

them must be outfitted with a fire detection control panel. Any other operating station must be outfitted with either a fire detection control panel or a remote indicator panel;

(4) The control panel includes:

- (i) A power available light;
- (ii) An audible to notify crew of a fire;
- (iii) Visual alarm alarms to identify the zone or zones of origin of the fire;
- (iv) A means to silence the audible alarm while maintaining indication by the visual alarms;
- (v) A circuit-fault detector test-switch, or internal supervision of circuit integrity; and
- (vi) Labels for all switches and indicator lights, identifying their functions.

(5) The system draws power from two sources. Switchover from the primary source to the secondary source may be either manual or automatic;

(6) The system serves no other purpose, unless it is an engine room monitoring system complying with paragraph (a)(8) of this section; and

(7) The design of the system and its installation on the towing vessel is certified and inspected by a registered professional engineer with experience in fire-detection system design, by a technician with qualifications as a National Institute for Certification in Engineering Technologies (NICET) level IV fire alarm engineering technician, or by an authorized classification society with equivalent experience, to comply with paragraphs (a)(1) through (6) of this section.

(8) A towing vessel whose construction was contracted for prior to January 18, 2000, may use an existing engine room monitoring system (with fire-detection capability) instead of a fire-detection system, if the monitoring system is operable and complies with paragraphs (a)(2) through (7) of this section, and uses detectors listed by an NRTL.

(b) *Smoke detection in berthing spaces.* Each towing vessel must be equipped with a means to detect smoke in the berthing spaces and lounges that alerts individuals in those spaces. This may be accomplished by an installed detection system, or by using individual battery-operated detectors meeting UL 217

(incorporated by reference, see § 136.112 of this subchapter). Detection systems or individual detectors must be kept operational at all times when the crew is onboard the towing vessel.

(c) *Heat-detection system in galley.* Each new towing vessel equipped with a galley must have a heat-detection system with one or more restorable heat-sensing detectors to detect fires in the galley. The system must be arranged to sound an audible alarm at each operating station. This may be a separate zone in the detection system required by paragraph (a) of this section, or a separate detection system complying with paragraphs (a)(1) and (2) of this section.

PART 143—MACHINERY AND ELECTRICAL SYSTEMS AND EQUIPMENT

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SOURCE: USCG-2006-24412, 81 FR 40101, June 20, 2016, unless otherwise noted.

Subpart A—General**§ 143.100 Purpose.**

This part contains requirements for the design, installation, and operation of primary and auxiliary machinery and electrical systems and equipment on towing vessels.

§ 143.105 Applicability.

This part applies to all towing vessels subject to this subchapter. The specific applicability of requirements in each subpart is set forth in that subpart.

§ 143.115 Definitions.

The definitions provided in § 136.110 of this subchapter apply to this part. In addition, the following definition applies exclusively to this part:

Independent means the equipment is arranged to perform its required function regardless of the state of operation, or failure, of other equipment.

Subpart B—Requirements for All Towing Vessels**§ 143.200 Applicability.**

(a) This subpart applies to all towing vessels subject to this subchapter.

(b) Except as noted paragraph (c) of this section, which lists later implementation dates for requirements in §§ 143.450 and 143.460, an existing towing vessel must comply with the applicable requirements in this part no later than either July 20, 2018 or the date the vessel obtains a Certificate of Inspection (COI), whichever date is earlier. The delayed implementation provisions in this section do not apply to a new towing vessel.

(c) Existing vessels must meet the pilothouse alerter and towing machinery requirements of §§ 143.450 and 143.460 no later than 5 years after the issuance of the first COI for the vessel.

§ 143.205 General.

(a) Machinery and electrical systems must be designed and maintained to provide for safe operation of the towing vessel and safety of persons onboard under normal and emergency conditions.

(b) The crew of each towing vessel must demonstrate the ability to operate the primary and auxiliary machinery and electrical systems for which they are responsible, and to do so under normal and emergency conditions. This includes, but is not limited to, responses to alarms and restoration of propulsion and steering in the event of failure.

(c) Propulsion machinery, including main engines, reduction gears, shafting, bearings, and electrical equipment and systems, must:

(1) Be maintained to ensure proper operation;

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(2) Be suitable for route and service; and

(3) Have suitable propulsion controls to provide the operator full control at each operating station.

(d) Repairs and minor alterations to existing towing vessels must be made in accordance with this part. New installations that are not replacements in kind must comply with the requirements of subpart C of this part, if applicable.

§ 143.210 Alternate design or operational considerations.

(a) Machinery or electrical systems of a novel design, unusual form, or special material that cannot be reviewed or approved in accordance with this part, may be approved by the Commanding Officer, Marine Safety Center. It must be shown by systematic analysis, based on engineering principles, that the machinery or electrical equipment or system provides an equivalent level of safety. The owner or managing operator must submit detailed plans, material component specifications, and design criteria, including the expected towing vessel service and operating environment, to the Marine Safety Center. Examples of novel design include use of liquefied natural gas, compressed natural gas, or propane fuel for propulsion, and hybrid, fuel cell, or battery propulsion.

(b) Alternate arrangements or equipment to comply with this part may be approved in accordance with § 136.115 of this subchapter.

§ 143.215 Existing vessels built to class.

(a) An existing towing vessel classed by a recognized classification society, as appropriate for the intended service and routes, is considered in compliance with the machinery and electrical standards of this subpart.

(b) An existing vessel built and equipped to conform to a recognized classification society's rules, appropriate for the intended service and routes, but not currently classed, may be deemed by the Officer in Charge, Marine Inspection (OCMI), or third-party organization (TPO), to be in compliance with this part, provided that the towing vessel conforms to the class rules.

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(c) Existing vessels meeting either paragraph (a) or (b) of this section must also meet the requirements of §§ 143.245 and 143.450.

§ 143.220 Machinery space fire prevention.

(a) All seals and gaskets must be properly maintained to prevent leaks of flammable or combustible liquid, as those terms are defined in 46 CFR subpart 30.10, into the machinery space.

(b) Piping and machinery components that exceed 220 °C (428 °F), including fittings, flanges, valves, exhaust manifolds, and turbochargers, must be insulated. Measures must be in place to prevent flammable or combustible liquid piping leaks from coming into contact with these components.

(c) Flammable and combustible products must not be stored in machinery spaces, unless they are stored in a suitable container that meets the requirements of § 142.225 of this subchapter.

§ 143.225 Control and monitoring requirements.

(a) Each towing vessel must have a means to monitor and control the amount of thrust, rudder angle, and (if applicable) direction of thrust, at each operating station.

(b) Each towing vessel equipped with rudder(s) must have a means to monitor and control the position of the rudder(s) at each operating station.

§ 143.230 Alarms and monitoring.

(a) Each towing vessel must have a reliable means to provide notification when an emergency condition exists or an essential system develops problems that require attention. The following alarms must be provided:

(1) Main engine low lubricating oil pressure;

(2) Main engine high cooling water temperature;

(3) Auxiliary generator engine low lubricating oil pressure;

(4) Auxiliary generator engine high cooling water temperature;

(5) High bilge levels;

(6) Low hydraulic steering fluid levels, if applicable; and

(7) Low fuel level, if fitted with a day tank.

(b) Alarms must:

(1) Be visible and audible at each operating station. The alarm located at the operating station may be a summary alarm; if the alarm at the operating station is a summary alarm, the specific alarm condition must be indicated at the machinery or bilge location;

(2) Have a means to test actuation at each operating station or have a continuous self-monitoring alarm system which actuates if an alarm point fails or becomes disabled;

(3) Continue until they are acknowledged; and

(4) Not interfere with night vision at the operating station.

(c) The following systems must be equipped with gauges at the machinery location:

(1) Main engine lubricating oil pressure and main engine RPM;

(2) Main engine cooling water temperature;

(3) Auxiliary generator engine lubricating oil pressure and auxiliary generator engine RPM;

(4) Auxiliary generator engine cooling water temperature; and

(5) Hydraulic steering fluid pressure, if the vessel is equipped with hydraulic steering systems.

§ 143.235 General alarms.

(a) This section does not apply to an excepted vessel as defined in § 136.110 of this subchapter.

(b) Each towing vessel must be fitted with a general alarm that:

(1) Is activated at each operating station and can notify persons onboard in the event of an emergency;

(2) Is capable of notifying persons in any accommodation, work space, and the engine room;

(3) Has installed, in the engine room and any other area where background noise makes a general alarm hard to hear, a supplemental flashing red light that is identified with a sign that reads: "Attention General Alarm—When Alarm Sounds or Flashes Go to Your Station"; and

(4) A public-address (PA) system or other means of alerting all persons on the towing vessel may be used in lieu of the general alarm in paragraph (b) of this section if the system meets the re-

quirements of paragraphs (b)(2) and (3) of this section.

§ 143.240 Communication requirements.

(a) This section does not apply to an excepted towing vessel as defined in § 136.110 of this subchapter.

(b) Each towing vessel must be fitted with a communication system between the pilothouse and the engine room that:

(1) Consists of either fixed or portable equipment, such as a sound-powered telephone, portable radios, or other reliable method of voice communication, with a main or reserve power supply that is independent of the towing vessel's electrical system; and

(2) Provides two-way voice communication and calling between the pilothouse and either the engine room or a location immediately adjacent to an exit from the engine room.

(c) Towing vessels with more than one propulsion unit and independent pilothouse control for all engines are not required to have internal communication systems.

(d) When the pilothouse engine controls and the access to the engine room are within 3 meters (10 feet) of each other and allow unobstructed visible contact between them, direct voice communication is acceptable instead of a communication system.

§ 143.245 Readiness and testing.

(a) Essential systems or equipment must be regularly tested and examined. Tests and examinations must verify that the system or equipment functions as designed. If a component is found unsatisfactory, it must be repaired or replaced. Test and examination procedures must be in accordance with manufacturer's instructions or the Towing Safety Management System (TSMS) applicable to the vessel, if the vessel has a TSMS.

(b) Each towing vessel must perform the applicable tests in Table 143.245(b) of this section. The tests required by this section must be recorded in accordance with part 140 of this subchapter.

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TABLE 143.245(b)—REQUIRED TESTS AND FREQUENCY

Tests of:	Frequency:
Propulsion controls; ahead and astern at the operating station.	Before the vessel gets underway, but no more than once in any 24 hour period.
Steering controls at the operating station.	Before the vessel gets underway, but no more than once in any 24 hour period.
Pilothouse alerter system	Weekly.
All alternate steering and propulsion controls.	At least once every 3 months.
Power supply for alarm actuation circuits for alarms required by §143.230.	At least once every 3 months.
Communications required by § 143.240.	Weekly.
General alarm if the vessel is so equipped.	Weekly.
Emergency lighting and power if the vessel is so equipped.	At least once every 3 months.
Charge of storage batteries if the vessel is so equipped, for emergency lighting and power.	At least once every 3 months.
Alarm setpoints	Twice every 5 years, with no more than 3 years elapsing since last test.
Pressure vessel relief valves	Twice every 5 years, with no more than 3 years elapsing since last test.
All other essential systems	At least once every 3 months.

§ 143.250 System isolation and markings.

Electrical equipment, piping for flammable or combustible liquid, seawater cooling, or fire-fighting systems must be provided with isolation devices and markings as follows:

(a) Electrical equipment must be provided with circuit isolation and must be marked as described in §143.400.

(b) Electrical panels or other enclosures containing more than one source of power must be fitted with a sign warning persons of this condition and identifying where to secure all sources.

(c) Piping for flammable or combustible liquid, seawater cooling, or fire-fighting systems must be fitted with isolation valves that are clearly marked by labeling or color coding that enables the crew to identify its function.

(d) Any piping system that penetrates the hull below the waterline must be fitted with an accessible valve, located as close to the hull penetration as is practicable, for preventing the accidental admission of water into the vessel either through such pipes or in the event of a fracture of such pipe.

The valve must be clearly marked by labeling or color coding that enables the crew to identify its function.

(e) Color coding required by this section may be met by complying with coding standards contained in the ISO 14726:2008(E) (incorporated by reference, see §136.112 of this subchapter), or in accordance with the TSMS applicable to the vessel.

§ 143.255 Fuel system requirements.

(a) Fuel systems for towing vessel main engines and generators must have a documented maintenance plan to ensure proper operation of the system.

(b) A continuous supply of clean fuel must be provided to main propulsion engines and generators.

(c) The fuel system must include filters and/or purifiers. Where filters are used:

(1) A supply of spare fuel filters must be provided onboard; and

(2) Fuel filters must be replaced in accordance with manufacturer's requirements or the vessel's TSMS, if applicable.

(d) Except as otherwise permitted under §143.210 or §143.520, no fuel other than diesel fuel may be used.

§ 143.260 Fuel shutoff requirements.

(a) This section does not apply to an excepted towing vessel as defined in §136.110 of this subchapter.

(b) To stop the flow of fuel in the event of a fire or break in the fuel line, a remote fuel shutoff valve must be fitted on any fuel line that supplies fuel directly to a propulsion engine or generator prime mover.

(c) The valve must be installed in the fuel piping directly outside of the fuel oil supply tank.

(d) The valve must be operable from a safe place outside the space where the valve is installed.

(e) Each remote valve control must be marked in clearly legible letters, at least 25 millimeters (1 inch) high, indicating the purpose of the valve and the way to operate it.

§ 143.265 Additional fuel system requirements for towing vessels built after January 18, 2000.

(a) *Applicability.* This section applies to towing vessels that are not excepted

vessels, as defined in §136.110 of this subchapter, and that were built after January 18, 2000. Except for outboard engines or portable bilge or fire pumps, each fuel system must comply with this section.

(b) *Portable fuel systems.* The vessel must not incorporate or carry portable fuel systems, including portable tanks and related fuel lines and accessories, except when used for outboard engines or portable bilge or fire pumps. The design, construction, and stowage of portable tanks and related fuel lines and accessories must comply with the ABYC H-25 (incorporated by reference, see §136.112 of this subchapter).

(c) *Vent pipes for integral fuel tanks.* Each integral fuel tank must have a vent that connects to the highest point of the tank, discharges on a weather deck through a bend of 180 degrees, and is fitted with a 30-by-30-mesh corrosion-resistant flame screen. Vents from two or more fuel tanks may combine in a system that discharges on a weather deck. The net cross-sectional area of the vent pipe for the tank must be not less than 312.3 square millimeters (0.484 square inches), for any tank filled by gravity. The cross-sectional area of the vent pipe, or the sum of the vent areas when multiple vents are used, must not be less than that of the fill pipe cross-sectional area for any tank filled by pump pressure.

(d) *Fuel piping.* Except as permitted in paragraphs (d)(1) through (3) of this section, each fuel line must be seamless and made of steel, annealed copper, nickel-copper, or copper-nickel. Each fuel line must have a wall thickness no less than 0.9 millimeters (0.035 inches) except for the following:

(1) Aluminum piping is acceptable on an aluminum-hull towing vessel if it is at least Schedule 80 in thickness.

(2) Nonmetallic flexible hose is acceptable if it:

- (i) Is used in lengths of not more than 0.76 meters (30 inches);
- (ii) Is visible and easily accessible;
- (iii) Does not penetrate a watertight bulkhead;
- (iv) Is fabricated with an inner tube and a cover of synthetic rubber or other suitable material reinforced with wire braid; and
- (v) Either:

(A) If designed for use with compression fittings, is fitted with suitable, corrosion-resistant, compression fittings, or fittings compliant with the SAE J1475 Revised JUN96 (incorporated by reference, see §136.112 of this subchapter); or

(B) If designed for use with clamps, is installed with two clamps at each end of the hose. 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.

(3) Nonmetallic flexible hose complying with SAE J1942 Revised APR2007 (incorporated by reference, see §136.112 of this subchapter), is also acceptable.

(e) *Alternative standards.* A towing vessel of less than 79 feet in length may comply with any of the following standards for fuel systems instead of those of paragraph (d) in this section:

(1) ABYC H-33 (incorporated by reference, see §136.112 of this subchapter);

(2) Chapter 5 of NFPA 302 (incorporated by reference, see §136.112 of this subchapter); or

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

§ 143.270 Piping systems and tanks.

Piping and tanks exposed to the outside of the hull must be made of metal and maintained in a leak free condition.

§ 143.275 Bilge pumps or other dewatering capability.

There must be an installed or portable bilge pump for emergency dewatering. Any portable pump must have sufficient hose length and pumping capability. All installed bilge piping must have a check/foot valve in each bilge suction that prevents unintended backflooding through bilge piping.

§ 143.300 Pressure vessels.

(a) Pressure vessels over 5 cubic feet in volume and over 15 pounds per square inch maximum allowable working pressure (MAWP) must be equipped with an indicating pressure gauge (in a readily visible location) and with one or more spring-loaded relief valves. The total relieving capacity of such relief valves must prevent pressure from

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exceeding the MAWP, as established by the manufacturer, by more than 10 percent.

(b) Pressure vessels must be externally examined annually. Relief valves must be tested in accordance with §143.245.

(c) All pressure vessels must have the MAWP indicated by a stamp, nameplate, or other means visible to the crew.

(d) Pressure vessels installed after July 20, 2018, or the date the vessel obtains a Certificate of Inspection (COI), whichever date is earlier, must meet the requirements of §143.545.

[USCG-2006-24412, 81 FR 40101, June 20, 2016; 81 FR 47312, July 21, 2016]

§ 143.400 Electrical systems, general.

(a) Electrical systems and equipment must function properly and minimize system failures and fire and shock hazards.

(b) Installed electrical power source(s) must be capable of carrying the electrical load of the towing vessel under normal operating conditions.

(c) Electrical equipment must be marked with its respective current and voltage ratings.

(d) Individual circuit breakers on switchboards and distribution panels must be labeled with a description of the loads they serve.

(e) Electrical connections must be suitably installed to prevent them from coming loose through vibration or accidental contact.

(f) Electrical equipment and electrical cables must be suitably protected from wet and corrosive environments.

(g) Electrical components that pose an electrical hazard must be in an enclosure.

(h) Electrical conductors passing through watertight bulkheads must be installed so that the bulkhead remains watertight.

(i) The connections of flexible cable plugs and socket outlets must be designed to prevent unintended separation.

§ 143.410 Shipboard lighting.

(a) Sufficient lighting suitable for the marine environment must be pro-

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vided within crew working and living areas.

(b) Emergency lighting must be provided for all internal crew working and living areas. Emergency lighting sources must provide for sufficient illumination under emergency conditions to facilitate egress from each space and must be either:

(1) Automatic, battery-operated with a duration of no less than 2 hours; or

(2) Non-electric, phosphorescent adhesive lighting strips that are installed along escape routes and sufficiently visible to enable egress with no power.

(c) Each towing vessel must be equipped with at least two portable, battery-powered lights. One must be located in the pilothouse and the other at the access to the engine room.

§ 143.415 Navigation lights.

(a) Towing vessels more than 65 feet in length must use navigation lights that meet UL 1104 (incorporated by reference, see §136.112 of this subchapter) or other standards accepted by the Coast Guard.

(b) Towing vessels 65 feet or less in length may meet the requirements listed in 33 CFR 183.810 or paragraph (a) of this section.

§ 143.450 Pilothouse alerter system.

(a) Except as provided in paragraph (d) or (e) of this section, a towing vessel with overnight accommodations and alternating watches (shift work), when pulling, pushing or hauling alongside one or more barges, must have a system to detect when its master or mate (pilot) becomes incapacitated. The system must:

(1) Have an alarm in the pilothouse distinct from any other alarm;

(2) Require action from the master or officer in charge of a navigational watch, during an interval not to exceed 10 minutes, in order to reset the alarm timer; and

(3) Immediately (within 30 seconds) notify another crewmember if the pilothouse alarm is not acknowledged.

(b) The time interval for the system alarm must be adjustable. The time may be adjusted by the owner or managing operator but must not be in excess of 10 minutes. This time interval, and information on alerter operation,

must be provided on board and specified in the vessel's TSMS if applicable.

(c) The system alarm may be reset physically (*e.g.* a push button), or the reset may be accomplished by a link to other pilothouse action such as rudder or throttle control movement, or motion detection of personnel.

(d) A towing vessel need not comply with this section if a second person is provided in the pilothouse.

(e) Towing vessels 65 feet or less in length are not required to have a pilothouse alerter system.

§ 143.460 Towing machinery.

(a) Towing machinery such as capstans, winches, and other mechanical devices used to connect the towing vessel to the tow must be designed and installed to maximize control of the tow.

(b) Towing machinery for towing astern must have sufficient safeguards, *e.g.*, towing bitt with crossbar, to prevent the machinery from becoming disabled in the event the tow becomes out of line.

(c) Towing machinery used to connect the towing vessel to the tow must be suitable for its intended service. It must be capable of withstanding exposure to the marine environment, likely mechanical damage, static and dynamic loads expected during intended service, the towing vessel's horsepower, and arrangement of the tow.

(d) When a winch that has the potential for uncontrolled release under tension is used, a warning must be in place at the winch controls that indicates this. When safeguards designed to prevent uncontrolled release are utilized, they must not be disabled.

(e) Each owner or managing operator must develop procedures to routinely examine, maintain, and replace capstans, winches, and other machinery used to connect the towing vessel to the tow.

Subpart C—Requirements for New Towing Vessels

§ 143.500 Applicability.

(a) This subpart applies to a new towing vessel, as defined in § 136.110 of this subchapter, unless it is an excepted vessel.

(b) Machinery or electrical systems of a novel design, unusual form, or special material must meet section § 143.210.

(c) Unless otherwise noted in §§ 143.515 and 143.520, new towing vessels must also meet the requirements of subpart B of this part.

§ 143.510 Verification of compliance with design standards.

Verification of compliance with the machinery and electrical design standards in this subpart is obtained by following the provisions in §§ 144.135 through 144.145 of this subchapter.

§ 143.515 Towing vessels built to recognized classification society rules.

(a) Except as noted in paragraph (c) of this section, a towing vessel classed by the American Bureau of Shipping (ABS), in accordance with the ABS Rules for Building and Classing Steel Vessels Under 90 Meters (295 Feet) in Length, or the ABS Rules for Building and Classing Steel Vessels for Service on Rivers and Intracoastal Waterways (incorporated by reference, see § 136.112 of this subchapter), as appropriate for the intended service and routes, complies with this subpart.

(b) Except as noted in paragraph (c) of this section, a towing vessel built and equipped to conform to the ABS rules specified in paragraph (a) of this section and appropriate for the intended service and routes, but not currently classed, may be deemed by the OCM I or a TPO to be in compliance with this subpart if it can be shown that the vessel continues to conform to the ABS rules.

(c) A vessel that complies with this subpart as described in paragraph (a) or (b) must also meet the requirements described in §§ 143.585 through 143.595 or the requirements of § 143.600 if it moves tank barges carrying oil or hazardous material in bulk.

(d) Vessels meeting either paragraph (a) or (b) of this section are considered as being in compliance with subpart B of this part except for the readiness and testing requirements of § 143.245, and pilothouse alerter requirements of § 143.450.

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(e) Towing vessels built to other recognized classification society rules, appropriate for the intended route and service, may be considered compliant with provisions in this subpart upon approval by the Coast Guard.

§ 143.520 Towing vessels built to American Boat and Yacht Council standards.

(a) Except as noted in paragraphs (b) and (c) of this section, a new towing vessel 65 feet (19.8 meters) or less in length built to conform with the American Boat and Yacht Council (ABYC) standards listed in this paragraph (a) (incorporated by reference, see §136.112 of this subchapter), complies with this subpart:

(1) E-11 (2003)—AC & DC Electrical Systems on Boats;

(2) H-2 (2002)—Ventilation of Boats Using Gasoline;

(2) H-22 (2005)—Electric Bilge Pump Systems;

(3) H-24 (2007)—Gasoline Fuel Systems;

(4) H-25 (2003)—Portable Gasoline Fuel Systems;

(5) H-32 (2004)—Ventilation of Boats Using Diesel Fuel;

(6) H-33 (2005)—Diesel Fuel Systems;

(7) P-1 (2002)—Installation of Exhaust Systems for Propulsion and Auxiliary Engines; and

(8) P-4 (2004)—Marine Inboard Engines and Transmissions.

(b) New towing vessels, 65 feet or less in length, built to the ABYC standards specified in this section are considered compliant with subpart B of this part except for the readiness and testing requirements of §143.245.

(c) If the vessel moves tank barges carrying oil or hazardous material in bulk, it must meet either the requirements described in §§143.585 through 143.595 or the requirements described in §143.600.

§ 143.540 Pumps, pipes, valves, and fittings for essential systems.

(a) Pumps, pipes, valves, and fittings in essential systems on vessels must meet ABS Rules for Building and Classing Steel Vessels Under 90 Meters (295 Feet) in Length (incorporated by reference, see §136.112 of this subchapter), Part 4, Chapter 4.

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(b) Pumps, pipes, valves, and fittings in essential systems on towing vessels operating exclusively on rivers or intracoastal waterways may meet ABS Rules for Building and Classing Steel Vessels for Service on Rivers and Intracoastal Waterways (incorporated by reference, see §136.112 of this subchapter), Part 4, Chapter 3.

§ 143.545 Pressure vessels.

(a) In lieu of meeting the requirements of §143.300, pressure vessels installed on new towing vessels must meet the requirements of this section.

(b) Pressure vessels over 5 cubic feet in volume and more than 15 psi maximum allowable working pressure must meet ABS Rules for Building and Classing Steel Vessels under 90 Meters (295 Feet) in Length (incorporated by reference, see §136.112 of this subchapter), Part 4, Chapter 1, Section 1.

§ 143.550 Steering systems.

(a) Steering systems must meet ABS Rules for Building and Classing Steel Vessels under 90 Meters (295 Feet) in Length (incorporated by reference, see §136.112 of this subchapter), Part 4, Chapter 3, Section 3.

(b) Steering systems on new towing vessels operating exclusively on rivers or intracoastal waterways may meet ABS Rules for Building and Classing Steel Vessels for Service on Rivers and Intracoastal Waterways (incorporated by reference, see §136.112 of this subchapter), Part 4, Chapter 2, Section 3.

§ 143.555 Electrical power sources, generators, and motors.

(a) *General requirements.* (1) There must be a source of electrical power sufficient for:

(i) All essential systems as defined by §136.110 of this subchapter;

(ii) Minimum conditions of habitability; and

(iii) Other installed or portable systems and equipment.

(2) Generators and motors must be suitably rated for the environment where they operate, marked with their respective ratings, and suitably protected against overcurrent.

(3) A towing vessel, other than an excepted vessel, must have a backup or a second power source that has adequate

capacity to supply power to essential alarms, lighting, radios, navigation equipment, and any other essential system identified by the cognizant OCMI or a TPO.

(b) *Specific requirements.* (1) The owner or managing operator must complete a load analysis that shows that the electrical power source is sufficient to power the sum of connected loads described in paragraph (a)(1) of this section utilizing an appropriate load factor for each load. A record of the analysis must be retained by the owner or managing operator.

(2) Installed generators and motors must have a data plate listing rated kilowatts and power factor (or current), voltage, and rated ambient temperature.

(3) Generators must be provided with overcurrent protection no greater than 115 percent of their rated current and utilize a switchboard or distribution panel.

(4) Motors must be provided with overcurrent protection that meets Parts I through VII, Article 430 of NFPA's National Electrical Code (NEC) (incorporated by reference, see §136.112 of this subchapter). Steering motor circuits must be protected as per Part 4 Chapter 6 Section 2, Regulation 11 (except 11.7) of ABS Rules for Building and Classing Steel Vessels Under 90 Meters (295 feet) in Length (incorporated by reference, see §136.112 of this subchapter).

(5) Generators and motors installed in machinery spaces must be certified to operate in an ambient temperature of 50 °C or be derated, or it can be shown that 40 °C ambient temperature will not be exceeded in these spaces.

(6) Each generator and motor, except a submersible-pump motor, must be in an accessible space which is adequately ventilated and as dry as practicable, and must be mounted above the bilges.

(7) A generator driven by a main propulsion unit (such as a shaft generator) may be considered one of the power sources required by paragraph (a) of this section.

(8) Other than excepted vessels, each towing vessel must be arranged so that the following essential loads can be energized from two independent sources of electricity:

(i) High bilge level alarm required by §143.230;

(ii) Emergency egress lighting, unless the requirements of §143.410(b)(1) or (2) are met;

(iii) Navigation lights;

(iv) Pilothouse lighting;

(v) Engine room lighting;

(vi) Any installed radios and navigation equipment as required by §§140.715 and 140.725;

(vii) All distress alerting communications equipment listed in §§140.715 and 140.725;

(viii) Any installed fire detection system; and

(ix) Any essential system identified by the cognizant OCMI or TPO, if applicable.

(9) If a battery is used as the second source of electricity required by paragraph (b)(8) of this section, it must be capable of supplying the loads for at least three hours. There must be a means to monitor the condition of the battery backup power source.

§ 143.560 Electrical distribution panels and switchboards.

(a) Each distribution panel or switchboard on a towing vessel must be:

(1) In a location that is accessible, as dry as practicable, adequately ventilated, and protected from falling debris and dripping or splashing water; and

(2) Totally enclosed and of the dead-front type.

(b) Each switchboard accessible from the rear must be constructed to prevent a person's accidental contact with energized parts.

(c) Nonconductive mats or grating must be provided on the deck in front of each switchboard and, if it is accessible from the rear, on the deck behind the switchboard.

(d) Each un-insulated current-carrying part must be mounted on non-combustible, nonabsorbent, and high-dielectric insulating material.

(e) Equipment mounted on a door of an enclosure must be constructed or shielded so that a person will not come into accidental contact with energized parts.

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§ 143.565 Electrical overcurrent protection other than generators and motors.

(a) *General requirement.* Power and lighting circuits on towing vessels must be protected by suitable overcurrent protection.

(b) *Specific requirements.* (1) Cable and wiring used in power and lighting circuits must have overcurrent protection that opens the circuit at the standard setting closest to 80 percent of the manufacturer's listed ampacity. Overcurrent protection setting exceptions allowed by NFPA's National Electrical Code (NEC), Article 240 (incorporated by reference, see §136.112 of this subchapter) may be employed.

(2) If the manufacturer's listed ampacity is not known, tables referenced in Article 310.15(B) of the NEC (incorporated by reference, see §136.112 of this subchapter) must be used, assuming a temperature rating of 75 °C and an assumed temperature of 50 °C for machinery spaces and 40 °C for other spaces.

(3) Overcurrent protection devices must be installed in a manner that will not open the path to ground in a circuit; only ungrounded conductors must be protected. Overcurrent protection must be coordinated such that an overcurrent situation is cleared by the circuit breaker or fuse nearest to the fault.

(4) Each transformer must have protection against overcurrent that meets Article 450 of the NEC (incorporated by reference, see §136.112 of this subchapter).

(5) On a towing vessel, other than an excepted vessel as defined in §136.110 of this subchapter, essential systems and non-essential systems must not be on the same circuit or share the same overcurrent protective device.

§ 143.570 Electrical grounding and ground detection.

(a) An ungrounded distribution system must be provided with a ground detection system located at the main switchboard or distribution panel that provides continuous indication of circuit status to ground, with a provision to temporarily remove the indicating device from the reference ground.

(b) A dual voltage or grounded electrical distribution system must have the neutral suitably grounded. There must be only one connection to ground, regardless of the number of power sources. This connection must be at the main switchboard or distribution panel.

(c) On a metallic towing vessel, a grounded distribution system must be grounded to the hull. This grounded system must be connected to a common, non-aluminum ground plate. The ground plate must have only one connection to the main switchboard or distribution panel, and the connection must be readily accessible for examination.

(d) On a nonmetallic towing vessel, all electrical equipment must be grounded to a common ground. Multiple ground plates bonded together are acceptable.

(e) Each grounding conductor of a cable must be identified by one of the following means:

(1) Green braid or green insulation; or

(2) Stripping the insulation from the entire exposed length of the grounding conductor.

(f) A towing vessel's hull may not carry current as a conductor, except for an impressed-current cathodic-protection system or a battery system used to start an engine.

(g) Cable armor may not be used to ground electrical equipment or systems.

(h) Each receptacle outlet and attachment plug for a portable lamp, tool, or similar apparatus operating at 100 or more volts must have a grounding pole and a grounding conductor in the portable cord.

(i) In a grounded distribution system, only grounded, three-prong appliances may be used. This does not apply to double-insulated appliances or tools and appliances of 50 volts or less.

§ 143.575 Electrical conductors, connections, and equipment.

(a) Each cable and wire on a towing vessel must be installed to meet the following requirements:

(1) Each conductor must have sufficient current-carrying capacity for the circuit in which it is used.

(2) Cable hangers for overhead and vertical cable runs must be installed with metal supports and retention devices at least every 48 inches.

(3) Each wire and cable run must be installed in a manner to prevent contact with personnel, mechanical hazards, and leaking fluids. Wire and cable runs must not be installed in bilges, across a normal walking path, or less than 24 inches from the path of movable machinery (*e.g.*, cranes, elevators, forktrucks, etc., where the machinery location can change) unless adequately protected.

(4) Connections and terminations must be suitable for the installed conductors, and must retain the original electrical, mechanical, flame-retarding, and where necessary, fire-resisting properties of the conductor. If twist-on types of connectors are used, the connections must be made within an enclosure and the insulated cap of the connector must be secured to prevent loosening due to vibration. Twist-on type of connectors may not be used for making joints in cables, facilitating a conductor splice, or extending the length of a circuit.

(5) Each cable and wire must be installed so as to avoid or reduce interference with radio reception and compass indication.

(6) Each cable and wire must be protected from the weather.

(7) Each cable and wire must be supported in order to avoid chafing or other damage.

(8) Each cable and wire must be protected by metal coverings or other suitable means, if in areas subject to mechanical abuse.

(9) Each cable and wire must be suitable for low temperature and high humidity, if installed in refrigerated compartments.

(10) Each cable and wire must be located outside a tank, unless it supplies power to equipment in the tank.

(11) If wire is installed in a tank, it must have sheathing or wire insulation compatible with the fluid in a tank.

(b) Extension cords must not be used as a permanent connection to a source of electrical power.

(c) Multi-outlet adapters (power strips) may not be connected to other adapters ("daisy-chained"), or other-

wise used in a manner that could overload the capacity of a receptacle.

§ 143.580 Alternative electrical installations.

In lieu of meeting the requirements of §§143.555 through 143.575, a vessel may meet the following:

(a) ABS Rules for Building and Classing Steel Vessels Under 90 Meters (295 Feet) in Length (incorporated by reference, see §136.112 of this subchapter), Part 4, Chapter 6; or

(b) ABS Rules for Building and Classing Steel Vessels for Service on Rivers and Intracoastal Waterways (incorporated by reference, see §136.112 of this subchapter), Part 4, Chapter 5, if they operate exclusively on rivers or intracoastal waterways.

§ 143.585 General requirements for propulsion, steering, and related controls on vessels that move tank barges carrying oil or hazardous material in bulk.

(a) There must be an alternate means to control the propulsion and steering system which must:

(1) Be independent of the primary control required by §143.225;

(2) Be located at or near the propulsion and steering equipment; and

(3) Be readily accessible and suitable for prolonged operation.

(b) There must be a means to communicate between each operating station and the alternate propulsion and steering controls.

(c) There must be a means to stop each propulsion engine and steering motor from each operating station.

(d) The means to monitor the amount of thrust, rudder angle, and if applicable, direction (ahead or astern) of thrust must be independent of the controls required by §143.225.

(e) The propulsion control system required by §143.225 must be designed so that, in the event of a single failure of any component of the system, propeller speed and direction of thrust are maintained or reduced to zero.

(f) On a towing vessel with an integrated steering and propulsion system, such as a Z-drive, the control system required by §143.225 must be designed so that, in the event of a single failure of any component of the system, propeller speed and direction of thrust are

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maintained or the propeller speed is reduced to zero.

(g) An audible and visual alarm must actuate at each operating station when:

(1) The propulsion control system fails;

(2) A non-follow up steering control system fails, if installed; and

(3) The ordered rudder angle does not match the actual rudder position on a follow-up steering control system, if installed. This alarm must have an appropriate delay and error tolerance to eliminate nuisance alarms.

(h) Alarms must be separate and independent of the control system required by §143.225.

(i) A means of communication must be provided between each operating station and any crewmember(s) required to respond to alarms.

(j) The two sources of electricity required by §143.555(a)(3) and (b)(8) must be capable of powering electrical loads needed to maintain propulsion, steering, and related controls for not less than 3 hours.

(k) The second source of supply required by §143.555(a)(3) must automatically start to help restore or maintain power to propulsion, steering, and related controls when the main power source fails.

(l) Propulsion, steering, or related controls that are directly reliant on stored energy, such as compressed air, battery power, or hydraulic pressure, must have two independent stored energy systems, such as compressed air cylinders, battery banks, or hydraulic cylinders, that are capable of maintaining the vessel's propulsion, steering, and related controls.

(m) After a power failure, electrical motors used to maintain propulsion and steering must automatically restart when power is restored, unless remote control starting is provided at the operating station.

§ 143.590 Propulsor redundancy on vessels that move tank barges carrying oil or hazardous material in bulk.

(a) A towing vessel must be provided with at least two independent propulsors unless the requirements of §143.595 are met.

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(b) There must be independent controls for each propulsor at each operating station.

(c) In the event of a failure of a single propulsor, the remaining propulsor(s) must have sufficient power to maneuver the vessel to a safe location.

§ 143.595 Vessels with one propulsor that move tank barges carrying oil or hazardous material in bulk.

(a) A towing vessel must have independent, duplicate vital auxiliaries. For the purpose of this section, vital auxiliaries are the equipment necessary to operate the propulsion engine, and include fuel pumps, lubricating oil pumps, and cooling water pumps. In the event of a failure or malfunction of any single vital auxiliary, the propulsion engine must continue to provide propulsion adequate to maintain control of the tow.

(b) In the event of a failure, the corresponding independent duplicate vital auxiliary, described in paragraph (a) of this section, must be fully capable of assuming the operation of the failed unit.

§ 143.600 Alternative standards for vessels that move tank barges carrying oil or hazardous material in bulk.

In lieu of meeting §§143.585 through 143.595, a towing vessel may comply with Sections 7-5 (class ABCU) and 3-5 (class R2) of Part 4 of the ABS Rules for Building and Classing Steel Vessels Under 90 Meters (295 Feet) in Length (incorporated by reference, see §136.112 of this subchapter), except that a vessel that operates exclusively on rivers or intracoastal waterways does not need to comply with 4-7-4/3.9 and the automatic day tank fill pump requirement of 4-7-4/25.3.

§ 143.605 Demonstration of compliance on vessels that move tank barges carrying oil or hazardous material in bulk.

(a) The owner or managing operator of each towing vessel must devise test procedures that demonstrate compliance with the design and engineering requirements prescribed in this subpart.

(b) The tests required in paragraph (a) of this section must be satisfactorily conducted and witnessed by the cognizant OCMI or a TPO. A record of the tests must be retained by the owner or managing operator and be available upon request of the cognizant OCMI or TPO.

PART 144—CONSTRUCTION AND ARRANGEMENT

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Subpart A—General

§ 144.100 Purpose.

This part details the requirements for design, construction and arrangement, and verification of compliance with this part, including document review.

§ 144.105 Applicability and delayed implementation.

This part applies to each towing vessel subject to this subchapter. Note that §§ 144.200 and 144.300 only apply to an existing vessel and that the following sections only apply to a new vessel: §§ 144.205, 144.305, 144.310, 144.405, 144.410, 144.420, 144.425, 144.430, and 144.920.

(a) An existing towing vessel must comply with § 144.320 starting July 20, 2016 and it must comply with the other applicable requirements in this part no later than either July 20, 2018 or the