(d) In addition to paragraph (a) or (b) of this section, the vessel may comply with the requirements of 33 CFR part 183, subpart I and § 28.370.

§ 28.350 General requirements for electrical systems.

(a) Electrical equipment exposed to the weather or in a

location exposed to seas must be waterproof, watertight, or enclosed in a watertight housing.

(b) Aluminum must not be used for current carrying parts of electrical equipment or wiring.

(c) As far as practicable, electrical equipment must not be installed in lockers used to store paint, oil, turpentine, or other flammable or combustible liquid. If electrical equipment, such as lighting, is necessary in these spaces, it must be explosion-proof or intrinsically safe.

(d) Explosion-proof and intrinsically safe equipment must meet the requirements of 46 CFR part 111, subpart 111.105.

(e) Metallic enclosures and frames of electrical equipment must be grounded.

(f) Each vessel with a nonmetallic hull must have a continuous, non-current carrying grounding conductor which connects together the enclosures and frames of electrical equipment and which connects metallic items such as engines, fuel tanks, and equipment enclosures to a common ground point.

(g) The equipment grounding conductor must be sized in accordance with section 250-95 of NFPA Standard 70.

§ 28.355 Main source of electrical power.

(a) Applicability. Each vessel that relies on electricity to power any of the following essential loads must have at least two electrical generators to supply these loads:

- (1) The propulsion system and its necessary auxiliaries and controls;
- (2) Interior lighting;
- (3) Steering systems;
- (4) Communication systems;
- (5) Navigation equipment and navigation lights;
- (6) Fire protection or detection equipment;

(7) Bilge pumps; or

(8) General alarm system.

(b) Each generator must be attached to an independent prime mover.

§ 28.360 Electrical distribution systems.

(a) Each electrical distribution system which has a neutral bus or conductor must have the neutral bus or conductor grounded.

(b) A grounded electrical distribution system must have only one connection to ground. This ground connection must be at the switchboard or, on a nonmetallic vessel, at the common ground point.

§ 28.365 Overcurrent protection and switched circuits.

(a) Each power source must be protected against overcurrent. Overcurrent devices for generators must be set at a value not exceeding 115 percent of the generator full load rating.

(b) Except for a steering circuit, each circuit must be protected against both overload and short circuit. Each overcurrent device in a steering system power and control circuit must provide short circuit protection only.

(c) Each ungrounded current carrying conductor must be protected in accordance with its current carrying capacity by a circuit breaker or fuse at the connection to the switchboard or distribution panel bus.

(d) Each circuit breaker and each switch must simultaneously open all ungrounded conductors.

(e) The grounded conductor of a circuit must not be disconnected by a switch or an overcurrent device unless all ungrounded conductors of the circuit are simultaneously disconnected.

(f) Navigation light circuits must be separate, switched circuits having fused disconnect switches or circuit breakers so that only the appropriate navigation lights can be switched on.

(g) A separate circuit with overcurrent protection at the

main distribution panel or switchboard must be provided for each radio installation.

§ 28.370 Wiring methods and materials.

(a) All cable and wire must have insulated, stranded copper conductors of the appropriate size and voltage rating for the circuit.

(b) Each conductor must be No. 22 AWG or larger. Conductors in power and lighting circuits must be No. 14 AWG or larger. Conductors must be sized so that the voltage drop at the load terminals is not more than 10 percent.

(c) Cable and wiring not serving equipment in a high risk fire area such as a galley, laundry, or machinery space must be routed as far as practicable from these spaces. As far as practicable, cables serving duplicated essential equipment must be separated so that a casualty that affects one cable does not affect the other.

(d) Cable and wire for power and lighting circuits must:

(1) For circuits of less than 50 volts, meet 33 CFR 183.425 and 183.430; and

(2) For circuits of 50 volts or greater:

(i) Meet sections 310-13 and 310-15 of NFPA 70, except that asbestos insulated cable and dry location cable must not be used;

(ii) Be listed by Underwriters Laboratories Inc. as UL Boat or UL Marine Shipboard cable; or

(iii) Meet 46 CFR part 111, subpart 111.60.

(e) All metallic cable armor must be electrically continuous and grounded to the metal hull or the common ground point at each end of the cable run, except that final sub-circuits (those supplying loads) may be grounded at the supply end only.

(f) A wiring termination and connection must be made in a fire retardant enclosure such as a junction box, fixture enclosure, or panel enclosure. A fire retardant plastic enclosure is acceptable.

§ 28.375 Emergency source of electrical power.

(a) Each vessel must have an emergency source of electrical power which is independent of the main sources of electrical power and which is located outside the main machinery space.

(b) The emergency source of electrical power must be capable of supplying all connected loads continuously for at least 3 hours.

(c) Except as provided in paragraphs (d) and (e) of this section, the following electrical loads must be connected to the emergency source of power:

- (1) Navigation lights;
- (2) Steering systems;
- (3) Bilge pumps;
- (4) Fire protection and detection systems, including fire pumps;
- (5) Communication equipment;
- (6) General alarm system and;
- (7) Emergency lighting.

(d) A vessel less than 36 feet (11.0 meters) in length need only supply communication equipment by an emergency source of electrical power if flashlights are provided.

(e) A vessel less than 79 feet (24 meters) in length which is not dependent upon electrical power for propulsion, including propulsion control systems or steering, need only supply emergency lighting, navigation equipment, general alarm system, and communication systems by the emergency source of power.

(f) Where the emergency source of power is a generator, the generator prime mover must have a fuel supply which is independent of other prime movers.

§ 28.380 General structural fire protection.

(a) Fire hazards to be minimized. Each vessel must be

constructed so as to minimize fire hazards insofar as is reasonable and practicable.

(b) Combustibles insulated from heated surfaces. An internal combustion engine exhaust, galley uptake, electrical heating tape, or similar source of ignition must be kept clear of and suitably insulated from combustible material. A dry exhaust system for an internal combustion engine on a wooden or fiber reinforced plastic vessel must be installed in accordance with ABYC P-1.

(c) Separation of machinery and fuel tank spaces from accommodation spaces.

(1) Each accommodation space must be separated from machinery and fuel tank spaces by a fire resistant boundary which will prevent the passage of vapors.

(2) Each pipe and cable penetration between an accommodation space and a machinery or a fuel tank storage space must be sealed.

(d) Paint and flammable liquid lockers. Each vessel carrying paint and flammable liquids must be equipped with a steel or a steel lined storage locker.

(e) Insulation. Except as provided in paragraphs (e)(1) and (e)(2) of this section, insulation must be noncombustible.

(1) In machinery spaces, combustible insulation may be used for pipe and machinery lagging.

(2) In cargo spaces and refrigerated compartments of service spaces, combustible insulation may be used.

(f) Vapor barrier. Where insulation of any type is used in spaces where flammable and combustible liquids or vapors are present, e.g., machinery spaces and paint lockers, a vapor barrier which covers the insulation must be provided.

(g) Paint. Nitrocellulose or other highly flammable or noxious fume producing paints or lacquers must not be used on the vessel.

(h) Mattresses. Polyurethane foam mattresses are prohibited.

Note: The U.S. Department of Commerce Standard for Mattress Flammability (FF4-72.16) in 16 CFR part 1632, subpart A, applies to each mattress.

(i) Fiber reinforced plastic. When the hull, a deck, deckhouse, or superstructure of a vessel is partially or completely constructed of fiber reinforced plastic, the resin used must be fire retardant.

(j) Cooking areas. Vertical or horizontal surfaces within 0.9144 meters (3 feet) of cooking appliances must be composed of noncombustible material or covered by noncombustible material. Curtains, draperies, or free hanging fabrics are not permitted within 0.9144 meters (3 feet) of cooking appliances.

§ 28.385 Structural fire protection for vessels that operate with more than 49 individuals on board.

(a) Applicability. Each vessel that operates with more than 49 individuals on board must comply with the requirements of this section in addition to the requirements of § 28.380.

(b) Construction. The hull, structural bulkheads, columns and stanchions must be composed of steel. Superstructures and deckhouses must be constructed of noncombustible material.

(c) Protection of accommodation spaces. A bulkhead or deck separating an accommodation space from a control station, machinery space, cargo space, or service space must be constructed of noncombustible material.

§ 28.390 Means of escape.

(a) Each space which is used by an individual on a regular basis or which is generally accessible to an individual must have at least two widely separated means of escape. At least one of the means of escape must be independent of watertight doors. Subject to the restrictions of this section, means of escape include normal exits and emergency exits, passageways, stairways, ladders, deck scuttles, and windows.

(b) At least one of the means of escape from each space must provide a satisfactory route to weather.

(c) Each door, hatch or scuttle used as a means of es-

cape must be capable of being opened by one individual, from either side, in both light and dark conditions, must open towards the expected direction of escape from the space served, and if a watertight door be of the quick acting type.

(d) Each deck scuttle which serves as a means of escape, must be fitted with a quick-acting release and a device to hold the scuttle in an open position.

(e) Each foothold, handhold, ladder, or similar structure, provided to aid escape, must be suitable for use in emergency conditions and must be of rigid construction.

(f) A window or windshield of sufficient size and proper accessibility may be used as one of the required means of escape from an enclosed space.

§ 28.395 Embarkation stations.

Each vessel must have at least one designated survival craft embarkation station and any additional embarkation stations necessary so that an embarkation station is readily accessible from each accommodation space and work space. Each embarkation station must be arranged to allow the safe boarding of survival craft.

§ 28.400 Radar and depth sounding devices.

(a) Each vessel must be fitted with a general marine radar system for surface navigation with a radar screen mounted at the operating station.

(b) Each vessel must be fitted with a suitable echo depth sounding device.

§ 28.405 Hydraulic equipment.

(a) Each hydraulic system must be so designed and installed that proper operation of the system is not affected by back pressure in the system.

(b) Piping and piping components must be designed with a burst pressure of not less than four times the system maximum operating pressure.

(c) Each hydraulic system must be equipped with at least one pressure relieving device set to relieve at the

system's maximum operating pressure.

(d) All material in a hydraulic system must be suitable for use with the hydraulic fluid used and must be of such chemical and physical properties as to remain ductile at the lowest operating temperature likely to be encountered by the vessel.

(e) Except for hydraulic steering equipment, controls for hydraulic equipment must be located where the operator has an unobstructed view of the hydraulic equipment and the adjacent working area.

(f) Controls for hydraulic equipment must be so arranged that the operator is able to quickly disengage the equipment in an emergency.

(g) Hydraulically operated machinery must be equipped with a holding device to prevent uncontrolled movement due to loss of hydraulic system pressure.

(h) A nonmetallic flexible hose must only be used between two points of relative motion, including a pump and piping system, and must meet SAE J 1942.

(i) Each nonmetallic flexible hose and hose assembly must be installed in accordance with the manufacturer's rating and guidelines and must be limited to a length of not more than 30 inches (0.76 meters) in an application not subject to torsional loading.

§ 28.410 Deck rails, lifelines, storm rails, and hand grabs.

(a) Except as otherwise provided in paragraph (d) of this section, deck rails, lifelines, grab rails, or equivalent protection must be installed near the periphery of all weather decks accessible to individuals. Where space limitations make deck rails impractical, hand grabs may be substituted.

(b) The height of deck rail, lifelines, or bulwarks must be at least 39 1/2 inches (1 meter) from the deck, except, where this height would interfere with the normal operation of the vessel, a lesser height may be substituted.

(c) All deck rails or lifelines must be permanently supported by stanchions at intervals of not more than 7 feet (2.3 meters). Stanchions must be through bolted or

welded to the deck.

(d) Portable stanchions and lifelines may be installed in locations where permanently installed deck rails would impede normal fishing operations or emergency recovery operations.

(e) Deck rails or lifelines must consist of evenly spaced courses. The spacing between courses must not be greater than 15 inches (0.38 meters). The opening below the lowest course must not be more than 9 inches (0.23 meters). Lower courses are not required where all or part of the space below the upper rail is fitted with a bulwark, chain link fencing, wire mesh, or an equivalent.

(f) A suitable storm rail or hand grab must be installed where necessary in a passageway, at a deckhouse side, at a ladder, and a hatch where an individual might have normal access.

(g) A stern trawler must have doors, gates, or other protective arrangements at the top of the stern ramp at least as high as adjacent bulwarks or 39 1/2 inches (1 meter), whichever is less.

§ 28.500 Applicability.

This subpart applies to each commercial fishing industry vessel which is 79 feet (24 meters) or more in length that is not required to be issued a load line under subchapter E of this chapter and that--

(a) Has its keel laid or is at a similar stage of construction or undergoes a major conversion started on or after September 15, 1991;

(b) Undergoes alterations to the fishing or processing equipment for the purpose of catching, landing, or processing fish in a manner different than has previously been accomplished on the vessel--these vessels need only comply with § 28.501 of this subpart; or

(c) Has been substantially altered on or after September 15, 1991.

§ 28.501 Substantial alterations.

(a) Except as provided in paragraph (b) of this section, a vessel that is substantially altered, including the cu-

mulative effects of all alterations, need not comply with the remainder of this subpart, provided that it has stability instructions developed by a qualified individual which comply with § 28.530 (c) through (e).

(b) A vessel that is substantially altered in a manner which adversely affects its stability, including the cumulative effects of all alterations, need not comply with the remainder of this subpart, provided the stability instructions required by paragraph (a) of this section are based on loading conditions or operating restrictions, or both, which compensate for the adverse affects of the alterations.

(c) The following changes to a vessel's lightweight characteristics are considered to adversely affect vessel stability:

- (1) An increase in the vertical center of gravity at lightweight by more than 2 inches (51 millimeters) compared to the original lightweight value.
- (2) An increase or decrease of lightweight displacement by more than 3 percent of the original lightweight displacement.
- (3) A shift of the longitudinal center of gravity of more than 1 percent of the vessel's length.

(d) In determining whether or not a vessel's stability has been adversely affected, a qualified individual must, at a minimum, consider the net effects on stability of any:

- (1) Reduction of the downflooding angle;
- (2) Increase in the maximum heeling moment caused by fishing gear or weight lifted over the side due to changes in lifting arrangement or capacity;
- (3) Reduction in freeing port area;
- (4) Increase in free surface effects, including increased free surface effects due to water on deck associated with any increase in length or height of bulwarks;
- (5) Increase in projected wind area;
- (6) Decrease in the angle of maximum righting arm;

(7) Decrease in the area under the righting arm curve; and

(8) Increase in the surface area on which ice can reasonably be expected to accumulate.

§ 28.505 Vessel Owner's responsibility.

(a) Where a test or calculations are necessary to evaluate stability, it is the owner's responsibility to select a qualified individual to perform the test or calculations.

(b) Test results and calculations developed in evaluating stability must be maintained by the owner.

§ 28.510 Definition of stability terms.

Downflooding means the entry of seawater through any opening into the hull or superstructure of an undamaged vessel due to heel, trim, or submergence of the vessel.

Downflooding angle means the static angle from the intersection of the vessel's centerline and the waterline in calm water to the first opening that cannot be closed weathertight and through which downflooding can occur.

Flush deck means a continuous weather deck located at the uppermost sheer line of the hull.

Forward perpendicular means a vertical line corresponding to the intersection of the forward side of the vessel's stem and the vessel's waterline at the vessel's deepest operating draft.

Open boat means a vessel not protected from entry of water by means of a complete deck, or by a combination of partial weather deck and superstructure which is seaworthy for the waters upon which the vessel operates.

Protected waters means sheltered waters presenting no special hazards such as most rivers, harbors, lakes, and similar waters as determined by the OCMI.

Qualified individual means an individual or an organization with formal training in and experience in matters dealing with naval architecture calculations.

Substantially altered means the vessel is physically altered in a manner that affects the vessel's stability and includes:

- (1) Alterations that result in a change of the vessel's lightweight vertical center of gravity of more than 2 inches (51 millimeters), a change in the vessel's lightweight displacement of more than 3 percent, or an increase of more than 5 percent in the vessel's projected lateral area, as determined by tests or calculations;
- (2) Alterations which change the vessel's underwater shape;
- (3) Alterations which change a vessel's angle of downflooding; and
- (4) Alterations which change a vessel's buoyant volume.

Well deck means a weather deck fitted with solid bulwarks that impede the drainage of water over the sides or an exposed recess in the weather deck extending one-half or more of the length of the vessel.

§ 28.515 Submergence test as an alternative to stability calculations.

- (a) A vessel may comply with this section in lieu of the remainder of the requirements in this subpart. A certification plate installed under 33 CFR part 183, subpart B, is acceptable evidence of compliance with this section.
- (b) A vessel which is fitted with inboard engines and loaded as described in paragraph (e) of this section must float in calm water, after being submerged for 18 hours, so that--
 - (1) For an open vessel, any portion of the vessel's gunwale is above the water's surface; or
 - (2) For a decked vessel, any portion of the main deck is above the water's surface.
- (c) A vessel which is fitted with an outboard engine must be loaded as described in paragraph (e) of this section and must float in calm water after being submerged for 18 hours so that--

- (1) The vessel has an equilibrium heel angle of less than 10°;

- (2) Any portion of the vessel's hull is above the water's surface; and

- (3) Any portion of the lowest 3 feet (0.91 meters) of the vessel's hull is not more than 6 inches (152 millimeters) below the water's surface as measured at the lowest point on the following--

- (i) The gunwale, for an open boat; or

- (ii) The main deck, for a decked vessel.

- (d) A vessel which is fitted with an outboard engine must be loaded as described in paragraph (f) of this section and must survive the submergence described in paragraph (c) of this section, except that the equilibrium heel angle must not exceed 30° and the vessel must float with the lower end of the vessel not more than 12 inches (0.31 meters) below the water's surface in calm water.

- (e) For the tests described in paragraphs (b) and (c) of this section, a vessel must be complete in all respects, except that machinery which would be damaged by water may be replaced with equivalent fixed weight in the same location as the machinery it replaces. The vessel must be loaded with weight to represent the most adverse loading condition. The most adverse loading condition normally includes the maximum weight of fish in its highest possible location. Weights must be substituted for operating personnel at 165 pounds (734 Newtons) per individual and may be substituted for fishing gear. The substitute weights may be located transversely so that the vessel floats level prior to being submerged. The two largest air chambers, or compartments of a decked vessel not used as fuel tanks, that contribute buoyancy to the vessel must be flooded.

- (f) For the test described in paragraph (d) of this section, a vessel must be complete and loaded as described in paragraph (e) of this section, except that the center of gravity of the equivalent maximum fish load must be located to one side of the vessel's centerline by a distance equal to one-fifth of the maximum transverse dimension of the fish storage space.

§ 28.530 Stability instructions.

(a) Intent. The intent of this section is to ensure that vessel masters and individuals in charge of vessels are provided with enough stability information to allow them to maintain their vessel in a satisfactory stability condition. The rules provide maximum flexibility for owners and qualified individuals to determine how this information is conveyed, taking into consideration decisions by operating personnel must be made quickly and that few operating personnel in the commercial fishing industry have had specialized training in stability. Therefore, stability instructions should take into account the conditions a vessel may reasonably be expected to encounter and provide simple guidance for the operating personnel to deal with these situations.

(b) Each vessel must be provided with stability instructions which provide the master or individual in charge of the vessel with loading constraints and operating restrictions which maintain the vessel in a condition which meets the applicable stability requirements of this subpart.

(c) Stability instructions must be developed by a qualified individual.

(d) Stability instructions must be in a format easily understood by the master or individual in charge of the vessel. Units of measure, language, and rigor of calculations in the stability instructions must be consistent with the ability of the master or the individual in charge of the vessel. The format of the stability instructions may include, at the owner's discretion, any of the following:

- (1) Simple loading instructions;
- (2) A simple loading diagram with instructions;
- (3) A stability booklet with sample calculations; or
- (4) Any other appropriate format for providing stability instructions.

(e) Stability instructions must be developed based on the vessel's individual characteristics and may include the following, as appropriate for the format chosen for presentation:

(1) A general description of the vessel, including lightweight data;

(2) Instructions on the use of the information;

(3) General arrangement plans showing watertight compartments, closures, vents, downflooding angles, and allowable weights;

(4) Loading restrictions, such as diagrams, tables, descriptions or maximum KG curves;

(5) Sample loading conditions;

(6) General precautions for preventing unintentional flooding;

(7) Capacity plan or tank sounding tables showing tank and hold capacities, centers of gravity, and free surface effects;

(8) A rapid and simple means for evaluating any specific loading condition;

(9) The amount and location of fixed ballast;

(10) Any other necessary guidance for maintaining adequate stability under normal and emergency conditions;

(11) A general description of the stability criteria that are used in developing the instructions;

(12) Guidance on the use of roll limitation devices such as stabilizers; and

(13) Any other information the owner feels is important to the stability and operation of the vessel.

§ 28.535 Inclining test.

(a) Except as provided in paragraphs (b) and (c) of this section, each vessel for which the lightweight displacement and centers of gravity must be determined in order to do the calculations required in this subpart must have an inclining test performed.

(b) A deadweight survey may be substituted for the inclining test, if there is a record of an inclining test of a

sister vessel. A vessel qualifies as a sister vessel if it is built to the same basic drawings and the undocumented weight difference between the two vessels is less than 3 percent of the lightweight displacement of the vessel which was inclined and the location of the longitudinal center of gravity differs less than 1 percent of the vessel's length.

(c) A deadweight survey may be substituted for the inclining test, or the inclining test may be dispensed with, if an accurate estimate of the vessel's lightweight characteristics can be made and the precise location of the position of the vessel's vertical center of gravity is not necessary to ensure that the vessel has adequate stability in all probable loading conditions.

(d) ASTM F 1321 (incorporated by reference, see § 28.40), with the exception of Annexes A and B, may be used as guidance for any inclining test or deadweight survey conducted under this section.

§ 28.540 Free surface.

(a) When doing the stability calculations required by this subpart, the virtual rise in the vessel's vertical center of gravity due to liquids in tanks must be considered by calculating the following--

(1) For each type of consumable liquid, the maximum free surface effect of a tank, or a transverse pair of tanks, having the greatest free surface effect, in addition to a correction for service tanks; and

(2) The free surface effect of each partially filled tank and hold containing a liquid that is not a consumable or containing fish or a fish product that can shift as the vessel heels. This should include correction for any loose water within the vessel's hull associated with the processing of fish.

(b) The free surface effect of tanks fitted with cross connection piping must be calculated assuming the tanks are one common tank, unless valves that will be kept closed to prevent the transfer of liquids as the vessel heels are installed in the piping.

(c) The moment of transference method may be used in lieu of the inertia method when calculating free surface effects.

§ 28.545 Intact stability when using lifting gear.

(a) Each vessel which lifts a weight over the side, or that uses fishing gear that can impose an overturning moment on the vessel, such as trawls and seines, must meet the requirements of this section if that maximum heeling moment exceeds $0.67(W)(GM)(F/B)$, in foot-long tons (meter-metric tons), where:

W=displacement of the vessel with the lifted weight or the force on the fishing gear included, in long tons (metric tons);

GM=metacentric height with the lifted weight or force on the fishing gear included, in feet (meters);

F=freeboard to the lowest weather deck, measured at amidships in feet (meters); and

B=maximum beam, in feet (meters).

(b) Except as provided in paragraph (f) of this section, each vessel must meet the requirements of § 28.570 or have at least 15 foot-degrees (0.080 meter-radians) of area under the righting arm curve, after correcting the righting arms for the heeling arm caused by lifting or fishing gear, from the angle of equilibrium to the least of the following:

(1) The angle corresponding to the maximum righting arm;

(2) The angle of downflooding; or

(3) 40° (0.7 radians).

(c) The angle of intersection of the heeling arm curve resulting from the lifting moment or the moment of fishing gear and the righting arm curve must not be at an angle of more than 10° (0.17 radians).

(d) The heeling arm curve resulting from lifting must be calculated as the resultant of the upright heeling moment divided by the vessel's displacement multiplied by the cosine of the angle of heel.

(e) For the purposes of this section, the weight of suspended loads must be assumed to act at the tip of the boom unless the suspended load's transverse movement

is restricted, such as by the use of sideboards.

(f) A vessel that operates on protected waters, as defined in § 170.050 of this chapter, must comply with the requirements of this section, except that the area described in paragraph (b) of this section must be at least 10 foot-degrees (0.053 meter-radians).

§ 28.550 Icing.

(a) Applicability. Each vessel that operates north of 42° North latitude between November 15 and April 15 or south of 42° South latitude between April 15 and November 15 must meet the requirements of this section.

(b) Except as provided in paragraph (d) of this section, the weight of assumed ice on each surface above the waterline of a vessel which operates north of 66°30' North latitude or south of 66° South latitude must be assumed to be at least:

(1) 6.14 pounds per square foot (30 Kilograms per square meter) of horizontal projected area which corresponds to a thickness of 1.3 inches (33 millimeters); and

(2) 3.07 pounds per square foot (15 Kilograms per square meter) of vertical projected area which corresponds to a thickness of 0.65 inches (16.5 millimeters).

(c) Except as provided in paragraph (d) of this section, the weight of assumed ice on a vessel that operates north of 42° North but south of 66°30' North latitude or south of 42° South but north of 66° South latitude must be assumed to be at least one-half of the values required by paragraphs (b)(1) and (b)(2) of this section.

(d) The height of the center of gravity of the accumulated ice should be calculated according to the position of each corresponding horizontal surface (deck and gangway) and each other continuous surface on which ice can reasonably be expected to accumulate. The projected horizontal and vertical area of each small discontinuous surface such as a rail, a spar, and rigging with no sail can be accounted for by increasing the calculated area by 15 percent.

(e) The weight and location of ice must be included in the vessel's weight and centers of gravity in each condi-

tion of loading when performing the stability calculations required by this subpart.

§ 28.555 Freeing ports.

(a) Except as provided in paragraph (i) of this section, each decked vessel fitted with bulwarks must be fitted with freeing ports.

(b) Freeing ports must be located to allow the rapid clearing of water in all probable conditions of list and trim.

(c) Except as provided by paragraphs (d) through (h) of this section, the aggregate clear area of freeing ports on each side of the vessel must not be less than 0.71 plus 0.035 times the length of the bulwark, in meters, for area in square meters, or 7.6 plus 0.115 times the length of the bulwark, in feet, for the area in square feet. The length of bulwark need not exceed 0.7 times the overall length of the vessel.

(d) Except as provided in paragraphs (e) through (h) of this section, for bulwarks which exceed 20.11 meters (66 feet) in length, the aggregate clear area of freeing ports on each side of the vessel must not be less than 0.07 times the length of the bulwark, in meters, for an area in square meters (0.23 times the length of the bulwark in feet, for an area in square feet). The length of the bulwark need not exceed 0.7 times the overall length of the vessel.

(e) For a bulwark more than 4 feet (1.22 meters) in height, the freeing port area required by paragraphs (c) or (d) of this section must be increased in accordance with the following formula:

$i=[h-4]0.04q$, ($i=[h-1.722]0.04q$, for metric units), where:

i =increase in freeing port area, in square feet (square meters);

h =bulwark height, in feet (meters); and

q =length of bulwark exceeding 4 feet (1.22 meters) in height, in feet (meters).

(f) For a bulwark less than 3 feet (0.91 meters) in height, the required freeing port area, required by paragraph (c) or (d) of this section, may be decreased in ac-

cordance with the following formula:

$r=[3-h]0.04q$, ($r=[h-0.91-h]0.04q$), where:

r =permitted reduction in freeing port area, in square feet (square meters).

h =bulwark height, in feet (meters).

q =length of bulwark which is less than 3 feet (0.914 meters) in height, in feet (meters).

(g) For a vessel without sheer, the freeing port area must be increased by 50 percent.

(h) The area of the freeing ports on a vessel that operates on protected waters need only be 50 percent of the area required by paragraphs (c) or (d) of this section.

(i) Freeing port covers are permitted provided that the freeing port area required by this section is not diminished and the covers are constructed and fitted so that water will readily flow outboard but not inboard.

§ 28.560 Watertight and weathertight integrity.

(a) Each opening in a deck or a bulkhead that is exposed to weather must be fitted with a weathertight or a watertight closure device.

(b) Except as provided in paragraphs (c) through (f) of this section, each opening in a deck or a bulkhead that is exposed to weather must be fitted with a watertight coaming as follows:

(1) For a vessel 79 feet (24 meters) or more in length, the coaming must be at least 24 inches (0.61 meters) in height; or

(2) For a vessel less than 79 feet (24 meters) in length, the coaming must be at least 12 inches (0.30 meters) in height.

(c) A coaming to a fish hold that is under constant attention when the closure is not in place need only be 6 inches (0.15 meters) in height.

(d) The coaming of an opening fitted with a quick-acting watertight closure device need only be of suffi-

cient height to accommodate the device.

(e) Except on an exposed forecastle deck, a coaming is not required on a deck above the lowest weather deck.

(f) Each window and portlight located below the first deck above the lowest weather deck must be provided with an inside deadlight. Each deadlight must be efficient, hinged, and arranged so that it can be effectively closed watertight.

(g) An opening in a vessel below the weather deck which is used for discharging water or debris resulting from processing or sorting operations must be fitted with a means to ensure the opening can be closed weathertight. This means of closing must be operable from a location which is outside the space containing the opening.

§ 28.565 Water on deck.

(a) Each vessel with bulwarks must comply with the requirements of this section.

(b) Except for a vessel that operates on protected waters, the residual righting energy, “b” in Figure 28.565, must not be less than the water on deck heeling energy, “a” in Figure 28.565.

(c) The water on deck heeling energy must be determined assuming the following:

(1) The deck well is filled to the top of the bulwark at its lowest point and the vessel heeled to the angle at which this point is immersed;

(2) Water does not run off through the freeing ports;

(3) Vessel trim and displacement are constant and equal to the values of the vessel without the water on deck; and

(4) Water in the well is free to run-off over the top of the bulwark.

(d) The residual righting energy is the righting energy from the value where the righting arm equals the water on deck heeling arm up to the lesser of the values of

40° (0.70 radians) of heel or the downflooding angle.

§ 28.570 Intact righting energy.

(a) Except as provided in paragraph (c) of this section, each vessel must have the following properties in each condition of loading:

(1) An initial metacentric height (GM) of at least 1.15 feet (0.35 meters);

(2) A righting arm (GZ) of at least 0.66 feet (0.2 meters) at an angle of heel not less than 30° (0.52 radians);

(3) A maximum righting arm that occurs at an angle of heel not less than 25° (0.44 radians);

(4) An area under each righting arm curve of at least 16.9 foot-degrees (0.090 meter-radians) up to the lesser of 40° (0.70 radians) or the angle of downflooding;

(5) An area under each righting arm curve of at least 10.3 foot-degrees (0.055 meter-radians) up to an angle of heel of 30° (0.52 radians);

(6) An area under each righting arm curve of at least 5.6 foot-degrees (0.030 meter-radians) between 30° (0.52 radians) and the lesser of 40° (0.70 radians) or the angle of downflooding; and

(7) Except as provided by paragraph (b) of this section, positive righting arms through an angle of heel of 60° (1.05 radians).

(b) In lieu of meeting the requirements of paragraph (a)(7) of this section, a vessel may comply with the following provisions:

(1) Hatches in the watertight/weathertight envelope must be normally kept closed at sea (e.g., the live tank hatch is only opened intermittently, under controlled conditions); or

(2) Unintentional flooding through these hatches must not result in progressive flooding to other spaces; and

(3) In all cases, a vessel must have positive righting arms through an angle of heel of at least 50° (0.87 radians) and the intact stability analysis must consider that spaces accessed by such hatches to be flooded full or flooded to the level having the most detrimental effect on stability when free surface effects are considered.

(c) In lieu of meeting the requirements of paragraph (a) of this section, a vessel may comply with the provisions of § 170.173(c) of this chapter, provided that righting arms are positive to an angle of heel of not less than 50° (0.87 radians).

(d) For the purpose of paragraphs (a) and (c) of this section, at each angle of heel a vessel's righting arm must be calculated assuming the vessel is permitted to trim free until the trimming moment is zero.

§ 28.575 Severe wind and roll.

(a) Each vessel must meet paragraphs (f) and (g) of this section when subjected to the gust wind heeling arm and the angle of roll to windward as specified in this section.

(b) The gust wind heeling arm, L_2 in figure 28.575 of this chapter, must be calculated by the following formula:

$$KE_n(V_n^2 A_n Z_n)/W$$

where:

$K=0.00216$ when consistent English units are used or 1.113 when consistent metric units are used.

E_n = series summation notation where n varies from 1 to the number of elements in the series;

$V_n = S[0.124LN(0.3048h_n)+0.772]$, in feet per second $S[0.127LN(h_n)+0.772]$, in meters per second and is the wind speed for profile element "n" on a vessel;

$S=64$ (19.5, if metric units are used) for a vessel that operates on protected waters; or 85.3 (26, if metric units are used) for a vessel that operates on waters other than protected waters;

LN=natural logarithm;

h_n = the vertical distance from the centroid of area A_n to the waterline for profile element n, in feet (meters);

A_n = projected lateral area for profile element n, in square feet (square meters);

Z_n = the vertical distance between the centroid of A_n and a point at the center of the underwater lateral area or a point at approximately one-half of the draft, for profile element n, in feet; and

W=displacement of the loaded vessel, in pounds (Newtons).

(c) The angle of roll to windward, A_1 , is measured from the equilibrium angle, A_{e1} , and is calculated by the following formula:

$$A_1 = 109kXY[\text{Square root of } (rs)], \text{ in degrees,}$$

where:

s,X,Y=factors from table 28.575;

$$r = 0.73 + 0.6 Z_g/d;$$

Z_g = distance between the center of gravity and the waterline (+ above, - below), in feet (meters);

k=1.0 for round bilged vessels with no bilge keels or bar keels; 0.7 for vessels with sharp bilges, or the value from table 28.575 for vessels with a bar keel, bilge keels, or both;

B=molded breadth of the vessel, in feet (meters);

d=mean molded draft of the vessel, in feet (meters);

C_b = block coefficient;

A_k = aggregate area of bilge keels, the area of the lateral projection of a bar keel, or the sum of these areas, in square feet (square meters);

L=length, in feet (meters);

T=1.108 BC/square root of GM, in seconds; 2.0 BC/square root of GM, if metric units are used;

GM=metacentric height corrected for free surface effects, as explained in § 28.540, in feet (meters);

C=0.373+0.023(B/d)-0.000131L or 0.373+0.023(B/D)-0.00043L, if metric units are used.

(d) The angle of equilibrium, A_{e1} in figure 28.575, is calculated by determining the lowest angle at which the gust wind heeling arm, L_2 , is equal to the righting arm.

(e) The area “b” in figure 28.575 must be measured to the least of the following:

- (1) The angle of downflooding, (A_f);
- (2) The angle of the second intercept, A_{e2} in figure 28.575, of the wind heeling arm curve, L_2 in figure 28.575, and the righting arm curve; or
- (3) A heel angle of 50° (0.87 radians).

(f) The angle of equilibrium, A_{e1} in figure 28.575, must not exceed 14° (0.24 radians).

(g) Area “b” in figure 28.575 must not be less than area “a” in figure 28.575.

Tables 28.575.--Roll Factors

B/d	X
2.4	1.0
2.5	0.98
2.6	0.96
2.7	0.95
2.8	0.93
2.9	0.91

3.0	0.90
3.1	0.88
3.2	0.86
3.3	0.84
3.4	0.82
3.5	0.80

Note. Intermediate values must be obtained by interpolation.

C_b	Y
0.45	0.75
0.50	0.82
0.55	0.89
0.60	0.95
0.93	0.97
0.70	1.0

Note. Intermediate values must be obtained by interpolation.

$100A_k/(LB)$	k
0	1.0
1.0	0.98
1.5	0.95
2.0	0.88
2.5	0.79
3.0	0.74
3.5	0.72
4.0	0.70

Note. Intermediate values must be obtained by interpolation.

T	S
6	0.100
7	0.098
8	0.093
12	0.065
14	0.053
16	0.044
18	0.038
20	0.035

Note: Intermediate values must be obtained by interpolation.

§ 28.580 Unintentional flooding.

(a) Applicability. Except for an open boat that operates on protected waters and as provided by paragraph (i) of this section, each vessel built on or after September 15, 1991 must comply with the requirements of this section.

(b) Collision bulkhead. A watertight collision bulkhead must be fitted and must meet the following:

(1) Openings in the collision bulkhead must be kept to a minimum, and each must be fitted with a watertight closure device;

(2) A collision bulkhead must not be fitted with a door below the bulkhead deck;

(3) A penetration or opening in a collision bulkhead must be--

(i) Located as high and as far inboard as practicable; and

(ii) Fitted with a means to rapidly make it watertight

which is operable from a location aft of the collision bulkhead;

(4) The collision bulkhead must be located at least 5 percent of the length from the forward perpendicular unless the vessel has a bulbous bow, in which case the forward reference point will be extended by half the distance between the vessel's forward perpendicular and the forwardmost point of the bulbous bow as shown in figure 28.580; and

(5) The collision bulkhead must not be stepped below the bulkhead deck.

(c) Each vessel must meet the survival conditions in paragraph (f) of this section in each condition of loading and operation with the extent and character of damage specified in paragraphs (d) and (e) of this section.

(d) Extent and character of damage. Except where a lesser extent of damage or a smaller penetration would be more disabling, in evaluating the damage stability of a vessel the following penetration must be assumed:

(1) Longitudinal extent--L/10, or 10 feet (3.05 meters) plus 0.03L, whichever is less. Transverse water-

tight bulkheads that are separated by at least this distance may be assumed to remain effective;

(2) Transverse extent--30 inches (0.76 meters) from the side measured at right angles to the centerline at the level of the deepest operating waterline; and

(3) Vertical extent--from the baseline upward without limit.

(e) Each space containing a through hull fitting, such as the lazarette and the engine room, must be assumed to be flooded.

(f) Survival conditions. A vessel is presumed to survive the assumed damage and unintentional flooding described in paragraphs (d) and (e) of this section if:

(1) The angle of equilibrium after flooding does not exceed 25° (0.44 radians); and

(2) Through an angle of 20° (0.35 radians) beyond the angle of equilibrium after flooding, the following are met--

(i) The righting arm curve is positive;

(ii) The maximum righting arm is at least 4 inches (102 millimeters);

(iii) Each submerged opening is capable of being made weathertight; and

(iv) The heeling arm caused by deploying all fully loaded davit-launched survival craft on one side of a vessel does not exceed the righting arm at any angle of heel beyond the equilibrium angle when launching is assumed on the damaged side.

(g) Permeability. The permeability of each space must not be less than the following:

(1) For an accommodations space--95 percent;

(2) For a propulsion machinery space--85 percent;

(3) For a tightly packed storage space--60 percent;

(4) For a void or an auxiliary machinery space--95

percent;

(5) For an empty fish hold--95 percent;

(6) For a full fish hold--50 percent; and

(7) For tanks--95 percent (less if a tank must be full to attain the draft under consideration.)

(h) Buoyancy of superstructure. A deckhouse or a superstructure may be included in the buoyant volume of a vessel provided it is:

(1) Sufficiently strong to withstand the impact of waves;

(2) Fitted with a weathertight or watertight closure device for each opening;

(3) Equipped with an efficient, hinged, inside dead-light, for each window and each portlight, arranged so that it can be effectively closed watertight; and

(4) Fitted with interior access from the spaces below.

(i) A vessel may obtain and maintain a Load Line Certificate under Subchapter E of this chapter in lieu of meeting the requirements of paragraphs (c) through (g) of this section.

§ 28.700 Applicability.

Each fish processing vessel which is not subject to inspection under the provisions of another subchapter of this chapter must meet the requirements of this subpart.

§ 28.710 Examination and certification of compliance.

(a) At least once in every two years each vessel must be examined for compliance with the regulations of this subchapter by the ABS, a similarly qualified organization, or a surveyor of an accepted organization.

(b) Each individual performing an examination under paragraph (a) of this section, upon finding the vessel to be in compliance with the requirements of this chapter, must provide a written certification of compliance to the owner or operator of the vessel.

(c) Each certification of compliance issued under paragraph (b) of this section must:

(1) Be signed by the individual that performed the examination;

(2) Include the name of the organization the individual performing the examination represents or the name of the accepted organization the individual belongs to; and

(3) State that the vessel has been examined and found to meet the specific requirements of this chapter.

(d) A certification of compliance issued under paragraph (b) of this section must be retained on board the vessel until superseded.

(e) A copy of the certification of compliance issued under paragraph (b) of this section must be forwarded by the organization under whose authority the examination was performed to the Coast Guard District Commander (Attention: Fishing Vessel Safety Coordinator) in charge of the district in which the examination took place.

§ 28.720 Survey and classification.

(a) Each vessel which is built after or which undergoes a major conversion completed after July 27, 1990, must be classed by the ABS, or a similarly qualified organization.

(b) Each vessel which is classed under paragraph (a) of this section must:

(1) Have on board a certificate of class issued by the organization that classed the vessel.

(2) Meet all survey and classification requirements prescribed by the organization that classed the vessel.

§ 28.800 Applicability and general requirements.

(a) This subpart applies to each fish tender vessel engaged in the Aleutian trade that has not undergone a major conversion and:

(1) Was operated in Aleutian trade before September

8, 1990; or

(2) Was purchased to be used in the Aleutian trade before September 8, 1990, and entered into service in the Aleutian trade before June 1, 1992.

(b) Except as noted otherwise in this subpart, a vessel subject to this subpart must also comply with the requirements of subparts A, B, and C of this part.

(c) Each fish tender vessel engaged in the Aleutian trade that undergoes a major conversion after September 15, 1991 must comply with the additional requirements of subpart D.

(d) A fish tender vessel engaged in the Aleutian trade is subject to inspection under the provisions of 46 U.S.C. 3301 (1), (6), or (7) unless it:

(1) Is not more than 500 gross tons;

(2) Has an incline test performed by a marine surveyor; and

(3) Has written stability instructions posted on board the vessel.

§ 28.805 Launching of survival craft.

In addition to the survival craft requirements in subpart B, each vessel must have a gate or other opening in the deck rails, lifelines, or bulwarks adjacent to the stowage location of each survival craft which has a mass of more than 50 kilograms (110 pounds), so that the survival craft can be manually launched.

§ 28.810 Deck rails, lifelines, storm rails and hand grabs.

(a) Except as otherwise provided in paragraph (d) of this section, deck rails, lifelines, grab rails, or equivalent protection must be installed near the periphery of all weather decks accessible to individuals. Where space limitations make deck rails impractical, hand grabs may be substituted.

(b) The height of deck rails, lifelines, or bulkwarks must be at least 1 meter (39 1/2 inches) from the deck, except where this height will interfere with the normal

operation of the vessel, a lesser height may be substituted.

(c) All deck rails or lifelines must be permanently supported by stanchions at intervals of not more than 2.3 meters (7 feet). Stanchions must be through bolted or welded to the deck.

(d) Portable stanchions and lifelines may be installed in locations where permanently installed deck rails will impede normal cargo operations or emergency recovery operations.

(e) Deck rails or lifelines must consist of evenly spaced courses. The spacing between courses must not be greater than 0.38 meters (15 inches). The opening below the lowest course must not be more than 0.23 meters (9 inches). Lower courses are not required where all or part of the space below the upper rail is fitted with a bulwark, chain link fencing, wire mesh, or an equivalent.

(f) A suitable storm rail or hand grab must be installed where necessary in a passageway, at a deckhouse side, at a ladder, and a hatch where an individual might have access.

§ 28.815 Bilge pumps, bilge piping, and dewatering systems.

Instead of meeting the requirements of § 28.255, each vessel to which this subpart applies must meet the following requirements:

(a) Each vessel must be equipped with a fixed, self priming, powered, bilge pump, having a minimum capacity rating of 50 gallons per minute, connected to a bilge manifold and piping capable of draining any watertight compartment, other than tanks and small buoyancy compartments, under all service conditions. Large spaces, such as engine rooms and cargo holds must be fitted with more than one suction line.

(b) In addition, each vessel must be fitted with a fixed secondary or backup bilge pump having an independent and separate source of power from the pump required in paragraph (a) of this section. One of the bilge pumps may be attached to the propelling engine.

(c) A portable bilge pump may substitute for the sec-

ondary pump required above, as long as it meets the following:

(1) It must be self priming and provided with a suitable suction hose of adequate length to reach the bilges of each watertight compartment it must serve and be fitted with a built-in check valve and strainer.

(2) The portable pump must be of at least the same minimum capacity as that listed in paragraph (a) of this section and fitted with a discharge hose of adequate length to ensure overboard discharge from the lowest compartment in which it can serve.

(3) The portable pump must also be capable of being quickly and efficiently attached to the vessel's fixed bilge suction main and/or discharge piping (such as with "camlocks", etc.) for alternate emergency use.

(d) Except for suction lines attached to an individual pump provided for a separate space, or for a portable pump, each individual bilge suction line must be provided with a stop valve at the manifold and a check valve at some accessible point in the bilge line to prevent unintended flooding of a space.

(e) Each bilge suction line and dewatering system must be fitted with a suitable strainer to prevent clogging of the suction line. Strainers must have an open area of not less than three times the open area of the suction line.

(f) Except for a fire pump required by 46 CFR 28.820, a bilge pump may be used for other purposes.

(g) Each vessel must comply with the oil pollution prevention requirements of 33 CFR parts 151 and 155.

§ 28.820 Fire pumps, fire mains, fire hydrants, and fire hoses.

(a) Each vessel must be equipped with a self-priming, power driven fire pump connected to a fixed piping system. This pump must be capable of delivering an effective stream of water from a hose connected to the highest outlet. The minimum capacity of the power fire pump shall be 50 gallons per minute at a pressure of not less than 60 pounds per square inch at the pump outlet.

(1) If multiple pumps are installed, they may be used for other purposes provided at least one pump is kept

available for use on the fire system at all times.

(2) In addition, each vessel must be fitted with a portable fire pump having a minimum capacity of that specified in paragraph (a) of this section, capable of producing a stream of water having a throw of at least 12 meters (39.4 feet) from the nozzle, and capable of being connected to National Standard Fire Hose of the size utilized on board the vessel. If a vessel already has on board a portable pump satisfying the bilge system requirements of § 28.760(c), no additional portable pump is required as long as the portable pump is of sufficient size/capacity, and is properly equipped to handle both fire fighting and flood control.

(b) Each vessel must have a sufficient number of fire hydrants to reach any part of the vessel using a single length of hose.

(c) Each fire hydrant must have at least one length of fire hose connected to the outlet at all times, a spanner, and a hose rack or other device for stowing the hose at all times.

(1) All parts of the firemain located on exposed decks shall either be protected against freezing or be fitted with cutout valves and drain valves.

(2) Firehose shall not be used for any other purpose other than fire extinguishing, drills, and testing.

(3) Each length of fire hose must be a minimum of 3.83 centimeters (1 1/2 ") diameter lined commercial fire hose and be fitted with a nozzle made of corrosion resistant material capable of providing a solid stream and a spray pattern.

§ 28.825 Excess fire detection and protection equipment.

Instead of meeting the requirements of § 28.155, each vessel to which this subpart applies must meet the following requirements:

(a) Installation of fire detection and protection equipment in excess of that required by the regulations in this Subchapter is permitted provided that the excess equipment does not endanger the vessel or individuals on board in any way. The excess equipment must, at a

minimum, be listed and labeled by an independent, nationally recognized testing laboratory and be in accordance with an appropriate industry standard for design, installation, testing, and maintenance.

(b) An existing fixed gas fire extinguishing system that is in excess of the required fire protection equipment required by subparts A, B, and C of this part, may remain in place and continue in service as long as all parts of the system are maintained in good condition to the satisfaction of the Coast Guard Representative, and subject to the following:

(1) A fixed fire extinguishing system capable of automatic discharge upon heat detection, may only be installed in a normally unoccupied space. For the purpose of this section, the machinery space aboard a fish tender operating in the Aleutian trade is considered occupied.

(2) A fixed fire extinguishing system must:

(i) Be capable of manual actuation from outside the space protected;

(ii) Produce an audible alarm to indicate the discharge of the extinguishing agent for 20 seconds before the extinguishing agent is released into the space;

(iii) The branch line valves of all fire extinguishing systems shall be plainly and permanently marked indicating the spaces serviced;

(iv) The control cabinets or spaces containing valves or manifolds for the various fire extinguishing systems shall be distinctly marked in conspicuous red letters at least 5.08 centimeters (2 inches) high:

“HALON FIRE SYSTEM”

“CARBON DIOXIDE FIRE SYSTEM” or

“FOAM FIRE SYSTEM”, as the case may be;

(v) Instructions for the operation of the system must be located in a conspicuous place at or near all pull boxes, stop valve controls, and in the agent storage space;

(vi) If the space or enclosure containing the supply or controls is to be locked, a key to the space or enclosure shall be in a break-glass-type box conspicuously located adjacent to the opening, and;

(vii) Be equipped with a sign at the alarm stating: "WHEN ALARM SOUNDS--VACATE AT ONCE. CARBON DIOXIDE BEING RELEASED", or list other fire extinguishing agent.

(3) Any modification, alteration, or new installation of a fixed gas fire extinguishing system must meet the additional requirements of subpart D of this part.

§ 28.830 Fire detection system.

(a) Each accommodation space must be equipped with an independent modular smoke detector or a smoke actuated fire detecting unit installed in accordance with § 76.33 of this chapter.

(b) An independent modular smoke detector must meet UL 217 and be listed as a "Single Station Smoke Detector--Also Suitable for Use in Recreational Vehicles".

§ 28.835 Fuel systems.

(a) Portable fuel systems including portable tanks and related fuel lines and accessories are prohibited except where used for outboard engines or portable bilge/fire pumps.

(b) Each integral fuel tank must be fitted with a vent pipe connected to the highest point of the tank terminating in a 180 degree (3.14 radians) bend on a weather deck and be fitted with a flame screen.

(c) Test cocks must not be fitted to fuel oil tanks.

(d) Valves for removing water or impurities from diesel fuel oil systems are permitted in the machinery space provided they are away from any potential sources of ignition. Such valves shall be fitted with caps or plugs to prevent leakage.

(e) Oil piping drains, strainers and other equipment subject to normal oil leakage must be fitted with drip pans or other means to prevent oil draining into the bilge.

(f) All nonmetallic filters and strainers must be fitted with a metal shield attached to their base in such a way as to prevent direct flame impingement in the case of a fire.

(g) Shutoff valves shall be installed in the fuel supply piping lines, one as close to each tank as practicable, and one as close to each fuel pump as practicable. Valves shall be accessible at all times.

(h) Fuel oil piping subject to internal head pressure from diesel oil in a tank must be fitted with a positive shutoff valve, installed to close against the flow at the tank. This valve is to be capable of remote actuation from outside the space in which the tank/piping is located, accessible at all times, and suitably marked.

(i) With the exception of paragraph (j) and (k) of this section, fuel piping shall be steel pipe, annealed seamless copper, brass, nickel copper, or copper nickel alloy tubing having a minimum wall thickness of 0.9 millimeters (0.035 inches).

(j) Flexible connections of a short length (no more than 762mm, (30 inches)), suitable metallic or nonmetallic flexible tubing or hose is permitted in the fuel supply line at or near the engine to prevent damage by vibration. If nonmetallic flexible hose is used it must:

(1) Not exceed the minimum length needed to allow for vibration;

(2) Be visible, easily accessible, and must not penetrate a watertight bulkhead;

(3) Be fabricated with an inner tube and outer-covering of synthetic rubber or other suitable material reinforced with wire braid;

(4) Be fitted with suitable, corrosion resistant, compression fittings; and

(5) Be installed with two hose clamps at each end of the hose, if designed for use with clamps. Clamps must not rely on spring tension and must be installed beyond the bead or flare or over the serrations of the mating spud, pipe, or hose fitting.

(k) Supply piping that conveys fuel oil or lubricating oil

to equipment and is in close proximity of equipment or lines having an open flame or having parts operating above 260degrees C (500degrees F) must be of seamless steel.

(l) Existing fuel oil piping may remain in service as long as it is serviceable to the satisfaction of the Coast Guard Representative. Any replacement, alterations, modifications or new installations to the fuel oil piping system must be made in accordance with the material requirements of this section.

§ 28.840 Means for stopping pumps, ventilation, and machinery.

All electrically driven fuel oil transfer pumps, fuel oil unit and service pumps, and ventilation fans shall be fitted with remote controls from a readily accessible position outside of the space concerned so that they may be stopped in the event of fire occurring in the compartment in which they are located. These controls shall be suitably protected against accidental operation or tampering and shall be suitably marked.

§ 28.845 General requirements for electrical systems.

(a) Electrical equipment exposed to the weather or in a location exposed to seas must be waterproof or watertight, or enclosed in a watertight housing.

(b) Aluminum must not be used for current carrying parts of electrical equipment or wiring.

(c) As far as practicable, electrical equipment must not be installed in lockers used to store paint, oil, turpentine, or other flammable or combustible liquids. If electrical equipment, such as lighting, is necessary in these spaces, it must be explosion-proof or intrinsically safe.

(d) Explosion-proof and intrinsically safe equipment must meet the requirements of § 111.105 of this chapter.

(e) Metallic enclosures and frames of electrical equipment must be grounded.

§ 28.850 Main source of electrical power.

(a) Applicability: Each vessel that relies on electricity to power any of the following essential loads must have

at least two electrical generators to supply:

- (1) The propulsion system and its necessary auxiliaries and controls;
- (2) Interior lighting;
- (3) Steering systems;
- (4) Communication systems;
- (5) Navigation equipment and navigation lights;
- (6) Fire protection or detection equipment;
- (7) Bilge pumps; and
- (8) General alarm system.

(b) Each generator must be attached to an independent prime mover.

§ 28.855 Electrical distribution systems.

(a) Each electrical distribution system which has a neutral bus or conductor must have the neutral bus or conductor grounded.

(b) A grounded electrical distribution system must have only one connection to ground. This ground connection must be at the switchboard.

§ 28.860 Overcurrent protection and switched circuits.

(a) Each power source must be protected against overcurrent. Overcurrent devices for generators must be set at a value not exceeding 115 percent of the generator's full load rating.

(b) Except for a steering circuit, each circuit must be protected against both overload and short circuit. Each overcurrent device in a steering system power and control circuit must provide protection only.

(c) Each ungrounded current carrying conductor must be protected in accordance with its current carrying capacity by a circuit breaker or fuse at the connection to the switchboard or distribution panel bus.

(d) Each circuit breaker and each switch must simultaneously open all ungrounded conductors.

(e) The grounded conductor of a circuit must not be disconnected by a switch or an overcurrent device unless all ungrounded conductors of the circuit are simultaneously disconnected.

(f) Navigation light circuits must be separate, switched circuits having fused disconnect switches or circuit breakers so that only the appropriate navigation lights can be switched on.

(g) A separate circuit with overcurrent protection at the main distribution panel or switchboard must be provided for each radio installation.

§ 28.865 Wiring methods and materials.

(a) All cable and wire must have insulated, stranded copper conductors of the appropriate size and voltage rating of the circuit.

(b) Each conductor must be No. 22 AWG or larger. Conductors in power and lighting circuits must be No. 14 AWG or larger. Conductors must be sized so that the voltage drop at the load terminals is not more than 10 percent.

(c) Cable and wiring not serving equipment in high risk fire areas such as a galley, laundry, or machinery space must be routed as far as practicable from these spaces. As far as practicable, cables serving duplicated essential equipment must be separated so that a casualty that affects one cable does not affect the other. Existing cables and wires may remain as routed; however, any replacement wiring, new cabling and/or alterations must be routed as specified above.

(d) No unused or dead ended cables may remain after the permanent removal or alteration of an electrical device.

(e) Cable and wire for power and lighting circuits must:

(1) For circuits of less than 50 volts, meet 33 CFR 183.425 and 183.430; and

(2) For circuits of 50 volts or greater:

(i) Meet section 310-13 and 310-15 of NFPA 70, except that asbestos insulated cable and dry location cable must not be used;

(ii) Be listed by Underwriters Laboratories Inc. as UL Marine Boat or UL Marine Shipboard cable; or

(iii) Meet § 111.60 of this chapter.

(f) All metallic cable armor must be electrically continuous and grounded to the metal hull or the common ground point at each end of the cable run, except that final sub-circuits (those supplying loads) may be grounded at the supply end only.

(g) Wiring terminations and connections must be made in a fire retardant enclosure such as a junction box, fixture enclosure, or panel enclosure.

(h) Existing cable and wire may remain in place and continue in use as long as it is deemed serviceable to the satisfaction of the Coast Guard Representative. Any new installation, replacement, modification or alteration must be done in accordance with the requirements of this section.

§ 28.870 Emergency source of electrical power.

(a) The following electrical loads must be connected to an independent emergency source of power capable of supplying all connected loads continuously for at least three hours:

(1) Navigation lights;

(2) Fire protection and detection systems;

(3) Communications equipment;

(4) General alarm system; and

(5) Emergency lighting;

(b) The emergency power source must be aft of the collision bulkhead, outside of the machinery space, and above the uppermost continuous deck.

(c) An emergency source of power supplied solely by storage battery must also meet the following requirements:

- (1) Each battery must be a lead-acid or alkaline type and be able to withstand vessel pitch, vibration, roll, and exposure to a salt water atmosphere;
- (2) A battery cell must not spill electrolyte when the battery is inclined at 30 degrees from the vertical;
- (3) Each battery installation must be in a battery room, in a box on deck, or in a well ventilated compartment. The batteries must be protected from falling objects;
- (4) Each battery tray must be secured to prevent shifting with the roll and pitch of the vessel and lined with a material that is corrosion resistant to the electrolyte of the battery;
- (5) Each battery bank installation must be fitted with its own drip-proof charging system; and
- (6) Each deck box used for battery storage must be weathertight, and have holes near the top to allow gas to escape.

§ 28.875 Radar, depth sounding, and auto-pilot.

- (a) Each vessel must be fitted with a general marine radar system for surface navigation with a radar screen mounted at the operating station, and facilities on the bridge for plotting radar readings.
- (b) Each vessel must be fitted with a suitable echo depth sounding device.
- (c) Except as provided in 33 CFR § 164.15, when the automatic pilot is used in areas of high traffic density, conditions of restricted visibility, and all other hazardous navigational situations, the master or person in charge shall ensure that:
 - (1) It is possible to immediately establish manual control of the unit's steering;
 - (2) A competent person is ready at all times to take over steering control; and

(3) The changeover from automatic to manual steering and vice versa is made by, or under the supervision of, the officer of the watch.

§ 28.880 Hydraulic equipment.

- (a) Each hydraulic system must be so designed and installed that proper operation of the system is not affected by back pressure in the system.
- (b) Piping and piping components must be designed with a burst pressure of not less than four times the system's maximum operating pressure.
- (c) Each hydraulic system must be equipped with at least one pressure relieving device set to relieve at the system's maximum operating pressure.
- (d) All material in a hydraulic system must be suitable for use with the hydraulic fluid used and must be of such chemical and physical properties as to remain ductile at the lowest operating temperature likely to be encountered by the vessel.
- (e) Except for hydraulic steering equipment, controls for operating hydraulic equipment must be located where the operator has an unobstructed view of the controls for operating hydraulic equipment and the adjacent work area. Protection shall be afforded to the operator of hydraulic equipment against falling or swinging objects and/or cargo.
- (f) Controls for hydraulic equipment must be so arranged that the operator is able to quickly disengage the equipment in an emergency.
- (g) Hydraulically operated machinery must be fail-safe or equipped with a holding device to prevent uncontrolled movement or sudden loss of control due to loss of hydraulic system pressure. A system is considered to be fail-safe if a component failure results in a slow and controlled release of the load so as not to endanger personnel.
- (h) Nonmetallic flexible hose assemblies must only be used between two points of relative motion, limited to the least amount of length that will afford maximum multidirectional movement of the equipment served.

(i) Hose end fittings must comply with SAE J1475, (Hydraulic Hose Fittings For Marine Applications). Field attachable fittings must be installed following the manufacturer's recommended practice (method).

(j) Nonmetallic flexible hose shall be marked with the manufacturer's name or trademark, type or catalog number and maximum allowable working pressure.

(k) Existing hydraulic piping, nonmetallic hose assemblies, and components may be continued in service so long as they are maintained in good condition to the satisfaction of the Coast Guard Representative, but all new installations, or replacements shall meet the applicable specifications or requirements of this section.

§ 28.885 Cargo gear.

(a) The safe working load (SWL) for the assembled gear shall be marked on the heel of each cargo boom, crane, or derrick. These letters and figures are to be in contrasting colors to the background and at least one inch in height. The SWL is construed to be the load the gear is approved to lift, excluding the weight of the gear itself.

(b) All wire rope, chains, rings, hooks, links, shackles, swivels, blocks, and any other loose gear used or intended to be used in cargo loading or unloading must be commensurable with the SWL rating in paragraph (a) of this section. This gear shall be visually inspected by the vessel's captain or his designee at frequent intervals, and in any event not less than once in each operating month.

(c) In addition to the inspection required in paragraph (b) of this section, a biennial, (every second year), thorough examination and proof load test, at a minimum of the SWL rating, shall be performed and witnessed by competent personnel. The proof load applied to the winches, booms, derricks, cranes and all associated gear shall be lifted with the ship's normal tackle with the boom or derrick at the lowest practicable angle. When the load has been lifted, it shall be swung as far as possible in both directions.

(d) After satisfactory completion of the tests and examinations required in paragraphs (b) and (c) of this section, all results and notations together with the date and location of each shall be maintained and available

to Coast Guard representatives upon request.

§ 28.890 Examination and certification of compliance.

(a) At least once in every two years each ATA vessel must be examined for compliance with the regulations of this subchapter by the ABS, a similarly qualified organization, or a surveyor of an accepted organization.

(b) Each individual performing an examination under paragraph (a) of this section, upon finding the vessel to be in compliance with the requirements of this chapter, must provide written certification of compliance to the owner or operator of the vessel.

(c) Each certification of compliance issued under paragraph (b) of this section must:

(1) Be signed by the individual that performed the examination;

(2) Include the name of the organization the individual performing the examination represents or the name of the accepted organization the individual belongs to; and

(3) State that the vessel has been examined and found to meet the specific requirements of this chapter.

(d) A certification of compliance issued under paragraph (b) of this section must be retained on board the vessel until superseded.

(e) A copy of the certification of compliance issued under paragraph (b) of this section must be forwarded by the organization under whose authority the examination was performed to the Coast Guard District Commander (Attention: Fishing Vessel Safety Coordinator) in charge of the district in which the examination took place.

§ 28.895 Loadlines.

(a) A fish tender vessel of not more than 500 gross tons, engaged in the Aleutian trade, is not subject to the loadline provisions of 46 U.S.C. Chapter 51 if it is not on a foreign voyage and the vessel:

(1) Operated in this trade before September 8, 1990;

or

(2) Was purchased to be used in this trade before September 8, 1990 and entered into service before June 1, 1992;

(3) Has not undergone a major conversion; and

(4) Has not had a loadline assigned at any time before November 16, 1990.

(b) The exemption from the loadline provision of 46 U.S.C. Chapter 51 set forth in paragraph (a) of this section expires on January 1, 2003.

§ 28.900 Post accident inspection.

The requirements for providing notice and reporting of marine casualties are contained in part 4 of this chapter. The owner of or master of the vessel shall ensure that the survey guidance provided by a Coast Guard Representative is effectively carried out, that the material and the workmanship of such repairs or renewals are in all respects satisfactory, and that the vessel complies in all respects with the regulations in this part.

§ 28.905 Repairs and alterations.

No repairs or alterations affecting the safety of the vessel with regard to the hull, machinery, or equipment, shall be made without the notification of a Coast Guard Representative.