

NOAA SMALL BOAT PROGRAM

Class III & SRV

Annual Inspection Book



Name of Boat:		
NOAA Number:		
Line Office:		
Date Completed: Built Date:		Location:
Route:		
<input type="checkbox"/> Oceans	<input type="checkbox"/> Coastwise	<input type="checkbox"/> Coastal Waters
<input type="checkbox"/> Lakes/Bays/Sounds	<input type="checkbox"/> Rivers	
Vessel Type:	<input type="checkbox"/> Class III	<input type="checkbox"/> SRV
	Does the vessel ever carry non-government personnel defined in NAO 217-106	<input type="checkbox"/> Yes <input type="checkbox"/> No
Overall Length (in feet):		
Maximum Number of Persons Allowed:		
Maximum Number of Overnight Accommodations:		
Inspectors:		

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Task 1: Administrative, Certificates, and Document Review

Step	Action	Ref
1.1	□ Review previous Annual Inspection	
1.2	□ Review Vessel Operations Manual content.	SPB Website
1.3	□ Verify lithium battery charging policy	SBSPM
1.4	□ Review Baseline and Mission Risk Assessments □ Confirm Annual Review by VOC is Completed.	
1.5	□ Verify that station bill is posted. • Emergency duties (Over 65 ft with total crew of 4 or more)	46CFR 185.514 46 CFR 176.306 46 CFR 178.230 SBSPM Section 14
1.6	□ Review stability information. □ Drainage (scuppers/freeing ports) □ Major changes/modifications affecting wind/heel sail area or weight □ Solid fixed ballast secure and documented □ Maximum personnel carried documented in VOM □ Verify minimum stability information is available onboard vessel	
1.7	▪ Examine waste management plan (≥ 40 ft and ocean-going)	33 CFR 151.57 33 CFR 151.59
1.8	□ Examine life raft servicing certificates.	46 CFR 185.730 46 CFR 160.151-57(p)
1.9	□ Examine fixed gas fire extinguishing system servicing certificates.	46 CFR 176.810

Notes:

Task 2: Crew Requirements

Step	Action	Ref
2.1	<input type="checkbox"/> Examine Captain's License. <ul style="list-style-type: none"><input type="checkbox"/> Original on board<input type="checkbox"/> Expiration date<input type="checkbox"/> Route<input type="checkbox"/> Tonnage<input type="checkbox"/> Endorsements	46 CFR 185.402
2.2	<input type="checkbox"/> NOAA Corps Officer OOD Qual (in lieu of	SBSPM Section 6
2.3	Master's License) <ul style="list-style-type: none"><input type="checkbox"/> Examine Operator Qualifications.<ul style="list-style-type: none"><input type="checkbox"/> Operator Course Completed<input type="checkbox"/> Component Course Completed<input type="checkbox"/> Current CPR and First Aid Training<input type="checkbox"/> Boat Specific PQS Completed<input type="checkbox"/> Boat Specific Training Documented<input type="checkbox"/> Knowledge of boat and equipment	
2.4	<input type="checkbox"/> Examine Crewmembers Qualifications. <ul style="list-style-type: none"><input type="checkbox"/> Designated in writing<input type="checkbox"/> Boat Specific Training Documented<input type="checkbox"/> Knowledge of boat and equipment	SBSPM Section 6

Notes:

Task 3: Logs and Manuals

Step	Action	Ref
3.1	<input type="checkbox"/> Examine current training records/logs. <ul style="list-style-type: none"> • Date and general description of training topics • Training record/log for each crewmember 	SBSPM Section 11
3.2	<input type="checkbox"/> Examine emergency training and drills logs. <ul style="list-style-type: none"> • Fire – Man Overboard – Abandon ship • Date of drill and training with general description 	SBSPM Section 11
3.3	<input type="checkbox"/> Examine lifesaving equipment maintenance. <ul style="list-style-type: none"> <input type="checkbox"/> Required maintenance documented <input type="checkbox"/> Manufacturer's Instructions on board for liferaft. <input type="checkbox"/> Monthly maintenance inspections for appliances. <input type="checkbox"/> Annual inspections; davit, winch, falls, or other launching appliance thoroughly inspected <input type="checkbox"/> Maintenance report for EPIRB <input type="checkbox"/> Steering gear test and drill <input type="checkbox"/> Monthly test of EPIRB 	SBSPM Section 10 46 CFR 185.726 (c-e) 46 CFR 185.728
3.4	<input type="checkbox"/> Examine official logbook.	SBSPM Sec. 8 46 CFR 185.280
3.5	<input type="checkbox"/> Verify crew and passenger list maintained.	SBSPM Sec. 8 46 CFR 185.502
3.6	<input type="checkbox"/> Verify float plan prepared and maintained.	SBSPM Sec. 8
3.7	<input type="checkbox"/> Verify passenger count recorded in log.	SBSPM Sec. 8 46 CFR 185.504
3.8	<input type="checkbox"/> Verify safety orientation template and recorded in logbook	SBSPM Sec. 8 46 CFR 185.506
3.9	<input type="checkbox"/> Night watchmen assigned and recorded in logbook	46 CFR 185.410
3.10	<input type="checkbox"/> SOPEP up to date and accurate	
3.11	<input type="checkbox"/> Review lithium-ion battery charging and emergency procedures	

Notes:

Task 4: Navigation Safety Systems

Step	Action	Ref
4.1	<input type="checkbox"/> Verify navigation publications and charts. <input type="checkbox"/> Current and corrected charts (large enough for safe navigation) <input type="checkbox"/> U.S. Coast Pilot <input type="checkbox"/> Coast Guard Light List <input type="checkbox"/> Tide tables <input type="checkbox"/> Tidal current tables <input type="checkbox"/> Rules of the Road (COLREGS)	46 CFR 184.420
4.2	<input type="checkbox"/> Compliance E-Nav Policy in lieu of paper charts	
4.3	<input type="checkbox"/> Test navigation lights and signals (Vessels>65 feet must meet UL 1104).	33 CFR Part 84 SBSPM
4.4	<input type="checkbox"/> Test radar(s).	Section 10
4.5	<input type="checkbox"/> Inspect magnetic compass. (Except rivers and short restricted routes)	46 CFR 184.404
4.6	<input type="checkbox"/> Compass light operational	46 CFR 184.402
4.7	<input type="checkbox"/> Inspect Sound Signaling devices <input type="checkbox"/> Whistle/horn <input type="checkbox"/> Bell proper size	33 CFR 86

Notes:

Task 4: Navigation Safety Systems (Continued)

Step	Action	Ref
4.8	<input type="checkbox"/> Inspect Signaling devices (distress) <ul style="list-style-type: none"> <input type="checkbox"/> Flares and day smokes (correct number and expiration) <input type="checkbox"/> Stowed in brightly colored, portable watertight container <input type="checkbox"/> Marked "Distress Signals" <input type="checkbox"/> Substitutions with proper expiration date 	46 CFR 28.145 46 CFR 185.614

IF vessel travels

THEN it MUST carry:

Oceans / Coastwise /Coastal / Great Lakes Route	3 parachute flares plus 6 red hand held flares and 3 smoke signals
Lakes, Bays, Sounds / Rivers Route	1 electric distress light or 3 red hand flares and 3 orange day smokes

4.9	<input type="checkbox"/> Test internal communications. <ul style="list-style-type: none"> <input type="checkbox"/> A fixed means of two-way communication from: <ul style="list-style-type: none"> • Operating station to machinery space (single screw vessels) • Operating station to auxiliary steering (single screw vessels) • Handheld radios acceptable 	46 CFR 184.602
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4.10	<input type="checkbox"/> Test public address system. IF vessels is: > 65 feet in length ≤ 65 feet in length ≤ 65 feet in length	46 CFR 184.610 AND carries: > 49 passengers ≤ 49 passengers	THEN vessel MUST have: Fixed installation Battery bullhorn NONE required
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Notes:

Task 4: Navigation Safety Systems (Continued)

Step	Action	Ref
4.11	<input type="checkbox"/> Verify propulsion engine control. <ul style="list-style-type: none"> <input type="checkbox"/> Two independent means of controlling each propulsion engine <input type="checkbox"/> Multiple engine vessel with independent remote propulsion control for each engine does not need a second means <input type="checkbox"/> Must have engine shutdowns at the operating station 	46 CFR 184.620
4.12	<input type="checkbox"/> Engine operating gauges, rpm, jacket water, lube oil pressure readily visible at the operating station	46 CFR 182.410 (b)
4.13	<input type="checkbox"/> Verify radio equipment operation	SBSPM Section 10 47 CFR 80.905

IF vessel travels

THEN it MUST carry:

Up to 20 NM from shore	2 VHF
20 NM to 100 NM	2 VHF and 1 MF or SSB or Sat Phone

Vessels 65 ft and over and operating in VTS waters, one radio must be tuned to the VTS frequency under 33 CFR 161.12 as per 33 CFR 26.03(f)

- Verify at least one fixed VHF Radio is receiving GPS position feed.
- Verify MMSI number is entered into all VHF's connected to a GPS

Notes:

Task 4: Navigation Safety Systems (Continued)

Step	Action	Ref
4.14	<input type="checkbox"/> Verify emergency broadcast placard is posted next to all radio installations.	46 CFR 184.506
4.15	<input type="checkbox"/> Verify that the vessel emergency instructions are posted.	46 CFR 185.510
4.16	<input type="checkbox"/> Witness operation of electronic position fixing device.	46 CFR 184.410
4.17	<input type="checkbox"/> Inspect EPIRB (>3 nautical miles from shore on any body of water.) <ul style="list-style-type: none">• Hydrostatic release date – 2yrs• NOAA Registration – 2yrs• Battery - per manufacture• Name of vessel	SBSPM Section 10 46 CFR 185.740 (b) 46 CFR 185.604 (c) 47 CFR 80.1061 (f)
4.18	<input type="checkbox"/> Inspect bridge windows.	46 CFR 177.1010
4.19	<input type="checkbox"/> Test bridge steering system and steering gear.	46 CFR 182.600

Notes:

Task 5: Structural Integrity

Step	Action	Ref
5.1	<input type="checkbox"/> Examine external hull structure. <ul style="list-style-type: none"> <input type="checkbox"/> Decks <input type="checkbox"/> Shell <input type="checkbox"/> Bulkheads <input type="checkbox"/> Strength members <input type="checkbox"/> Visible damage <input type="checkbox"/> Bulwarks, rails, and guards <input type="checkbox"/> Welds 	46 CFR 176.802 Aluminum NVIC 11-80 FRP NVIC 8-87 Steel NVIC 7-68
5.2	<input type="checkbox"/> Review stability information. <ul style="list-style-type: none"> <input type="checkbox"/> Drainage (scuppers/freeing ports) <input type="checkbox"/> Major changes/modifications affecting wind/heel sail area or weight <input type="checkbox"/> Solid fixed ballast secure and documented 	SBSPM Section 9 46 CFR 171 H
5.3	<input type="checkbox"/> Examine hull markings. <ul style="list-style-type: none"> <input type="checkbox"/> Draft marks and load marks (>65 feet) <input type="checkbox"/> Name/NOAA Symbol/ NOAA Number 	46 CFR 185.602 SBSPM Section 13
5.4	<input type="checkbox"/> Examine deck cranes, A-Frames, Lifting gear <ul style="list-style-type: none"> <input type="checkbox"/> OSHA Quadrennial weight test and inspection records <input type="checkbox"/> Annual Inspection documented <input type="checkbox"/> Daily crane inspection incorporated into pre-underway checklist <input type="checkbox"/> All devices stenciled with Safe Working Load (SWL) <input type="checkbox"/> Operating controls clearly labeled 	SBSPM Section 18

Notes:

Task 5: Structural Integrity (Continued)

Step	Action	Ref
5.5	<input type="checkbox"/> Examine internal compartment structures.	46 CFR 176.802
	<input type="checkbox"/> Frames	Aluminum NVIC 11-80
	<input type="checkbox"/> Floors	FRP NVIC 8-87
	<input type="checkbox"/> Shelves, brackets, clamps	Steel NVIC 7-68
	<input type="checkbox"/> Bulkheads	
	<input type="checkbox"/> Ventilation	
5.6	<input type="checkbox"/> Examine watertight integrity.	46 CFR 176.802
	<input type="checkbox"/> Hull openings and closures	46 CFR 179.360
	<input type="checkbox"/> Deadlight covers	46 CFR 171.24
	<input type="checkbox"/> Deck openings and closures	
	<input type="checkbox"/> Sill heights, combings, knife edges, gaskets, hardware	NVIC 2-62
	<input type="checkbox"/> Watertight doors and subdivision bulkheads	46 CFR 182.720 (d)
	<input type="checkbox"/> Piping	46CFR 182.40-1
	<input type="checkbox"/> Free of sluice valves	46 CFR 179.320 (d)
5.7	<input type="checkbox"/> Examine Scuppers / Freeing ports	
	<input type="checkbox"/> Vessels with cockpit	46 CFR 171.145
	<input type="checkbox"/> Vessels with well deck	46 CFR 171.150
5.8	<input type="checkbox"/> Examine dead light covers on port lights below main deck	46 CFR 171.117 46 CFR 179.350
5.9	<input type="checkbox"/> Inspect rails.	
	<input type="checkbox"/> Deck rails (39.5 Inches minimum and 200 pound point load minimum)	46 CFR 177.900
	<input type="checkbox"/> Storm rails	46 CFR 177.920

Notes:

Task 6: General Health and Safety Systems

Step	Action	Ref
6.1	<input type="checkbox"/> Test general alarms (vessels with overnight accommodations).	46 CFR 183.550
6.2	<input type="checkbox"/> Verify upper decks marked for maximum number of persons as per stability letter.	46 CFR 185.602g
6.3	<input type="checkbox"/> Inspect crew spaces. <ul style="list-style-type: none"> • Overnight accommodations 	46 CFR 177.700 46 CFR 177.710 46 CFR 177.25
6.4	<input type="checkbox"/> Inspect accommodations. <ul style="list-style-type: none"> • Overnight accommodations • Seating 	46 CFR 177.800 46 CFR 177.30
6.5	<input type="checkbox"/> Verify means of escape. <ul style="list-style-type: none"> <input type="checkbox"/> Two widely separated <input type="checkbox"/> Adequate size <input type="checkbox"/> Operable for either side <input type="checkbox"/> Open towards expected escape direction <input type="checkbox"/> Properly Marked 	46 CFR 177.500 46 CFR 185.606
6.6	<input type="checkbox"/> Inspect cooking and heating system. <ul style="list-style-type: none"> <input type="checkbox"/> Clear of combustible materials <input type="checkbox"/> Properly fitted/installed for use in heavy seas <input type="checkbox"/> No open flames without approval certification <input type="checkbox"/> Grease trap <input type="checkbox"/> Remote shutoff valve for gas systems <input type="checkbox"/> No continuous pilot lights or glow plugs <input type="checkbox"/> Ventilation ducts above frying vats or grills constructed of >11 gage steel <input type="checkbox"/> Gas systems <input type="checkbox"/> Cooking equipment, grab rails/sea rails 	46 CFR 177.410 46 CFR 184.210 46 CFR 184.240 46 CFR 184.220

Notes:

Task 6: General Health and Safety Systems (Continued)

Step	Action	Ref
6.7	<input type="checkbox"/> Conduct sanitation inspection. <input type="checkbox"/> Quarters <input type="checkbox"/> Toilets/washrooms <input type="checkbox"/> Galleys <input type="checkbox"/> Pantries <input type="checkbox"/> Lockers and similar spaces	46 CFR 176.818
6.8	<input type="checkbox"/> Verify presence of first aid kit. <input type="checkbox"/> Marked "First Aid Kit" <input type="checkbox"/> Watertight container <input type="checkbox"/> Easily visible and readily available to crew <input type="checkbox"/> Must be Coast Guard Approved	46 CFR 184.710 46 CFR 160.041
6.9	<input type="checkbox"/> Inspect ventilation systems. <input type="checkbox"/> Adequate ventilation to enclosed spaces normally occupied <input type="checkbox"/> Must be capable of being shut down from the pilot house	46 CFR 177.600
6.10	<input type="checkbox"/> Inspect portable lights. <input type="checkbox"/> At least two on board <input type="checkbox"/> Located at operating station and at access to propulsion machinery space	46 CFR 183.430
6.11	<input type="checkbox"/> Ensure no unsafe conditions or practices exist. <input type="checkbox"/> Slips, trips, and falls <input type="checkbox"/> Sharp edges <input type="checkbox"/> Swinging loads/gear adrift	46 CFR 176.830
6.12	<input type="checkbox"/> Ensure proper ground tackle	46 CFR 184.300 46 CFR 184.10

Notes:

Task 7: Lifesaving Equipment

Step	Action	Ref
7.1	<input type="checkbox"/> TYPE I PFD Inspect life preservers. <ul style="list-style-type: none"> <input type="checkbox"/> Adequate number of PFDs <input type="checkbox"/> PFDs are USCG-approved <input type="checkbox"/> PFDs are serviceable and in good repair <input type="checkbox"/> Inflatable PFDs are serviced annually <input type="checkbox"/> PFDs are marked with vessel's name <input type="checkbox"/> PFDs are correctly marked with retro-reflective tape <input type="checkbox"/> PFDs are correctly fitted with approved serviceable lights <input type="checkbox"/> Light batteries are in working order and not expired <input type="checkbox"/> Each PFD is fitted with a whistle 	SBSPM Section 10 46 CFR 180.71 a 46 CFR 185.604 VIB 01-09
7.2	<input type="checkbox"/> IMMERSION SUITS Inspect immersion suits <ul style="list-style-type: none"> <input type="checkbox"/> Adequate number and appropriately sized <input type="checkbox"/> USCG-SOLAS Approved <input type="checkbox"/> Suits inspected monthly and logged <input type="checkbox"/> Suits are marked with vessel's name <input type="checkbox"/> Suits are correctly fitted with approved serviceable lights and whistle <input type="checkbox"/> Light batteries are in working order and not expired <input type="checkbox"/> Suits air tested over 10yrs old 	SBSPM Section 10 NVIC 01-08 VIB 01-09 VIB 04-10
7.3	<input type="checkbox"/> TYPE I PFD Inspect life preserver stowage. <ul style="list-style-type: none"> <input type="checkbox"/> Life preservers readily accessible and distributed throughout accommodation spaces <input type="checkbox"/> Stowage containers are not capable of being locked and when practical allow life preservers to float free <input type="checkbox"/> Overhead PFDs stowed for quick release <input type="checkbox"/> Stowage space clearly marked with "Life Preservers," "Child or Adult," and quantity <input type="checkbox"/> Child-size PFDs stowed separately. If not carried, VOM must restrict the carriage of persons weighing less than 90lbs. 	46 CFR 180.78

Notes:

Task 7: Lifesaving Equipment (Continued)

Step	Action	Ref
		SBSPM
7.4	<input type="checkbox"/> Inspect work vests. <ul style="list-style-type: none"> <input type="checkbox"/> Work PFDs must be USCG approved <input type="checkbox"/> Work PFDs are in serviceable condition <input type="checkbox"/> Work PFDs have light and whistle 	Section 10 46 CFR 180.72(b)
		SBSPM
7.5	<input type="checkbox"/> Inspect work vest stowage. <ul style="list-style-type: none"> <input type="checkbox"/> Stowed separately and in a manner so as not to be confused with TYPE I PFDs 	Section 10 46 CFR 180.78 (b)
7.6	<input type="checkbox"/> Verify that lifejacket donning placards are properly posted or available to the passengers.	46 CFR 185.516
7.7	<input type="checkbox"/> Examine ring lifebuoys and water lights. <ul style="list-style-type: none"> <input type="checkbox"/> Appropriate number of USCG-approved ring life buoys on board <input type="checkbox"/> Must be orange on ocean or coastal route <input type="checkbox"/> In serviceable condition <input type="checkbox"/> Properly marked with vessel's name in block capital letters <input type="checkbox"/> Properly marked with retro-reflective tape <input type="checkbox"/> At least one fitted with approved water light <input type="checkbox"/> Water lights are serviceable and batteries are replaced by their marked expiration date or if not marked, replaced annually and date recorded <input type="checkbox"/> Water light is attached with a lanyard at least 3 feet in length and secured around the body of the buoy <input type="checkbox"/> If only one is carried, water light is to be attached to lanyard with a corrosion resistant clip to allow quick disconnect <input type="checkbox"/> Stowage not permanently secured 	SBSPM Section 10 46 CFR 180.70 46 CFR 185.604 46 CFR 160.50 46 CFR 180.75

Notes:

Task 7: Lifesaving Equipment (Continued)

Step	Action	Ref
7.8	<input type="checkbox"/> Verify number and type of survival craft. <input type="checkbox"/> Examine VOM to ensure vessel capacity matches survival craft quantity.	SBSPM Section 9
7.9	<input type="checkbox"/> Inspect inflatable life rafts and inflatable buoyant apparatus (IBA). <input type="checkbox"/> USCG-approved <input type="checkbox"/> Meets approved capacity as noted on approval plate <input type="checkbox"/> Properly equipped <input type="checkbox"/> Has been serviced during the previous 12 months or immediately if container is damaged, or seals or straps are broken <input type="checkbox"/> Marked with vessel's name and port of registry <input type="checkbox"/> L/R-SOLAS A or B pack; IBA-per manufacturer's outfit	SBSPM Section 9 46 CFR 180.175 NVIC 2-63
7.10	<input type="checkbox"/> Inspect life floats. <input type="checkbox"/> USCG-approved <input type="checkbox"/> Has sufficient capacity as noted on approved label <input type="checkbox"/> In serviceable condition <input type="checkbox"/> Marked clearly with vessel's name and capacity <input type="checkbox"/> Properly outfitted, pendants, painters, and lights <input type="checkbox"/> Marked with retro-reflective tape	46 CFR 180.175 NVIC 4-86 46 CFR 185.700 46 CFR 185.604 46 CFR 160.010-8 NVIC 1-83
7.11	<input type="checkbox"/> Verify that lifesaving placards are posted. <input type="checkbox"/> Inflatable survival craft placards	46 CFR 185.518

Notes:

Task 7: Lifesaving Equipment (Continued)

Step	Action	Ref
7.12	<input type="checkbox"/> Rescue platforms. Note: <i>Vessels are required to carry a rescue platform. If the vessel is configured in such a manner as to be able to recover a person from the water without a platform, no platform is required.</i>	46 CFR 180.210
7.13	<input type="checkbox"/> Ensure adequate means are provided for transferring a victim from a rescue platform to the deck of the vessel.	46 CFR 176.808 (g)
7.14	<input type="checkbox"/> Inspect survival craft stowage. Ensure each survival craft is: <ul style="list-style-type: none"><input type="checkbox"/> Secured to vessel by a painter with a weak link<input type="checkbox"/> Stowed in a float-free arrangement (hydrostatic release unit needed when tied down)<input type="checkbox"/> Automatically inflates where applicable<input type="checkbox"/> Readily accessible to crew for quick launch<input type="checkbox"/> Fully equipped as required<input type="checkbox"/> Sheltered from breaking seas and fire damage<input type="checkbox"/> Stowed to prevent shifting	46 CFR 180.137 46 CFR 180.130 46 CFR 180.150

Notes:

Task 7: Lifesaving Equipment (Continued)

Step	Action	Ref
7.15	<input type="checkbox"/> Ensure hydrostatic release units (HRUs) used in float-free arrangements are CG-approved.	46 CFR 160.062

If HRU is	Then they must be...
Non-disposable	<ul style="list-style-type: none"> • Serviced annually. • Installed with body of HRU not making contact with survival craft or any other structure.
Disposable	<ul style="list-style-type: none"> • Not expired. • Installed right side up.

7.16	<input type="checkbox"/> Ensure launching device is provided for any survival craft weighing more than 200 lb that requires lifting more than 1 vertical foot to launch.	NVIC 4-86
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Notes:

Task 7: Lifesaving Equipment (Continued)

Step	Action	Ref
7.17	<input type="checkbox"/> Ensure stowage of each life float and buoyant apparatus also meets each of the following:	46 CFR 180.137 (e)(1)
	<input type="checkbox"/> Secured with a CG-approved weak link (160.073) that is of proper strength for the capacity of the survival craft and that is attached at one end to the painter and at the other end to the vessel	46 CFR 180.175 (e)(3)(ii)
	<input type="checkbox"/> Means to secure weak link to vessel must have a breaking strength at least equal to strength of painter; if synthetic, be dark colored or UV resistant; and if metal, be corrosion resistant	46 CFR 180.137 (f)
	<input type="checkbox"/> If painter attachment fitting is not provided, a means to attach the painter must be provided by a wire or line that encircles the device's body; will not slip off; has breaking strength that is at least the breaking strength of the painter; and is dark colored or UV resistant	
	<input type="checkbox"/> If a single painter is used for 2 or more life floats/buoyant apparatus, ensure that:	
	<ul style="list-style-type: none">• The total weight of the devices does not exceed 400 lb.• Each device is attached to the painter with a line long enough (and of differing lengths) to ensure devices can float without contacting one another and that each device can be launched independently of the other(s).• The strength of the weak link and the breaking strength of the painter (1,500 lb or, for 50 and more persons - 3,000 lb) is determined by the combined capacity of the devices attached to that painter.• If stowed in tiers, ensure tiers are not more than 4' high and that spacers are used between devices.	

Notes:

Task 7: Lifesaving Equipment (Continued)

Step	Action	Ref
7.18	Inspect survival craft embarkation arrangements.	46 CFR 185.700 (a)
	<input type="checkbox"/> Ensure a CG-approved launching appliance (160.175) is provided for each inflatable life raft and IBA when either:	46 CFR 180.150 (a)(1) & (2)
	<input type="checkbox"/> The craft is to be boarding prior to being placed in the water	
	<input type="checkbox"/> Ensure a CG-approved embarkation ladder (160.017) is provided at every embarkation station whose deck is more than 10' above the waterline.	46 CFR 185.704 (c) 46 CFR 185.700 (a)
	<input type="checkbox"/> Ensure ladder is in satisfactory condition (lines & steps not excessively worn or rotted, steps securely fitted to lines, etc.) and securely fastened to vessel (attachment points and shackles not wasted)	46 CFR 185.700 (b)
	<input type="checkbox"/> Ensure deck area in vicinity of ladder is clear of any obstructions that may interfere with boarding or launching of survival craft	

Notes:

Task 8: Fire Protection Systems (Continued)

Step	Action	Ref
8.6	<input type="checkbox"/> Inspect fixed gas fire extinguishing systems.	46 CFR 176.810
	<input type="checkbox"/> Complete operating instructions	46 CFR 185.612
	<input type="checkbox"/> Verify cylinders are weighted	NVIC 6-72 CH 1
	<input type="checkbox"/> Verify cylinders are hydro-tested	NVIC 3-95
	<input type="checkbox"/> Testing or renewal of flexible connections/hoses (47 CFR 147.65)	46 CFR 176.180
	<input type="checkbox"/> Must have manual ventilation closures on protected space	(a)(5)
	<input type="checkbox"/> Controls and valves must be located outside the protected space	46 CFR 181.410
	<input type="checkbox"/> Must have local manual controls at the storage cylinders	46 CFR 182.465
	<input type="checkbox"/> Must have remotes in a break glass enclosure	(h)
	<input type="checkbox"/> Piping	46 CFR 181.20-35
	• Pre-engineered –	46 CFR 181.410
	• automatic shut down for power ventilation and machinery	(b)
	• properly installed as per manufacture instruction	
	• light to indicate discharge	46 CFR 181.410
	• audio alarm	(d)
	• means to reset	
	• only one pre-engineered system per protected space	46 CFR 181.420 46 CFR 181.20

Notes:

Task 8: Fire Protection Systems (Continued)

Step	Action	Ref
8.7	<input type="checkbox"/> Verify fixed gas fire extinguishing system has been serviced or tested annually. Verify machinery shutdowns were tested	46 CFR 176.810 (b)(2)
8.8	<input type="checkbox"/> Portable and semiportable fire extinguishers	46 CFR 176.810
	<input type="checkbox"/> Annual service IAW NFPA 10	NVIC 6-72 CH 1
	<input type="checkbox"/> Cylinders hydrotested	
	<input type="checkbox"/> Testing or renewal of flexible connections/hoses (46 CFR 147.65)	46 CFR 176.180 (a)(5)
	<input type="checkbox"/> Required number and location	46 CFR 181.500
8.9	<input type="checkbox"/> Inspect fire main and hydrants.	46 CFR 181.310
8.10	<input type="checkbox"/> Inspect fire axes (65' and over)	46 CFR 181.15
		46 CFR 181.600
8.11	<input type="checkbox"/> Inspect fire pump.	46 CFR 181.15-10
		46 CFR 181.300
		46 CFR 181.10

Notes:

Task 8: Fire Protection Systems (Continued)

Step	Action	Ref
8.12	<input type="checkbox"/> Test pump (all vessels)	46 CFR 181.300
	<input type="checkbox"/> Vessel < 65ft & > 49 passengers & vessels > 65ft	
	<input type="checkbox"/> No excessive leaking	
	<input type="checkbox"/> Manual priming not required	
	<input type="checkbox"/> Pump is operable from main operating station and locally at the pump.	
	<input type="checkbox"/> Meets required capacity 50 gpm and pressure of 60psi	
	<input type="checkbox"/> Pump must have a pressure gauge	
8.13	<input type="checkbox"/> Inspect fire hoses and nozzles.	46 CFR 181.320
	<input type="checkbox"/> Vessel < 65ft & > 49 passengers & vessels > 65ft	
	<input type="checkbox"/> Commercial lined fire hose (UL 19)	
	<input type="checkbox"/> 1.5 inches in diameter & 50 ft in length	
	<input type="checkbox"/> Fittings of brass or other suitable material (NFPA)	
	<input type="checkbox"/> Nozzle must be approved under 46 CFR 162.027 or type recognized by Commandant.	
	<input type="checkbox"/> Vessel < 65ft & < 49 passengers	
	<input type="checkbox"/> May have a garden type hose > .0625 inches in diameter and >25 ft but < 50 ft	
	<input type="checkbox"/> Fittings must be corrosion resistant material	
	<input type="checkbox"/> Nozzle must be corrosion resistant and be able to switch from stream to spray.	

Notes:

Task 8: Fire Protection Systems (Continued)

Step	Action	Ref
8.14	<input type="checkbox"/> Test fire hoses using installed fire pump.	46 CFR 176.810
	<input type="checkbox"/> Piping	46 CFR 181.310
	<input type="checkbox"/> Valves	46 CFR 181.320
	<input type="checkbox"/> Fittings	
8.15	<input type="checkbox"/> Inspect structural fire protection.	46 CFR 177.405
	<input type="checkbox"/> Noncombustible trim	46 CFR 177.410
	<input type="checkbox"/> Fire-resistant furnishing	
8.16	<input type="checkbox"/> Inspect paint lockers.	46 CFR 177.405
	<input type="checkbox"/> Constructed of steel or equivalent material	
	<input type="checkbox"/> Protected by fire extinguishing system	

Notes:

Task 9: Machinery and Auxiliary Machinery

Step	Action	Ref
9.1	Inspect propulsion machinery.	
	<input type="checkbox"/> Ensure propulsion machinery is suitable and capable of operating at constant marine loads	46 CFR 182.200 (a)
	<input type="checkbox"/> Ensure propulsion machinery has not been changed out since last inspection (change in center of gravity and weight may adversely affect stability).	46 CFR 176.702 46 CFR 176.402 (d)(3) & (4)
	<input type="checkbox"/> Ensure all engines have at least two means for stopping the engine(s), one of which may be the shutoff valves required in fuel lines.	46 CFR 182.200 (b)
	<input type="checkbox"/> Ensure there is a reliable means of shutting down a propulsion engine at the main pilothouse control station.	46 CFR 184.620 (a) 46 CFR 175.10-29
	<input type="checkbox"/> Ensure machinery guards are installed over exposed gears, belts or other rotating machinery	46 CFR 184.620 (b) 46 CFR 177.960 46 CFR 177.35-15
9.2	<input type="checkbox"/> Inspect internal combustion engines (diesel and gasoline powered).	
	<input type="checkbox"/> Ensure all starting motors, generators, and spark-producing devices are mounted as high above bilges as practicable	46 CFR 182.410 (a)
	<input type="checkbox"/> Ensure gauges for rpm, jacket water discharge temperature, and lubricating oil pressure are provided and are readily visible at the operating station (rpm gauge not required for existing vessels)	46 CFR 182.410 (b) 46 CFR 182.15-5 46 CFR 182.20-5
	<input type="checkbox"/> Ensure all flexible hoses are clamped at each end with two corrosion-resistant metal hose clamps where practicable (a single clamp is allowed when pipe end is expanded or beaded)	46 CFR 182.410 (d)
	<input type="checkbox"/> Hose meets SAE J-1942 standards and has end fittings that comply with SAE J-1475 standards which have been installed IAW the manufacturer's instructions.	46 CFR 182.720
<hr/>		

Task 9: Machinery and Auxiliary Machinery (Continued)

Task 9: Machinery and Auxiliary Machinery (Continued)

Step	Action	Ref
9.3	□ Inspect engine cooling system as follows:	46 CFR 182.420
	□ Ensure the engine head, block, and exhaust manifold are cooled by water from a pump that operates whenever the engine operates.	(a)(1) 46 CFR 182.420 (a)(2)
	□ Ensure a suitable strainer is installed on the raw water intake line of the cooling system.	46 CFR 182.420 (c)&(d)
	□ On vessels ≤ 65 ft and carrying ≤ 12 passengers, a propulsion or auxiliary gasoline engine may be air cooled if in compliance with ABYC P-4.	46 CFR 182.420 (d)(1)
	□ An auxiliary gasoline engine may be air cooled if it is installed on an open deck and has a self-contained fuel system.	46 CFR 182.420 (e)
	□ A diesel engine may be air cooled or employ an air cooled jacket water radiator when sufficient ventilation is available, or is installed on vessels ≤ 65 ft and carrying ≤ 12 passengers and is in compliance with ABYC P-4.	46 CFR 182.465 (b)
9.4	□ Ensure keel coolers are provided with a shutoff valve where the cooler penetrates the hull (not required for integral keel coolers).	46 CFR 182.422 (b)
	□ Ensure all piping outboard of the shutoff valves is at least Schedule 80 and that any flexible hoses used at the machinery connections is approved hose and double hose clamped	46 CFR 182.422 (c)&(d)
	□ Ensure all integral keel coolers are fabricated with material of the same thickness and quality of the hull using full penetration welds and with a slope at each end not greater than 4 to 1.	46 CFR 182.422 (e)

Notes:

Task 9: Machinery and Auxiliary Machinery (Continued)

Step	Action	Ref
9.5	<input type="checkbox"/> Inspect engine exhaust systems as follows (as an alternative, vessels may instead comply with ABYC P-1): <ul style="list-style-type: none"> <input type="checkbox"/> Ensure dry exhaust pipes are clear of and suitably insulated from combustible materials and suitably insulated to prevent injuries. <input type="checkbox"/> Ensure dry exhaust pipes installed on wood and FRP boats are installed IAW ABYC P-1 (designed to arrest sparks; metallic connections are flanged, threaded, or welded; and flexible sections are seamless stainless steel). 	46 CFR 182.425 (c) 46 CFR 182.430 (k) 46 CFR 182.425 (a)(1) & (2)(v) 46 CFR 177.405 (b)
9.6	<input type="checkbox"/> Ensure horizontal dry exhaust pipes: <ul style="list-style-type: none"> <input type="checkbox"/> Do not pass through living or berthing spaces. <input type="checkbox"/> Terminate above the deepest load waterline. <input type="checkbox"/> Are arranged to prevent entry of cold water from rough or boarding seas (i.e., flaps installed over exhaust outlet). <input type="checkbox"/> Are constructed of corrosion-resisting material at the hull penetration. 	46 CFR 182.425 (a)(2)

Notes:

Task 9: Machinery and Auxiliary Machinery (Continued)

Step	Action	Ref
9.7	<input type="checkbox"/> Ensure that exhaust pipe systems cooled by water are:	
	<input type="checkbox"/> Provided with cooling water obtained from the engine cooling system or from a separate engine driven pump.	46 CFR 182.425 (b)(1)
	<input type="checkbox"/> Fitted so that cooling water is injected into the exhaust system as close as possible to the engine exhaust manifold and so that water passes through the entire length of the exhaust pipe.	46 CFR 182.425 (b)(2)
	<input type="checkbox"/> Fitted with insulation or be water-jacketed between the exhaust manifold and the point of cooling water injection.	46 CFR 182.425 (b)(3)
	<input type="checkbox"/> Either water-jacketed or insulated, if a vertical exhaust pipe, to ensure no water is mixed with exhaust gases.	46 CFR 182.425 (b)(4)
	<input type="checkbox"/> Provided with a suitable warning device, visual or audible, installed at the operating station to indicate any reduction in water flow when the cooling water is provided from a source other than the engine cooling water system.	46 CFR 182.425 (b)(5)
	<input type="checkbox"/> Provided with a suitable strainer in the intake line.	46 CFR 182.15-15 (b)(5)
9.8	<input type="checkbox"/> Ensure there are two independent means to control speed and direction of rotation for each propulsion engine (not required for vessels with multiple propulsion engines with independent control for each engine).	46 CFR 182.425 (b)(6)
		46 CFR 182.430 (b)
		46 CFR 182.15-20 (a)
		46 CFR 184.620 (a)

Notes:

Task 9: Machinery and Auxiliary Machinery (Continued)

Step	Action	Ref
9.9	<input type="checkbox"/> Ensure there is a fixed means of two-way communications from the operating station to the location of the means to control the engine (not required for multi-engine vessels with pilothouse controls for each engine).	46 CFR 184.602 (a)
	<input type="checkbox"/> Two-way communications may be satisfied with handheld portable radios or, if locations are sufficiently close together, with direct voice communications (test while underway at full power).	46 CFR 184.602 (d) & (e)
9.10	<input type="checkbox"/> Ensure machinery and boilers for steam and electrically propelled vessels comply with subchapter F (Marine Engineering) and subchapter J (Electrical Engineering).	46 CFR 182.220 (b)

Notes:

Task 9: Machinery and Auxiliary Machinery (Continued)

Step	Action	Ref
9.11	<input type="checkbox"/> Inspect auxiliary machinery.	
	<input type="checkbox"/> Ensure heating boilers are tested or examined every 3 years	46 CFR 182.310
	<input type="checkbox"/> Ensure water heaters comply with 46 CFR Parts 53 & 63 except:	46 CFR 182.310 (c)
	<input type="checkbox"/> Electric water heaters rated at not more than 100 psi and 250°F are acceptable if:	
	<input type="checkbox"/> Capacity ≤ 120 gallons;	46 CFR 182.320 (a) & (b)
	<input type="checkbox"/> Heat input ≤ 200,000 Btu per hour;	
	<input type="checkbox"/> UL listed (UL 174 or UL 1453); AND	
	<input type="checkbox"/> Protected by pressure-temperature relief device	46 CFR 182.320 (a)
9.12	<input type="checkbox"/> Ensure water heaters are installed and secured from rolling and movement.	46 CFR 182.320 (c)
9.13	<input type="checkbox"/> Ensure unfired pressure vessels (Air Receivers) comply with subchapter F (Marine Engineering).	46 CFR 182.330

Notes:

Task 9: Machinery and Auxiliary Machinery (Continued)

Step	Action	Ref
9.14	<input type="checkbox"/> Conduct tests & inspections of UNFIRED pressure vessels IAW 46 CFR 61.10.	46 CFR 176.812
	<input type="checkbox"/> Complete external and internal visual inspection at least every 5 years, except:	46 CFR 182.15-25(b)(4)
	<input type="checkbox"/> Internal inspection is not required on Class I and II pressure vessels (see 46 CFR table 54.01-5(b)) with a volume of <5 cu ft which do not contain hazardous materials and are stamped with either the ASME "U" or "UM" symbols	46 CFR 61.10-5 (b)
	<input type="checkbox"/> Complete hydrostatic test (water, not air) if visual inspection reveals defect which may affect safety of pressure vessel. Test pressure shall be 1-1/2 times the vessel's MAWP	46 CFR 54.01-5 (c)(3)
	<input type="checkbox"/> Complete check of safety or relief valves settings at least twice in 5 years and not more than every 3 years	46 CFR 61.10-5 (b) (3)
	<input type="checkbox"/> Ensure safety or relief valve setting does not exceed the pressure vessel's MAWP and that valve does not relieve at a pressure greater than the vessel's MAWP	46 CFR 61.10-5 (i)
	<input type="checkbox"/> Ensure safety or relief valve relieves at a pressure not more than 10% above or below the valve's marked pressure	46 CFR 54.15-10 (a)
	<input type="checkbox"/> Ensure safety or relief valve relieves at a pressure not more than 10% above or below the valve's marked pressure	46 CFR 54.15-10 (g)

Service	Working Pressure	Relief Valve Setting	Date Tested or Examined

Notes:

Task 9: Machinery and Auxiliary Machinery (Continued)

Step	Action	Ref
9.15	<input type="checkbox"/> Ensure independent fuel tank(s) has not been replaced with a different sized tank or relocated since last inspection (change in center of gravity and weight may adversely affect stability).	46 CFR 176.702 46 CFR 176.402 (d)(3) & (4)
	<input type="checkbox"/> Ensure fuel tank(s) is free of excessive corrosion, that no fittings are leaking, that independent fuel tanks are properly secured in place to prevent movement, and that tank is insulated from braces and supports by a nonabrasive and nonabsorbent material.	46 CFR 176.804 (d) 46 CFR 182.440 (b)(3)
	<input type="checkbox"/> When the structural integrity of a fuel tank is in question, ensure the tank is replaced or, as an alternative, witness a satisfactory hydrostatic (use liquid only, not air) pressure test of the tank to 5 psig or 1-½ times the max pressure head the tank may be subjected to, whichever is greater.	46 CFR 176.804 (c)(1)

Notes:

Task 9: Machinery and Auxiliary Machinery (Continued)

Step	Action	Ref
9.16	<input type="checkbox"/> Ensure all fuel tanks are electrically bonded to a common ground.	46 CFR 182.440 (b)(4) 46 CFR 182.15-25(b)(4)
9.17	<input type="checkbox"/> Ensure there is a means to accurately determine the amount of fuel in each tank.	46 CFR 182.445 (b)
9.18	<input type="checkbox"/> Ensure fill pipes and sounding pipes are so arranged that overflow of liquid or vapor cannot escape to the inside of the vessel.	46 CFR 182.445 (d)
9.19	<input type="checkbox"/> Ensure all fuel tank fill pipes and sounding pipes are suitably marked.	46 CFR 182.445 (e)
9.20	<input type="checkbox"/> Each fuel tank is fitted with a vent pipe connected to its highest point (tanks without a vent line must be inspected as a pressure vessel).	46 CFR 182.440 (c)(3) 46 CFR 182.450 (b)&(c)
	<input type="checkbox"/> Ensure net cross sectional area of vent pipes are at least:	46 CFR 182.450 (d)
	<input type="checkbox"/> .625 inches if fill pipe terminates at top of the tank;	
	<input type="checkbox"/> .75 inches if fill pipe extends into tank; or	
	<input type="checkbox"/> The cross sectional area of the fill pipe if the tank is filled under pressure.	46 CFR 182.450 (e)
	<input type="checkbox"/> Ensure tank space is properly vented	46 CFR 182.15-35
	<input type="checkbox"/> >500 cubic feet = gooseneck >2.5 inches	46 CFR 182.460
	<input type="checkbox"/> <500 cubic feet = gooseneck >1.5 inches	46 CFR 182.470
		46 CFR 182.15-45
		46 CFR 182.20-50

Notes:

Task 9: Machinery and Auxiliary Machinery (Continued)

Step	Action	Ref
9.21	<input type="checkbox"/> Ensure discharge ends of vent pipes terminate outside of vessel, either on the hull exterior or in U-bends as high above the weather deck as possible. <input type="checkbox"/> Ensure discharge ends of vent pipes are fitted with a flame screen or flame arrester of such design and size as to not reduce the net cross sectional diameter of the vent pipe and to permit cleaning or renewal (flame screens must consist of a single screen of corrosion resistant wire of at least 30 x 30 mesh).	46 CFR 182.450 (e)
9.22	<input type="checkbox"/> Verify when flexible hose is used in the vent pipe: <input type="checkbox"/> Hose has high resistance to salt water, petroleum oils, heat, and vibration. <input type="checkbox"/> Hose overlaps metal pipe ends at least 1-½ times the pipe diameter and is secured with 2 hose clamps.	46 CFR 182.450 (g)
9.23	<input type="checkbox"/> Vent pipes are installed with an upward gradient in a manner to prevent fuel from being trapped in the line.	46 CFR 182.450 (h)

Notes:

Task 9: Machinery and Auxiliary Machinery (Continued)

Step	Action	Ref
9.24	Inspect fuel piping as follows:	
	<input type="checkbox"/> Ensure fuel lines are of one of the following materials:	46 CFR 182.455 (a)(1)
	<input type="checkbox"/> Annealed tubing of copper, copper-nickel, or nickel-copper having wall thickness of at least 0.035 inches; or	
	<input type="checkbox"/> For diesel fuels, piping which provides equivalent safety such as seamless steel pipe or tubing may be used; or	46 CFR 182.455 (a)(1)(iii)
	<input type="checkbox"/> For diesels fuels on aluminum hulled vessels, aluminum piping of at least schedule 80 may be used.	
	<input type="checkbox"/> Flexible hose meets the following requirements:	46 CFR 182.720 (e)
	<input type="checkbox"/> Hose meets SAE J-1942 standards and has end fittings that comply with SAE J-1475 standards which have been installed IAW the manufacturer's instructions.	46 CFR 182.40 46 CFR 182.720 (e)(1)
	<input type="checkbox"/> Hose runs are visible, easily accessible, protected from mechanical damage, and do not penetrate watertight decks or bulkheads	46 CFR 182.720 (e)(3)
	<input type="checkbox"/> Hose used only for the purpose of flexibility in lengths \leq 30 inches and subject to pressures \leq 5 psig (normally used to connect metallic fuel pipe runs to the engine to eliminate effects of engine vibration) may meet the following requirements:	46 CFR 182.720 (e)(3)(v)
	<input type="checkbox"/> Suitable compression-type connection fittings may be used or hose may be installed with two hose clamps at each end of the hose; and	
	<input type="checkbox"/> USCG Type A1, A2, B1, or B2 may be accepted instead of hose meeting SAE Standard J-1942	

Notes:

Task 9: Machinery and Auxiliary Machinery (Continued)

Step	Action	Ref
9.25	<input type="checkbox"/> Ensure no cock-type valves are in fuel lines except for the solid bottom type.	46 CFR 182.455 (b)(3) 46 CFR 182.15-40(a)(5) 46 CFR 182.20-40(a)(4)
9.26	<input type="checkbox"/> Ensure all fuel lines are accessible for inspection, protected from mechanical injury, and secured against excessive movement and vibration. <ul style="list-style-type: none"> <input type="checkbox"/> Ensure fuel line securing straps are of soft, nonferrous metal which have no sharp edges and are insulated to protect against corrosion <input type="checkbox"/> Ensure fuel lines passing through bulkheads are protected from damage by close fitting ferrules or stuffing boxes 	46 CFR 182.455 (b)(3)
9.27	<input type="checkbox"/> Ensure manually operated shutoff valves are installed in the fuel supply lines at the fuel tank connection and the engine end of the fuel line. <ul style="list-style-type: none"> <input type="checkbox"/> Ensure that the shutoff valve at the fuel tank connection (also known as the emergency fuel shutoff valve) can be manually operated from outside the compartment in which the valve is located. <input type="checkbox"/> If the handle of the emergency fuel shutoff valve is located inside the machinery space, it must be located so operator does not have to reach more than 12 inches into space and must be shielded from flames. <input type="checkbox"/> Ensure electric solenoid shutoff valves are used only if used in addition to the manual valves. <input type="checkbox"/> Ensure remote fuel shutoff stations are marked indicating direction of turn 	46 CFR 182.455 (b)(4) 46 CFR 182.15-40(b)(3) 46 CFR 182.20-40(b)(3) 46 CFR 185.608 46 CFR 185.30-20

Notes:

Task 9: Machinery and Auxiliary Machinery (Continued)

Step	Action	Ref
9.28	<input type="checkbox"/> Ensure a loop of copper tubing or flexible hose is installed in the fuel supply line where it connects to the engine.	46 CFR 182.455 (b)(5)
9.29	<input type="checkbox"/> Ensure that a suitable metal marine type strainer is fitted in the fuel supply line in the engine compartment and meets the following: <ul style="list-style-type: none"> <input type="checkbox"/> Is leak free; and <input type="checkbox"/> Fuel filters fitted with bowls of other than steel construction (such as Racor filter with clear bowls) must be approved by COMDT, be protected from mechanical damage, and be fitted with a flame shield if specified when approved by COMDT. 	46 CFR 182.455 (b)(6) 46 CFR 182.20-40(b)(5) 46 CFR 182.15-40(b)(5)
9.30	<input type="checkbox"/> Ensure any accessory installed in the fuel line is independently supported.	46 CFR 182.455 (b)(7)
9.31	<input type="checkbox"/> Ensure any valves for removing water or impurities from diesel fuel water traps or strainers are fitted with caps or plugs.	46 CFR 182.455 (b)(9)
9.32	<input type="checkbox"/> Ensure portable fuel tanks are not used except when used for portable dewatering pumps and outboard engines.	46 CFR 182.458 (a)
9.33	<input type="checkbox"/> Ensure portable fuel tanks and any related fuel lines and accessories meet ABYC H-25 standards.	46 CFR 182.458 (b)

Notes:

Task 9: Machinery and Auxiliary Machinery (Continued)

Step	Action	Ref
9.34	<input type="checkbox"/> Inspect the following on vessels equipped with GASOLINE-powered internal combustion engines ONLY:	46 CFR 182.410 (a)
	<input type="checkbox"/> Ensure electrical equipment in spaces containing machinery powered by and fuel tanks for gasoline are explosion-proof, intrinsically safe, or ignition protected for use in a gasoline atmosphere.	46 CFR 182.410 (c)
	<input type="checkbox"/> Ensure enclosed spaces containing machinery powered by gasoline are equipped with a flammable vapor detection system.	46 CFR 182.480 (a)
	<input type="checkbox"/> Ensure flammable vapor detection system meets UL Standard 1110 "Marine Combustible Gas Indicators"	46 CFR 182.480 (c)
	<input type="checkbox"/> Ensure system is operational for at least 30 seconds prior to engine startup and continues sensing the entire engine is running	46 CFR 182.480 (d)
	<input type="checkbox"/> Ensure system provides a visual and audible alarm at the operating station	46 CFR 182.480 (e)
	<input type="checkbox"/> Ensure a system sensor is located in the lowest part of a machinery space and a fuel tank space above expected bilge water levels	46 CFR 182.480 (b)&(h)
	<input type="checkbox"/> Ensure that system operating instructions are posted at the operating station and that the system's operations and maintenance manual is onboard	46 CFR 182.415 (a)
	<input type="checkbox"/> Ensure all carburetors (except downdraft types) are equipped with an integral or externally fitted drip collector of adequate capacity.	

Notes:

Task 9: Machinery and Auxiliary Machinery (Continued)

Step	Action	Ref
9.34 (Con't)	<input type="checkbox"/> Ensure all gasoline engines (except outboard engines) are fitted with an acceptable means of backfire flame control as follows: <ul style="list-style-type: none"> <input type="checkbox"/> A clean backfire flame arrester complying with, and marked, SAE J-1928 or UL 1111 secured to the air intake with a flamtight connection <input type="checkbox"/> An engine air and fuel induction system that provides adequate protection equivalent to a backfire flame arrester <input type="checkbox"/> An arrangement of the carburetor or engine air induction system that will disperse any flames to the atmosphere outside the vessel in a safe manner, or <input type="checkbox"/> An air induction system approved, marked, and tested under 46 CFR 162.043 	46 CFR 182.415 (c)
9.35	<input type="checkbox"/> Ensure gasoline is stored only in fuel tanks that are independent of the hull.	46 CFR 182.435 (a)
9.36	<input type="checkbox"/> Ensure fill pipes and sounding pipes for gasoline fuel tanks extend to within one-half of their diameter from the bottom of the tank.	46 CFR 182.445 (e)
9.37	<input type="checkbox"/> Ensure valves in gasoline fuel lines are of a suitable nonferrous type.	46 CFR 182.455 (a)(4)
9.38	<input type="checkbox"/> Ensure all gasoline fuel lines are connected at the top of the tank and run at or above the level of the tank top to a point as close as possible to the engine connection (fuel lines may be run below the level of the tank top if fitted with anti-siphon protection).	46 CFR 182.455 (b)(1)

Notes:

Task 9: Machinery and Auxiliary Machinery (Continued)

Step	Action	Ref
9.39	<input type="checkbox"/> Ensure a drip pan fitted with a flame screen is installed under each gasoline strainer.	46 CFR 182.455 (b)(6)
9.40	<input type="checkbox"/> Ensure no outlets to permit drawing of fuel below deck are present in gasoline fuel lines.	46 CFR 182.455 (b)(8)
9.41	<input type="checkbox"/> Ensure flexible hose used for alcohol-gasoline blend fuels meets the permeability requirements of 33 CFR 183, subpart J (SAE Class 1 or Class 2 hose or USCG A1, A2, B1 or B2 hose).	46 CFR 182.720 (e)(3)(iv) 46 CFR 182.455 (g) 46 CFR 182.20-30 (d)
9.42	<input type="checkbox"/> Operational test of all overboard discharge and intake valves and watertight bulkhead pipe penetration valves;	46 CFR 176.804 (g)
	<input type="checkbox"/> Operational test of the means provided for pumping bilges; and (i) Test of machinery alarms including bilge high level alarms.	46 CFR 176.804 (h)
	<input type="checkbox"/> Ensure vessel has been provided with bilge pumps in accordance with Table 182.520(a).	46 CFR 182.520 (a)
	<input type="checkbox"/> If there is a portable hand bilge pump must be:	
	<input type="checkbox"/> Capable of pumping water, but not necessarily simultaneously, from all watertight compartments; and	46 CFR 182.520 (b)
	<input type="checkbox"/> Provided with suitable suction hose capable of reaching the bilge of each watertight compartment and discharging overboard.	46 CFR 182.25-5(d)

Notes:

Task 9: Machinery and Auxiliary Machinery (Continued)

Step	Action	Ref
9.43	<input type="checkbox"/> Ensure that a vessel of at least 26 feet in length, has a visual and audible alarm at the operating station to indicate a high water level in each of the normally unmanned spaces <input type="checkbox"/> Ensure that a vessel of at least 26 feet in length has been provided with individual bilge lines and bilge suctions for each watertight compartment, the arrangement of the vessel is such that ordinary leakage may be removed from this compartment by the use of a hand portable bilge pump or other equipment, and such equipment is provided. <input type="checkbox"/> Ensure a bilge pipe in a vessel of not more than 65 feet in length must be not less than 1 inch nominal pipe size.	46 CFR 182.530 (a) 46 CFR 182.510 (a) 46 CFR 182.25-5(d) 46 CFR 182.510 (b)
9.44	<input type="checkbox"/> Ensure all vital systems piping is appropriate and meet subpart F	46 CFR 182.710 46 CFR 182.40-5

Notes:

Task 10: Electrical

Step	Action	Ref
10.1	<input type="checkbox"/> Inspect independent generators. <ul style="list-style-type: none"><input type="checkbox"/> Ensure that when a ship service generator driven by a propulsion engine is used as a source of electrical power, a vessel speed change, throttle movement or change in direction of the propeller shaft rotation must not interrupt power to any of the loads specified in paragraph (a)(1) of this section.	46 CFR 183.310 (b)
10.2	<input type="checkbox"/> Inspect batteries and alternator (if required). <ul style="list-style-type: none"><input type="checkbox"/> Ensure a vessel with batteries of adequate capacity to supply the loads specified in paragraph (a)(1) of this section for three hours, and a generator or alternator driven by a propulsion engine, complies with the requirement in paragraph (a)(1) of this section.<input type="checkbox"/> Inspect of batteries for condition and security of stowage<input type="checkbox"/> All batteries must be located as high above the bilge as practicable, secured to protect against shifting with the roll and pitch of the vessel, and free from exposure to water splash or spray<input type="checkbox"/> All batteries must be mounted in trays lined with, or constructed of, a material that is resistant to damage by the electrolyte<input type="checkbox"/> Battery charger with ammeter connected to charging circuit	46 CFR 183.310 (a)(2) 46 CFR 176.806 (f) 46 CFR 183.350 46 CFR 183.350 (d) 46 CFR 183.05-20

Notes:

Task 10: Electrical (Continued)

Step	Action	Ref
10.3	<input type="checkbox"/> Inspect switchboards and distribution panels.	46 CFR 183.330
	<input type="checkbox"/> Ensure location is dry, adequately ventilated, totally enclosed, has drip shield, non-conducting mat or grating, and over current	46 CFR 183.380
	<input type="checkbox"/> Check that if a grounded distribution system is provided, there must be only one connection to ground, regardless of the number of power sources. This ground connection must be at the switchboard or at the common ground plate, which must be accessible	46 CFR 183.376 (a)
	<input type="checkbox"/> Ensure each propulsion, power, lighting, or distribution system having a neutral bus or conductor must have the neutral grounded	46 CFR 183.376 (b)
	<input type="checkbox"/> The neutral bus must be permanently connected to the neutral bus on the main switchboard;	46 CFR 183.376 (c)
	<input type="checkbox"/> No switch, circuit breaker, or fuse in the neutral conductor of the bus-tie feeder connecting the emergency switchboard to the main switchboard	
	<input type="checkbox"/> Ensure on a metallic vessel, a grounded alternating current system must be grounded to the hull. On a nonmetallic vessel, the neutral must be connected to the common ground, except that aluminum grounding conductors must not be used.	46 CFR 183.376 (d)

Notes:

Task 10: Electrical (Continued)

Step	Action	Ref
10.3 (cont)	<input type="checkbox"/> Ensure all metallic enclosures and frames of electrical equipment are permanently grounded to the hull on a metallic vessel. On a nonmetallic vessel, the enclosures and frames of electrical equipment must be bonded together to a common ground by a normally non-current carrying conductor. Metallic cases of instruments and secondary windings of instrument transformers must be grounded.	46 CFR 183.372 (a)
	<input type="checkbox"/> Ensure that on a nonmetallic vessel, where a ground plate is provided for radio equipment, it must be connected to the common ground.	46 CFR 183.372 (b)
10.4	<input type="checkbox"/> Inspect radios fused at the main panel (INSPECT RADIO POWER SUPPLY).	46 CFR 183.392
10.5	<input type="checkbox"/> Inspect cable, wiring, receptacles, outlets, and accessories.	
	<input type="checkbox"/> Inspect all cable as far as practicable without undue disturbance of the cable or electrical apparatus	46 CFR 176.806 (a)
	<input type="checkbox"/> Test all circuit breakers by manual operation;	46 CFR 176.806 (b)
	<input type="checkbox"/> Inspect fuses including ensuring the ratings of fuses are suitable for the service intended;	46 CFR 176.806 (c)
10.6	<input type="checkbox"/> Inspect lighting fixtures.	46 CFR 183.410 46 CFR 183.30-1

Notes:

Task 10: Electrical (Continued)

Step	Action	Ref
10.7	<input type="checkbox"/> Inspect portable lighting.	46 CFR 183.430
10.8	<input type="checkbox"/> Test emergency lighting.	
	<input type="checkbox"/> Ensure each vessel has adequate emergency lighting fitted along the line of escape to the main deck from all passenger and crew accommodation spaces located below the main deck	46 CFR 183.432 (a) 46 CFR 183.30
	<input type="checkbox"/> The emergency lighting required by 46 CFR 183.432 paragraph (a) of this section must automatically actuate upon failure of the main lighting system. If a vessel is not equipped with a single source of power for emergency lighting, it must have individual battery powered lights that:	
	<input type="checkbox"/> Are connected to an automatic battery charger; and Have sufficient capacity for a minimum of 2 hours of continuous operation	46 CFR 183.432 (b)

Notes:

Task 10: Electrical (Continued)

Step	Action	Ref
10.09	<input type="checkbox"/> Inspect general electrical installation.	
	<input type="checkbox"/> If individual wires, rather than cable, are used in systems greater than 50 volts, the wire must be in conduit.	46 CFR 183.340
	<input type="checkbox"/> All cable and wire must have stranded copper conductors with sufficient current carrying capacity for the circuit in which they are used;	46 CFR 183.05-40 46 CFR 183.05-45
	<input type="checkbox"/> Be protected from the weather;	46 CFR 183.05-50
	<input type="checkbox"/> Be installed with metal supports spaced not more than 24 inches apart, and in such a manner as to avoid chafing and other damage.	46 CFR 183.10-20
	<input type="checkbox"/> Operationally test electrical apparatus, which operates as part of or in conjunction with a fire detection or alarms system installed on board the vessel, by simulating, as closely as practicable, the actual operation in case of fire; and	46 CFR 176.806 (g)
	<input type="checkbox"/> Operationally test of all emergency electrical systems	
	<input type="checkbox"/> A portable or temporary electric cord or cable must be constructed and used in compliance with the requirements of Sec. 111.60-13 in subchapter J of this chapter for a flexible electric cord or cable	46 CFR 176.806 (h) 46 CFR 183.340 (r)
10.10	<input type="checkbox"/> Inspect over current protection.	46 CFR 183.380

Notes:

Task 11: Pollution Prevention Systems

Step	Action	Ref
11.1	Verify oil pollution placard posted. (Vsl >26 ft in length)	33 CFR 155.450
11.2	<input type="checkbox"/> Verify garbage placard. (Vsl >26 ft in length) <input type="checkbox"/> Prominent locations: readable by crew and passengers	33 CFR 151.59
11.3	<input type="checkbox"/> Examine marine sanitation device. <ul style="list-style-type: none">• Operable• Labeled type I, II, or III (not required for type IIIs that store effluent at ambient air pressure and temperature)	33 CFR 159.7
11.4	<input type="checkbox"/> Verify bilges are free of debris and excessive amounts of oil.	46 CFR 176.830

Notes:

Task 12: Fire Drill

Step	Y	N	Action
12.1	<input type="checkbox"/>	<input type="checkbox"/>	Advise crew smoke and flames coming from a space.
12.2	<input type="checkbox"/>	<input type="checkbox"/>	Did crewmember sound alarm?
12.3	<input type="checkbox"/>	<input type="checkbox"/>	Did crewmember attempt an initial action?
12.4	<input type="checkbox"/>	<input type="checkbox"/>	Did the Master turn the vessel into the wind, slow down, etc, and make announcements to crew/passengers and make the call to local CG or vessels in the surrounding area?
12.5	<input type="checkbox"/>	<input type="checkbox"/>	Did Master control situation from helm, make announcements, and communicate effectively with crew?
12.6	<input type="checkbox"/>	<input type="checkbox"/>	Did crewmembers take control of situation and direct passengers as appropriate?
12.7	<input type="checkbox"/>	<input type="checkbox"/>	Did crewmembers communicate effectively with Master, other crewmembers, and passengers?
12.8	<input type="checkbox"/>	<input type="checkbox"/>	Was a charged firemain or fire buckets provided?
12.9	<input type="checkbox"/>	<input type="checkbox"/>	Did crewmember effectively fight the fire with portable fire extinguishers, close off ventilation closures, secure power and fuel?
12.10	<input type="checkbox"/>	<input type="checkbox"/>	If available, did the crew know how to operate and deploy the Fixed Fire Extinguishing System and/or fire pump?
12.11	<input type="checkbox"/>	<input type="checkbox"/>	Did the crew understand what agent they were using?
12.12	<input type="checkbox"/>	<input type="checkbox"/>	Did the drill follow the training and operations manual, the emergency instructions, or other placards posted?
12.13	<input type="checkbox"/>	<input type="checkbox"/>	Was the drill satisfactory?

Notes:

Task 13: Abandon Ship Drill

Step	Y	N	Action
13.1	<input type="checkbox"/>	<input type="checkbox"/>	Advise crew the vessel is sinking and cannot be saved.
13.2	<input type="checkbox"/>	<input type="checkbox"/>	Did the Master simulate broadcasting a mayday on the VHF radio and provide the vessels position, number of persons on board, and type of distress?
13.3	<input type="checkbox"/>	<input type="checkbox"/>	Were life preservers properly donned by crew and passengers?
13.4	<input type="checkbox"/>	<input type="checkbox"/>	Did the crew have a plan (demonstrate as necessary) on how to deploy and marshal the vessel's primary lifesaving devices?
13.5	<input type="checkbox"/>	<input type="checkbox"/>	Did the Master simulate activating the vessel's 406 EPIRB?
13.6	<input type="checkbox"/>	<input type="checkbox"/>	Did the drill following the Vessel Operations Manual (VOM) or emergency instructions or other placards posted?
13.7	<input type="checkbox"/>	<input type="checkbox"/>	Was the drill satisfactory?

Notes:

Task 14: Man Overboard Drill

Step	Y	N	Action
14.1	<input type="checkbox"/>	<input type="checkbox"/>	Did the crew throw Oscar or fender overboard?
14.2	<input type="checkbox"/>	<input type="checkbox"/>	Did the crewmember call out "man overboard" and which side of the vessel the victim fell over, throw ring life buoy or PFD, fender, or other flotsam overboard and begin pointing to victim?
14.3	<input type="checkbox"/>	<input type="checkbox"/>	Did crewmember throw ring life buoy, PFD, fender, or other flotsam over?
14.4	<input type="checkbox"/>	<input type="checkbox"/>	If at night, was the waterlight attached to the life ring buoy and, was it deployed immediately?
14.5	<input type="checkbox"/>	<input type="checkbox"/>	Did the Master mark vessel's position, and conduct a Williamson turn to get on reciprocal course (if man overboard is not in sight) or a destroyer turn (if man overboard is still in sight)?
14.6	<input type="checkbox"/>	<input type="checkbox"/>	Did the Master sound danger signal, mark position, course and speed, announce situation to crew/passengers and make the call to local CG or vessels in surrounding area?
14.7	<input type="checkbox"/>	<input type="checkbox"/>	Did the Master control situation from helm, make announcements, and communicate effectively with crew?
14.8	<input type="checkbox"/>	<input type="checkbox"/>	Did the Master approach the victim with a plan and was he successful?
14.9	<input type="checkbox"/>	<input type="checkbox"/>	Did the crewmembers properly don PFDs, take control of the situation, and direct passengers as appropriate?

Notes:

Task 14: Man Overboard Drill (Continued)

Step	Y	N	Action
14.10	<input type="checkbox"/>	<input type="checkbox"/>	Did crewmembers communicate effectively with Master, other crewmembers, and passengers?
14.11	<input type="checkbox"/>	<input type="checkbox"/>	When alongside, did the crew members have a plan for retrieving the victim? <input type="checkbox"/> Y <input type="checkbox"/> N Did they use a boat hook or fish gaff to retrieve the victim? <input type="checkbox"/> Y <input type="checkbox"/> N Did they use a ring life buoy or other safe lifesaving device to reign in the victim?
14.12	<input type="checkbox"/>	<input type="checkbox"/>	When the victim was recovered, did the crew complete basic first aid that included the ABCs?
14.13	<input type="checkbox"/>	<input type="checkbox"/>	Did the drill follow the training and operations manual, or emergency instructions?
14.14	<input type="checkbox"/>	<input type="checkbox"/>	Was the drill satisfactory?

Notes:

Task 15: Plan Review for Modifications

Step	Action	Ref
15.1	<input type="checkbox"/> Verify that vessel's construction/equipment remains unchanged. <ul style="list-style-type: none">• Wind profile• Stability characteristics• Engines• Ballast has not been added/deleted/moved• Tankage capacity has not increased/decreased/moved	46 CFR 178.320 (d)
15.2	<input type="checkbox"/> Verify that vessel meets subdivision requirements (if applicable). <ul style="list-style-type: none">• Watertight bulkheads have not been moved or removed• No unauthorized openings have been placed in watertight bulkheads	46 CFR 179.210
15.3	<input type="checkbox"/> Verify that the Small Boat Program (SBP) has approved all repairs and/or alterations that affect the safety of the vessel. <ul style="list-style-type: none">• Replacement, repair, or refastening of deck or hull planking, plating, and structural members• Repair of plate or frame cracks• Damage repair or replacement, other than replacement in kind, of electrical wiring, fuel lines, tanks, boilers and other pressure vessels, and steering, propulsion, and power supply systems• Alterations affecting stability• Repair or alteration of lifesaving, fire detecting, or fire extinguishing equipment	SBSPM Section14

Notes:

Task 15: Plan Review for Modifications (Continued)

Step	Action	Ref
15.4	<input type="checkbox"/> Determine if any of the following have been installed or replaced onboard a vessel.	SBSPM Section 9

If item is...	Then conduct...
launching appliance; survival craft; rescue boat; fixed gas fire extinguishing system; machinery; fuel tank; or pressure vessel.	Examination of VOM to ensure vessel personnel capacity is accurate and any emergency instructions are still accurate for the newly installed equipment. Evaluate stability against requirements in SBSPM

Notes:

Task 16: Drydock and Ground Tackle

Step	Action	Ref
16.2	<input type="checkbox"/> Inspect external structural members. <input type="checkbox"/> Shell <input type="checkbox"/> Keel and bilge keel <input type="checkbox"/> High stress locations <input type="checkbox"/> Caulking <input type="checkbox"/> Welds	46 CFR 176.610 Aluminum NVIC 11-80 FRP NVIC 8-87 Steel NVIC 7-68
16.3	<input type="checkbox"/> Inspect running gear. <input type="checkbox"/> Rudders <input type="checkbox"/> Propellers <input type="checkbox"/> Tailshaft(s)	46 CFR 176.610
16.4	<input type="checkbox"/> Inspect fastenings. <input type="checkbox"/> Hull fastenings <input type="checkbox"/> Keel bolts <input type="checkbox"/> Attachments/appendages	46 CFR 176.610
16.5	<input type="checkbox"/> Examine Hull Markings. <input type="checkbox"/> Draft marks (>65 feet or SOLAS) <input type="checkbox"/> Load marks (>65 feet or SOLAS) <input type="checkbox"/> Load line (vsl>79 feet) <input type="checkbox"/> Name/ hailing port/ state number	46 CFR 185.602

Notes:

Task 16: Drydock and Ground Tackle (Continued)

Step	Action	Ref
16.6	<input type="checkbox"/> Airports below weatherdecks <input type="checkbox"/> Dogs or other securing appliance <input type="checkbox"/> Rims or seats <input type="checkbox"/> Glass <input type="checkbox"/> Dead covers <input type="checkbox"/> Hinges and lugs	46 CFR 179.350
16.7	<input type="checkbox"/> Self-bailers and cockpit freeing ports <input type="checkbox"/> Check valves <input type="checkbox"/> Required area	46 CFR 178.420
16.8	<input type="checkbox"/> Compartment or inner bottom drains (drydocking drains) <input type="checkbox"/> Secure plugs	
16.9	<input type="checkbox"/> Inspect thru-hull fittings. <input type="checkbox"/> Sea chests <input type="checkbox"/> Sea valves (must be fitted on all fittings within 6 inches of deepest load waterlight) <input type="checkbox"/> Keel/grid coolers <input type="checkbox"/> Bow/stern thrusters <input type="checkbox"/> Transducers <input type="checkbox"/> Shaft packings <input type="checkbox"/> Rudder packings	46 CFR 171.119 46 CFR 176.610 46 CFR 176.630

Notes:

Task 16: Drydock and Ground Tackle (Continued)

Step	Action	Ref
16.10	<input type="checkbox"/> Inspect internal structural members. <ul style="list-style-type: none"><input type="checkbox"/> Frames<input type="checkbox"/> Floors<input type="checkbox"/> Shelves, brackets, clamps<input type="checkbox"/> Bulkheads<input type="checkbox"/> Tank tops	46 CFR 176.610 FRP NVIC 8-87 Steel NVIC 7-68
16.11	<input type="checkbox"/> Inspect for watertight integrity. <ul style="list-style-type: none"><input type="checkbox"/> Hull openings and closures<input type="checkbox"/> Deck openings and closures<input type="checkbox"/> Watertight doors<input type="checkbox"/> Watertight subdivisions/bulkheads	46 CFR 176.802 46 CFR 176.124
16.12	<input type="checkbox"/> Inspect for stability. <ul style="list-style-type: none"><input type="checkbox"/> Drainage<input type="checkbox"/> Major changes/modifications<input type="checkbox"/> Solid fixed ballast	46 CFR 171 (H)
16.13	<input type="checkbox"/> Inspect ground tackle. <ul style="list-style-type: none"><input type="checkbox"/> Anchor<input type="checkbox"/> Cable	46 CFR 184.300 46 CFR 184.10

Notes:

Conversions:

STEEL PLATE			
Fractions	Decimal	MM Standard Plate	Wastage Standard / MM @ 25
1/8	.125	3.175mm	.0938 / 2.381
¼	.250	6.35mm	.1875 / 4.7625
3/8	.375	9.52mm	.2812 / 7.14
½	.500	12.70mm	.3750 / 9.525
5/8	.625	15.78mm	.4688 / 11.906
¾	.750	19.05mm	.5625 / 14.287
7/8	.875	22.22mm	.6566 / 16.66
1	1.00	25.40mm	.7500 / 19.05

ALUMINUM PLATE			
Decimal	MM Standard Plate	Wastage MM @ 25	Aluminum Wastage Allowances, Conventional Vessels Under 90 M (295 Feet) built to ABS Class
.1969	5mm	3.75mm	Main Deck Plating 15%
.2362	6mm	4.50mm	Bottom Plating 15%
.2756	7mm	5.25mm	Keel Plating 15%
.3150	8mm	6.00mm	Sheer Strake 15%
.3543	9mm	6.75mm	Bilge Strake 15%
.3937	10mm	7.50mm	Side Shell Plating 20%
.4331	11mm	8.25mm	Forecastle 20%
.4724	12mm	9.00mm	Internals and Bulkheads 20%
.5118	13mm	9.75mm	
.5519	14mm	10.50mm	

Conversions:

Distance and Energy				
Kilowatts (kW)	X	1,341	=	Horsepower (hp)
Feet (ft)	X	3.281	=	Meters (m)
Long Ton (LT)	X	.98421	=	Metric Ton (t)
Liquid (NOTE: Values are approximate.)				
Liquid	bbl/LT	m ³ /t	bbl/m ³	bbl/t
Freshwater	6.40	1.00	6.29	6.29
Saltwater	6.24	.975	6.13	5.98
Heave Oil	6.77	1.06	6.66	7.06
DFM	6.60	1.19	7.48	8.91
Lube Oil	7.66	1.20	7.54	9.05
Weight				
1 Long Ton	= 2240 lb		1 Metric Ton	= 2204 lb
1 Short Ton	= 2000 lb		1 Cubic Foot	= 7.48 gal
1 Barrel (oil)	= 5.61 ft = 42 gal		1 psi	=.06895 Bar =
	= 6.29			2.3106 ft of water
Temperature: Fahrenheit = Celsius (F= 9/5 C+32 and C=5/9 (F-32))				
0	=	-17.8	80	= 26.7
32	=	0	90	= 32.2
40	=	4.4	100	= 37.8
50	=	10.0	110	= 43.3
60	=	15.6	120	= 48.9
70	=	21.1	150	= 65.6
200	=	93.3	250	= 121.1
300	=	148.9	400	= 204.4
500	=	260	1000	= 537.8
Pressure:				
1 Bar	=	14.5 psi	5 Bars	= 72.5 psi
2 Bars	=	29.0 psi	6 Bars	= 87.0 psi
3 Bars	=	43.5 psi	7 Bars	= 101.5 psi
4 Bars	=	58.0 psi	8 Bars	= 116.0 psi
9 Bars	=	130.5 psi	10 Bars	= 145.0 psi