MSU TOLEDO
SMALL PASSENGER VESSEL GUIDE

SECTION 1

INTRODUCTION

About the Coast Guard Marine Safety Office

Introduction

Coast Guard Marine Safety Office Toledo is located in the Ohio building.

Our address is:

U.S. Coast Guard Marine Safety Office Toledo
420 Madison Ave. Suite 700
Toledo Ohio 43604-1209

Web Site: http://www.uscg.mil/d9/msuToledo

Calling our office:

Vessel Inspections/	(419) 418-6036
Investigations	(419) 418-6032

After Hours Emergencies:

Command Duty Officer	(419) 392-0324
Duty Petty Officer	(419) 392-0316
Sending us a fax:	(419) 259-6374

About the Office

The Marine Safety Office (MSU) is under the command of the Commanding Officer. The Commanding Officer is both the *Officer in Charge, Marine Inspection (OCMI)* and *Captain of the Port (COTP).*

The office is divided into five divisions

- Inspections *Department*- Responsible for the inspection of all U.S. vessels that operate in, or enter our zone. This includes but is not limited to passenger vessels, freight vessels, barges, and ferries.

- *Investigations Department*- Responsible for conducting investigations of marine casualties in the Toledo zone.

- *Regional Exam Center*-Responsible for issuing licenses and documents to merchant mariners.

- *Port Operations Department* - Responsible for the port security, inspection of port facilities, and responses to pollution of the marine environment.

- *Planning and Support Division* - Responsible for administrative support and contingency planning.

Introduction to this Guide

Introduction

This guide applies to vessels less than 100 gross tons, carrying more than 6 passengers and at least one of which who is a passenger for hire.

Although extensive, this guide is not meant to be all-inclusive or to replace the regulations regarding passenger-carrying vessels. It is designed to provide an introduction to the regulations.

Getting a Copy of the Regulations

If you do decide to have your passenger vessel Coast Guard certificated, we strongly recommend that you obtain a copy of applicable regulations.

To remain fully up to date, navigate the government's internet web site at: www.access.gpo.gov/nara/cfr/cfr-table-search.html

Printed copies can be obtained from the government printing office (202) 512-1800. They accept Visa or MasterCard. Ask for 46 CFR Parts 166 to 199 if your vessel carries 150 or less passengers and Parts 90 to 139 if your vessel carries more than 150 passengers. You can order online at www.access.gpo.gov/

Introduction to this Guide *(Continued)*

Using This Guide

This guide is divided into sections 1 thru 10, which relate to specific topics covered by the regulations.

Throughout this guide you will find regulatory cites used as references. Those marked with ***(T)*** as a suffix apply to vessels, which carry 150 passengers or less, or have overnight accommodations for 49 or less passengers. Regulatory cites marked with ***(K)*** as a suffix are applicable to vessels, which carry more than 150 passenger or have overnight accommodations for more than 49 passengers. These references are general in scope and may lead you to other applicable regulations.

Within each section there are numbered pages that correspond with each subtopic (e.g., 1-1, 2-1, etc.) we hope this makes your search easier.

With this section numbering in mind, we recommend that you use the Index to quickly guide you to your topics of interest.

Summary

We hope this package will help answer questions you have about passenger carrying vessels. If you have additional questions contact our office. **Remember this is only a guide and is not all-inclusive or meant to replace the regulations regarding passenger carrying.**

Introduction to the Certification of Small Passenger Vessels

Introduction

The Vessel Inspections Department at Marine Safety Office Toledo has the responsibility for inspecting all passenger vessels that operate in the Toledo OCMI zone. The zone extends North to the Detroit River Light, South West to the Maumee River, including navigable water and their tributaries to I-75, Rout 2, and East to Vermilion Ohio.

Federal Regulations

Title 46 of the Code of Federal Regulations, Subchapter K, Parts 114 to 122 and Subchapter T, Parts 175 to 187, govern the inspection and operation of small passenger vessels. These regulations will be used to inspect your vessel.

Passenger for Hire

Passenger for hire means a passenger for whom consideration (payment of a fee, act or promise) is contributed as a condition of carriage on the vessel, whether directly or indirectly flowing to the owner, charterer, operator, agent, or any other persons having an interest in the vessel.

Uninspected Passenger Vessel

A passenger vessel less than 100 gross tons, that carries 6 or less passengers is <u>not</u> required to be inspected by the U. S. Coast Guard. These vessels are sometimes referred to as "6-pack vessels", and are required to be operated in accordance with *46 CFR Parts 24-28, commonly referred to as Subchapter "C"*.

The person in charge of an uninspected 6-pack vessel must hold, as a minimum, a valid U.S. Coast Guard license as operator of an uninspected passenger vessel.

Appeals

Introduction

It is your right as the owner or operator of your vessel to appeal any decision or a requirement issued by a Marine Inspector.

Procedure

Your first step in the appeal process is to write a letter to the OCMI explaining why you disagree with the requirement(s) written by the Marine Inspector. This letter should be submitted to MSU Toledo in accordance with 46 CFR Part 1.03-20.

If the OCMI denies your request and you are still not satisfied, you have the right to continue your appeal "up the chain of command" in the order as follows:

You may next appeal to the 9th Coast Guard District, Marine Safety Division, Cleveland, OH, in accordance with 46 CFR 1.03-25.

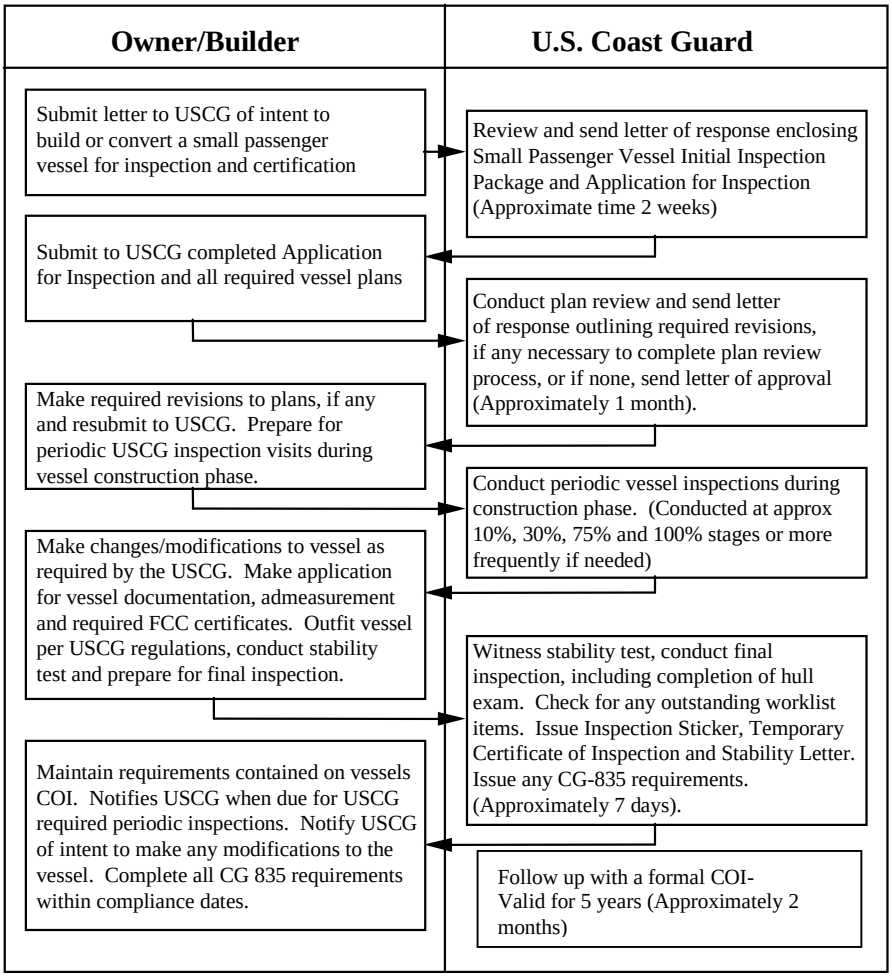
Finally, you have the right to appeal to the Commandant of the Coast Guard, Washington, D.C., in accordance with 46 CFR 1.03-15.

Certification Process

Introduction

The process of certificating a vessel takes approximately 6 months. The time can vary considerably but ultimately depends on the quality and quantity of the information submitted in the plans, whether the vessel is a new construction project or a conversion, and how prepared the vessel is for inspection.

The flow chart illustrated below lists all the steps for new build certification.



Inspection Requirements once your Vessel is Certificated

Inspection Intervals

Your vessel is issued a Certificate of Inspection (COI) valid for a period of 5 years. You must submit your written application for renewal of the Certificate of Inspection at least 30 days prior to the expiration date.

On the annual anniversaries of your vessel's COI issuance date, your vessel must be **reinspected**. This is done to ensure your vessel is being maintained in accordance with the regulations. The annual inspection must be conducted within 90 days **before or after** the COI anniversary date for the certificate to remain valid. You must contact the cognizant OCMI to schedule an annual inspection at a time and place, which he or she approves. No application is required to schedule an annual inspection.

In general, the annual inspection will consist of a visit to your vessel by a Coast Guard marine inspector who will examine the internal and external condition of your vessel's hull, assess the status of your vessel's documentation, lifesaving, firefighting, navigation, and machinery equipment. Your vessel most likely will be required to get underway to conduct drills and to examine the vessel under normal operating conditions.

Deficiencies (CG-835's)

Any equipment, machinery or structural items found by the inspector to be deficient will be required to be corrected within a defined period of time.

The inspector will provide you with a list of items found deficient and needing correction. These items are listed on a Coast Guard Form CG-835.

The Marine Inspector may allow your vessel to continue to operate provided the deficiencies are corrected prior to the 835's established deadline date. Some items, such as those involving lifesaving or firefighting equipment, may be required to be fixed prior to your vessel carrying passengers.

Drydocking and Internal Structural Exam Inspection Requirements once Your Vessel is Certificated

Drydocking Intervals

All vessels are required to drydock at intervals as follows:

2 Years – Vessels that are exposed to salt water more than 3 months in any 12-month period.

5 Years – Vessels that are exposed to salt water not more than 3 months in any 12-month period. *(most vessels in this zone)*

Whenever damage or deterioration to hull plating or structural members that may affect the seaworthiness of a vessel is discovered or suspected, the cognizant OCMI may conduct an internal structural examination in any affected space including fuel tanks, and may require the vessel to be drydocked or taken out of service to assess the extent of the damage, and to effect permanent repairs. The OCMI may also decrease the drydock examination intervals to monitor the vessel's structural condition.

Note: The Inspections Department must be notified before your vessel is ever drydocked (for any reason)

Drydocking and Internal Structural Exam Inspection Requirements once Your Vessel is Certificated (Continued)

Drydocking or Hauling Out

You must accomplish the following steps prior to the arrival of the Coast Guard marine inspector:

- Clean the hull ***(do not paint the vessel prior to the inspector's arrival)***
- Remove all sea strainers all sea valves (within 6" of the waterline and below). The inspector will need to examine valve surfaces and valve seats
- Open and ventilate all internal spaces for 12 hrs.
- Clean all water and oily water from the bilges.
- Remove all deck plates needed to gain complete access to the interior hull plating and framing.

The marine inspector will inspect all items as listed before and inspect the vessel's shaft(s), shaft bearing(s), propeller(s) and rudder(s). If necessary, the inspector may require that the propeller(s) or shaft(s) be pulled for inspection, and based on the condition of the hull, may require gauging to further determine its condition.

Note: Water lubricated shaft bearings and rudder bushings shall be renewed if any water groove is found to be worn down to half or more of its original depth.

Scheduling an Inspection

Application for Inspection

You must schedule an COI inspection by either filling out and submitting an application for inspection form (CG-3752) or contacting the Inspections Department directly at (419) 418-6036.

It is important to note that it is your responsibility to schedule a time and date to have a marine inspector visit your vessel. You will need to contact the Inspections Department to schedule inspections for COIs, Annual inspections, Drydock exams, and any return visits.

We recommend that you contact the Inspections Department several weeks in advance to schedule an inspection. This allows the staff time to make arrangements, and to ensure an inspector will be available at your requested time.

Preparing your Vessel for Inspection

Prior to inspection, we encourage you to prepare by using the 840 book or pre-inspection checklist that was developed as a supplement to this guide. Although not all inclusive, it will provide you with an overview of the items the inspectors may check. It will also help expedite the inspection process.

Length of Inspections

The length of time it takes to complete an inspection varies from vessel to vessel. Having the vessel prepared prior to the marine inspector's arrival helps streamline the process. On average, a COI will take 2 to 3 hours, while a annual inspection may only take 1 to 2 hours. A Drydock inspection should take approximately 2 to 3 hours depending on your vessel's age and size. At all inspections, except for drydocking you should anticipate getting your vessel underway with a complete crew to conduct drills.

Vessel Routes

Introduction	The Certificate of Inspection specifies the route the vessel will be allowed to operate on while carrying passengers. Depending on the vessel's route, different construction and equipment requirements may apply.
Oceans	A route which is more than 20 nautical miles from shore.
Coastwise	A route which is not more than 20 miles from shore.
Limited Coastwise	A route which is not more than 20 miles from a harbor of safe refuge.
Great Lakes	Means both the waters of the Great Lakes and the St. Lawrence River as far east as a straight line drawn from Cap de Rosiers to West Point, Anticosti Island, and west of a line along the 63rd meridian from Anticosti Island to the north shore of the St. Lawrence River.
Lakes, Bays and Sounds	A route which is inshore of the boundary line on any lakes, bays or sounds.
Rivers	A route on the following waters: a river, a canal or such other similar waters designated by the Coast Guard District Commander.
Note	The regulations refer to the following descriptions of waters: **Exposed Waters**- These normally include vessel on an Oceans, Coastwise, and Great Lakes route beyond 20 miles from a harbor of safe refuge. **Partially Protected Waters**- Includes vessels operating on Great Lakes within 20 miles of a harbor of safe refuge and Lakes, Bays and Sounds. **Protected Waters**- Includes vessels on lakes, harbors, and rivers that are not partially protected or exposed.

Required Manning

Introduction

The Inspections Department evaluates each vessel and determines a safe manning level.

The vessel must have the required number of crewmembers on board while carrying passengers.

Master

All vessels are required to have a licensed master qualified for the type and tonnage of the vessel being operated.

Licensed Mate

A licensed mate is normally only required on a vessel engaged in voyages exceeding 12 hours in duration.

Senior Deckhand

In lieu of a required licensed mate, one of the required crewmembers may be designated as a senior deckhand providing they have been trained in accordance with NVIC 1-91. In addition, each master of the vessel must designate The Senior Deckhand in writing. The senior deckhand must be familiar with the operation of the vessel and be capable of operating the vessel in the event of an emergency.

You may obtain a copy of NVIC-1-91 from the Marine Safety Centers Web site.

Deckhand/ Crewman

A deckhand is an unlicensed member of the vessels crew.

Every deckhand on a small passenger vessel should be at least 16 years of age, should be qualified as to sight, hearing, and physical condition to perform the deckhand's duties and should be physically able to perform all duties associated with the protection and evacuation of passengers during emergency situations.

NVIC 1-91 establishes the minimum competencies for a deckhand.

Required Manning *(Continued)*

Manning

The following is provided as a reference.

Most "T" boats are required to have as a minimum 1 deckhand/ crewmember in addition to the Master. In addition a crewmember is normally required for each deck that is available to passengers.

The vessel will also be required to increase manning based on the amount of passengers the vessel is carrying. "T-Boats" are usually not required any additional manning.

The below table shows that additional manning is required of vessels regulated by Subchapter K, since they can carry more than 150 passengers.

Passengers on board	Not more than 12 hours operation	More than 12 hours operation
0-149	0	0
150-299	1	2
300-499	2	4
500-799	3	6
800 & Up	4	8

Determining Maximum Passengers – *46 CFR 176.113 & 177.820(T) and 46 CFR 115.112 & 115.113(K)*

Introduction

The maximum number of passengers permitted is determined by using one of the following criteria.

- Length of rail
- Deck area
- Fixed Seating

The method that provides for the greatest number of passengers may be used.

It is important to note that the maximum passengers may be further limited by stability considerations.

Calculating

Different passenger capacity criteria may be used on each deck of a vessel and added together to determine the total passenger capacity of the vessel.

Where seats are provided on a part of a deck and not on another, the number of passengers permitted may be the sum of the number permitted by the seating criterion for the space having seats and the number permitted by the deck area criterion for the space having no seats.

The length of rail criteria may not be combined with either the deck criteria or the fixed seating criteria when determining the maximum passengers permitted on an individual deck.

Length of Rail Criteria

One passenger is allowed for each 30 inches of rail.

Rail space in congested areas, on stairways, or in a location that would block the vision of operator of the vessel cannot be included.

Determining Maximum Passengers *(Continued)*

Deck Area Criteria

One passenger is allowed for each 10 square feet available for passenger use.

Areas occupied by the following shall be excluded:

- Concession stands
- Toilet and washrooms
- Companionways, stairway, etc.
- Spaces occupied by and necessary for handling Lifesaving equipment
- Spaces below deck not suitable for or not normally used by passengers
- Interior passage ways less than 30 inches wide and Passage ways on the open deck less than 18 inches Wide.

Fixed Seating

One person per 18 inches of seat width.

Each sleeping berth or rack in overnight accommodation spaces shall be counted as only one seat.

Fixed Seating Installations

Seating installations for passengers are required only when the number of passengers was determined by using the fixed seating criteria. All fixed seating must be secured to the deck, bulkhead, or bulwark.

Seating must be arranged to allow for ready escape in case of fire or other casualty.

Aisles not over 15 feet long shall be 24 inches wide. Aisles over 15 feet long shall be 30 inches wide.

If seats are in rows the distance from seat front to seat back shall be not less than 30 inches.

SECTION 2

PLAN SUBMITTAL

Submitting Plans - *46 CFR 177.202(T) and 46 CFR 116.202(K)*

Vessel Under Construction

The owner of a vessel requesting initial inspection for certification shall prior to the start of construction unless otherwise allowed, submit along with an application for inspection, at least 3 copies of the following plans to the Marine Safety Center at the address on the bottom of pg.3:

- Outboard profile
- Inboard profile
- Arrangement of decks

In addition, prior to receiving a Certification of Inspection the owner must submit the following as applicable:

- Midship section.
- Survival craft embarkation stations.
- Machinery installation, *including but not limited to:*
  - Propulsion and propulsion control, including shaft details
  - Steering and steering control, including rudder details
  - Ventilation diagrams
  - Engine exhaust diagrams
- Electrical installation, *including but not limited to:*
  - Elementary one line diagram of the power system
  - Cable lists
  - Bill or materials
  - Type and size of generators and prime movers
  - Type and size of generator cables, bus tie cables, feeders, and branch circuit cable
  - Power, lighting, and interior communication panel boards with number of circuits and rating of energy consuming devices
  - Type of capacity of storage batteries
  - Rating of circuit breakers and switches, interrupting capacity of circuit breakers, and rating and setting of over current devices
  - Electric plant load analysis
- Lifesaving equipment locations and installation

Submitting Plans *(Continued)*

Vessel Under Construction *(Continued)*

- Fire protection equipment installation, *including but not limited to:*
  - Fire main system plans and calculations
  - Fixed gas fire extinguishing system plans and calculations
  - Fire detecting systems and smoke detecting system plans
  - Sprinkler system diagram and calculations
  - Portable fire extinguisher types, sizes and locations
- Fuel tanks
- Piping systems including: bilge, ballast, hydraulic, sanitary, compressed air, combustible and flammable liquids, vents, sounding, and overflows
- Hull penetrations
- Marine sanitation device model number, approval number, connecting wiring and piping

.

For sailing vessels

- Masts, including integration into the ship's structure
- Rigging plan showing sail areas and centers of effort as well as the arrangement, dimensions, and connections of the standing rigging.

Vessels Less Than 65 Feet

For vessels less than 65 feet the owner may submit specifications, sketches, photographs, line drawings or written descriptions instead of any of the required drawings, provided the required information is adequately detailed and acceptable to the OCMI.

Plan Approval

If your vessel is greater than 65 feet in length or depending on the complexity of the vessel, you may be required to forward your plans to the Marine Safety Center for approval. In this instance you must provide them with 3 copies of all required drawings.

Their address is: *U.S. Coast Guard Marine Safety Center*
400 Seventh St. S.W.
Washington, D.C. 20590-0001

Submitting Plans *(Continued)*

Vessels Already Constructed

For vessels constructed prior to approval of the plans and information as required above, in addition to the above plans, additional plans and information, manufacturers' certifications of construction, testing including reasonable destructive testing, and inspections may be required to verify that the vessel complies with minimum construction requirements.

Sister Vessels

Plans are not required for a vessel that is a sister to one that is already certified, provided:

- Plans for the original vessel are on file with the Marine Safety Center or our department vessel files.
- The owner of the plans authorizes their use.
- The regulations used for the original plan approval have not changed since the original approval.
- There are no major changes to the systems to be used.

General Requirements for Plans

Introduction

All plans submitted for approval should have the following information marked on them

- Vessel name
- Official number
- Route
- Scale: *i.e.* ___inches = ___feet
- Plan identification
- Builder/Shipyard
- Hull identification number

Helpful Ideas

- Use of graph paper is recommended
- Scaled drawings are preferred
- List dimensions, measurements, & specifications
- Photos if large enough & show sufficient detail may be submitted in addition to plans
- Abbreviations may be used if they are defined or explained and clear to the reviewing officer

Midship Section

Description

Midship Section and other Sections showing construction details:

(1) Amidship
(2) Bow at the collision bulkhead (*see page F-3*)
(3) Immediately forward of the deckhouse
(4) Transom

Where a vessel is to carry more than 49 passengers, the section views should also show the construction of the watertight bulkheads. Specify species of wood, grade of steel or aluminum, welding procedure and rod. All the dimensions are to be finished sizes.

Construction Details

Construction details are to show deck and hull plating or planking, and structural members including

- keel
- planking
- sheer clamps
- bilge stringers
- deck beams
- columns
- frames
- floors
- chine (if hard chine)
- engine beds
- fuel tank supports
- fuel tank installation

Fastenings

The means of fastenings to include

- type
- size
- material of fastening
- weld design

Midship Section *(Continued)*

Fiberglass Reinforced Plastic

The layup of the hull must be shown in detail, information including:

- Size, type and manufacturer of **woven roving**
- Size, type and manufacturer of **mat**
- Type and manufacture of **resin**
- Layup schedule
- Joint details
- Burnout test results
- Tensile test results

Fire retardant resins are recommended. If fire retardant resins are not used, additional requirements for fixed fire fighting systems and restrictions from overnight accommodations will be required.

Summary

Drawings must clearly show the necessary details of the vessel.

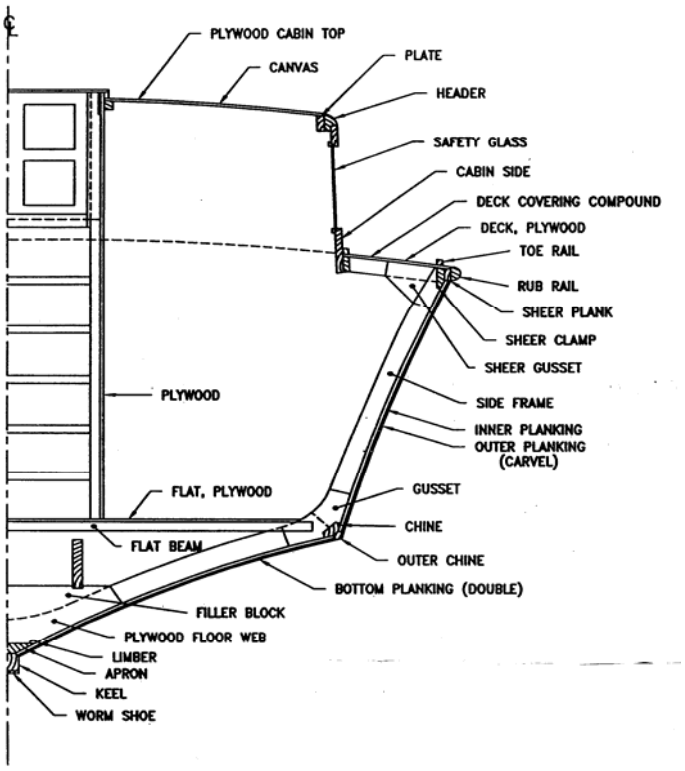
When plans are approved by the OCMI, one copy will be kept by the inspection office and the other will be returned to the submitter.

If plans submitted to the MSC are approved, one copy will be kept at the MSC, one copy forwarded to the OCMI, and one copy returned to the submitter.

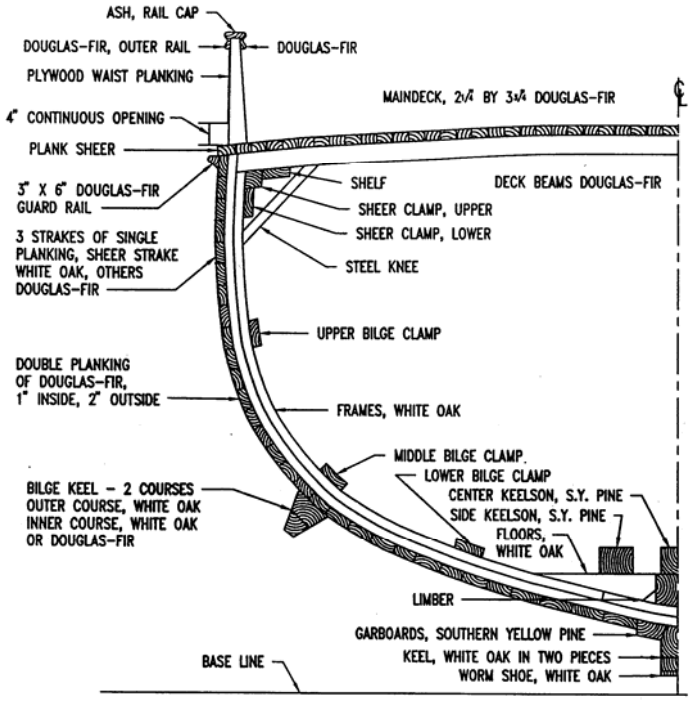
Plans returned for revision must be corrected in accordance with the comments provided in the MSC letter returned with the plans. Make all corrections required and provide explanations if requirements were not incorporated.

Plans too small, indecipherable, incomplete or overly sloppy will not be reviewed.

Midship Section *(Continued)*



Drawing should be to scale and should include the following: Fastenings, describe material specifying, monel, copper, etc. and size.



The midship section drawing should show the construction details at various locations on the vessel I.E. In the bow at the collision bulkhead, immediately forward of the deckhouse. If the vessel is to carry more than 49 passengers, the section views should also show the construction of required watertight bulkheads.

Outboard Profile

Information to be Included

The outboard profile must show the exterior view of the vessel as it appears or will appear when completed.

This view should show in solid outline the:

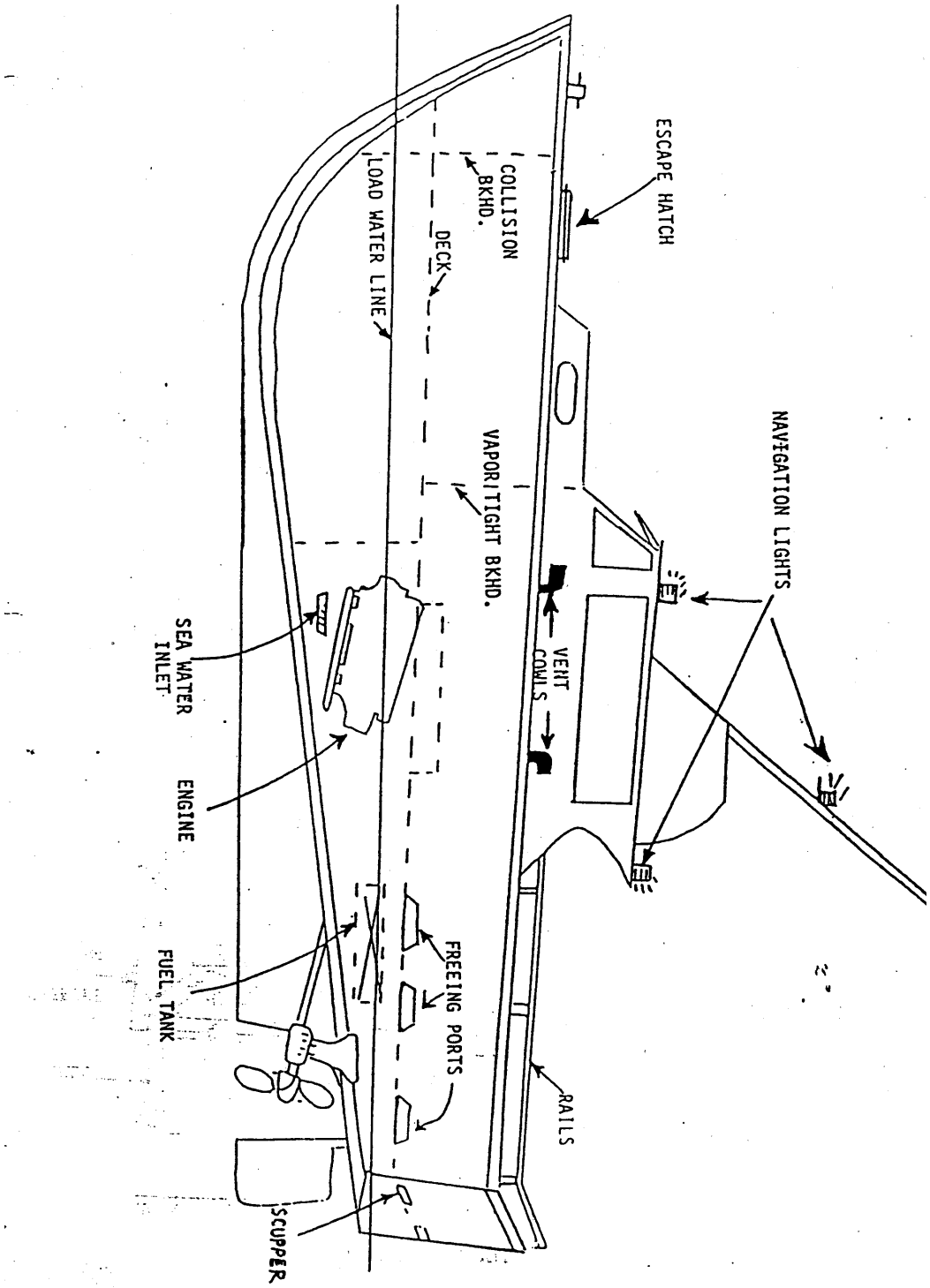
- Deckhouse
- Keel
- Rudders
- Propellers
- Shafts
- Struts
- Deck scuppers
- Freeing Ports
- Port lights
- Ventilation cowls
- Bulkheads
- Navigation lights
- Safety rails
- Estimated load waterline
- Openings into the hull and deckhouse

Dotted lines should show the outline of:

- Decks
- Bulkheads
- Engines
- Fuel tanks
- Watertight hatches
- Means of escape

Outboard Profile *(Continued)*

Example



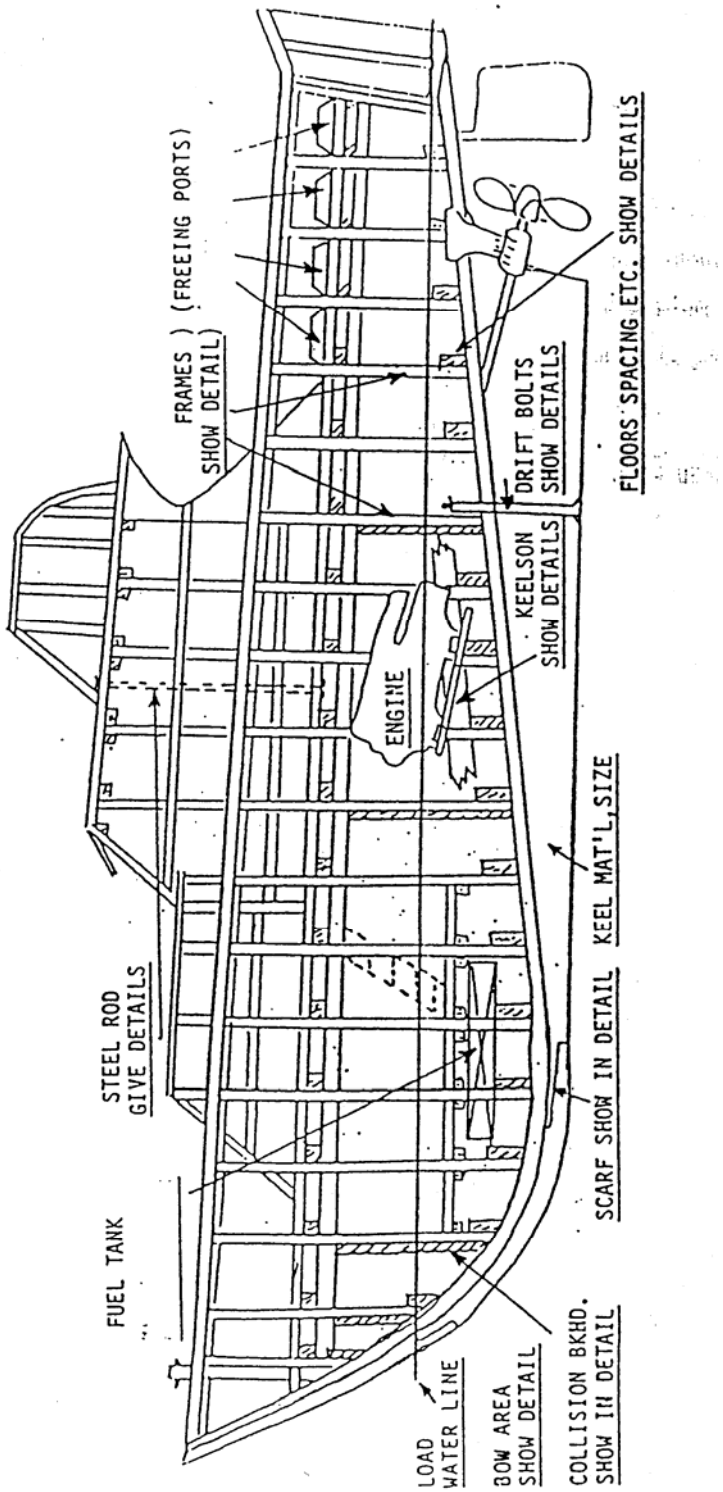
Inboard Profile

Information to be Included

The inboard profile plan must show those internal structural members as listed under the midship sections and in addition the type of material used in construction *(species, in the case of wood)*, location of decks, hatches, fuel tank, and engines.

Inboard Profile *(Continued)*

Example



Arrangement of Decks

Information to be Included

Plan view of various decks are to show the locations of :

- All watertight and non-tight bulkheads
- Arrangements of all compartments
- All permanent installed equipment
- All portable installed equipment

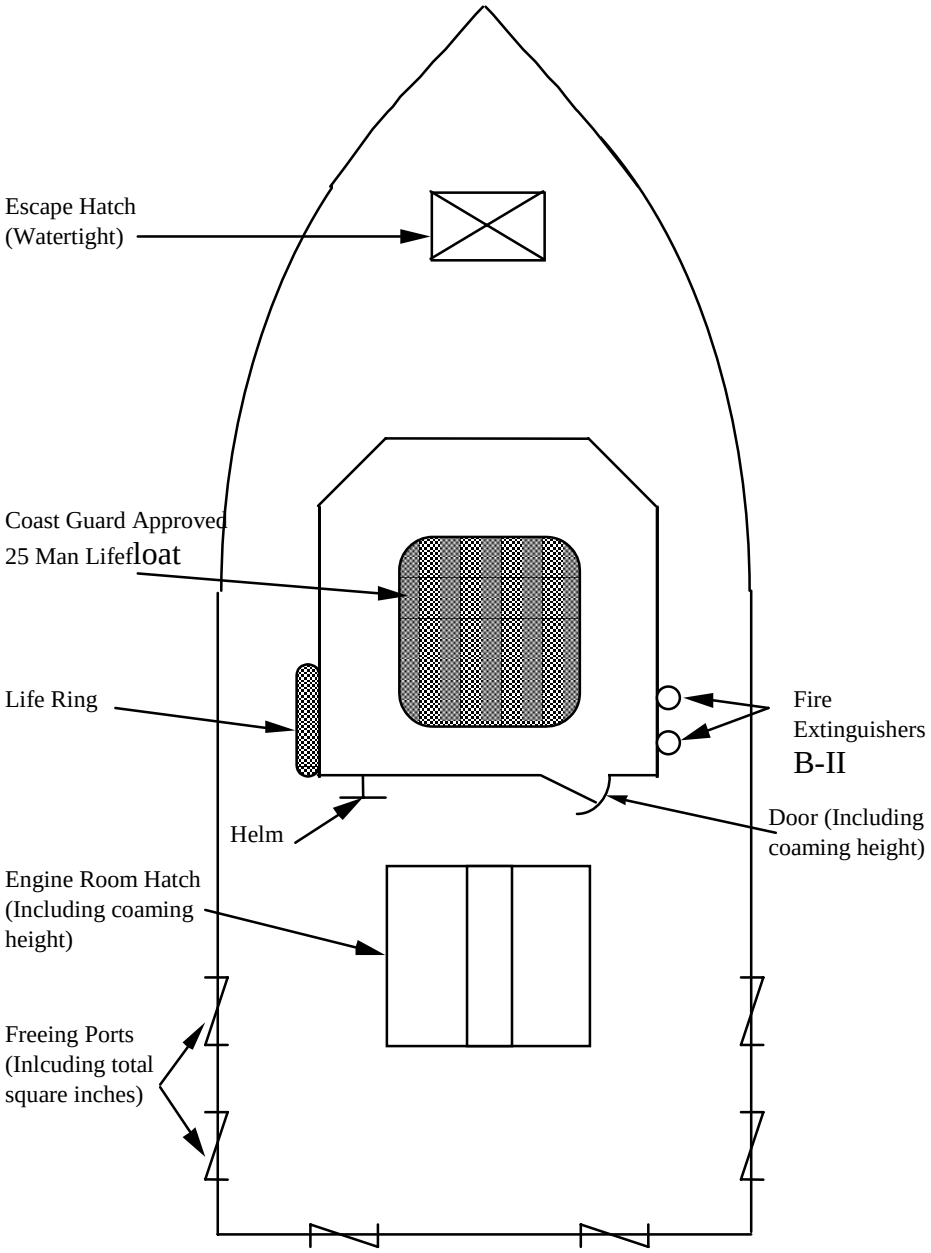
These will include:

- Toilet areas
- Pilothouse
- Hatches
- Doors
- Galley
- Accommodation spaces
- Ladders
- Windows
- Portable fire extinguishers
- Fixed fire extinguisher systems
- Primary life saving equipment
- Freeing ports

Provisions for ventilating all spaces including machinery and fuel tank spaces shall also be shown.

Arrangement of Decks *(Continued)*

Example



Machinery Installation

Information to be Included

Plans shall show in detail the installation of propulsion and auxiliary machinery including

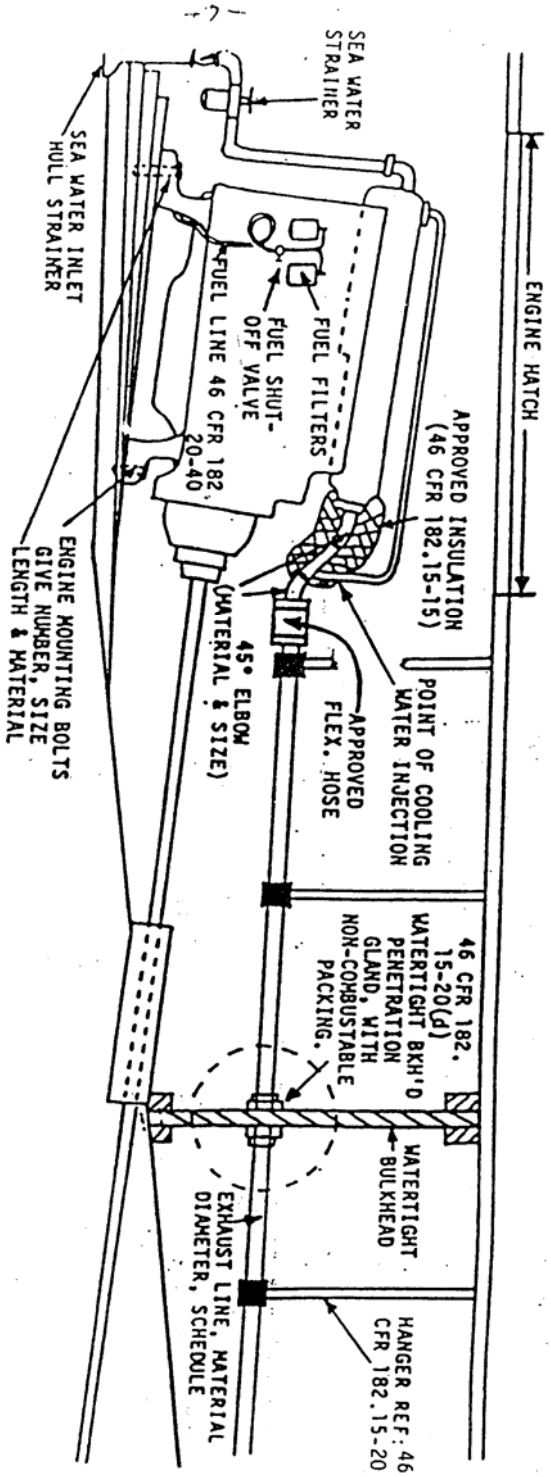
- Descriptions
- Ratings
- Locations

Of particular concern are

- Propulsion machinery
- Auxiliary generators
- Steering systems
- Pressure vessels
- Boilers
- Heating equipment
- Davits on cranes
- Machinery space ventilation

Machinery Installation *(Continued)*

Example



Electrical Installation *46 CFR 183(T) and 46 CFR 120(K)*

Information to be Included

The electrical system plan should be a schematic drawing which shows all the electrical installations.

All cables must be identified by

- Type
- Size
- Number of conductors
- Approximate length of run

The plan must show all system components to include

- Batteries
- Regulators
- Light fixtures
- Gauges
- Ground Systems
- Transformers
- Inverters
- Rectifiers
- Size of all loads
- Generators
- Disconnect switches
- Overload protection
- Distribution panels
- Cooking Equipment
- Emergency lighting
- Heating Equipment
- Shore Connections Independent motors

Name plate data and rating for each component must be included.

Load calculator must be submitted for each circuit.

Equipment installed in machinery spaces must be rated for service at an ambient temperature of 50 degrees C.

Voltage Requirements

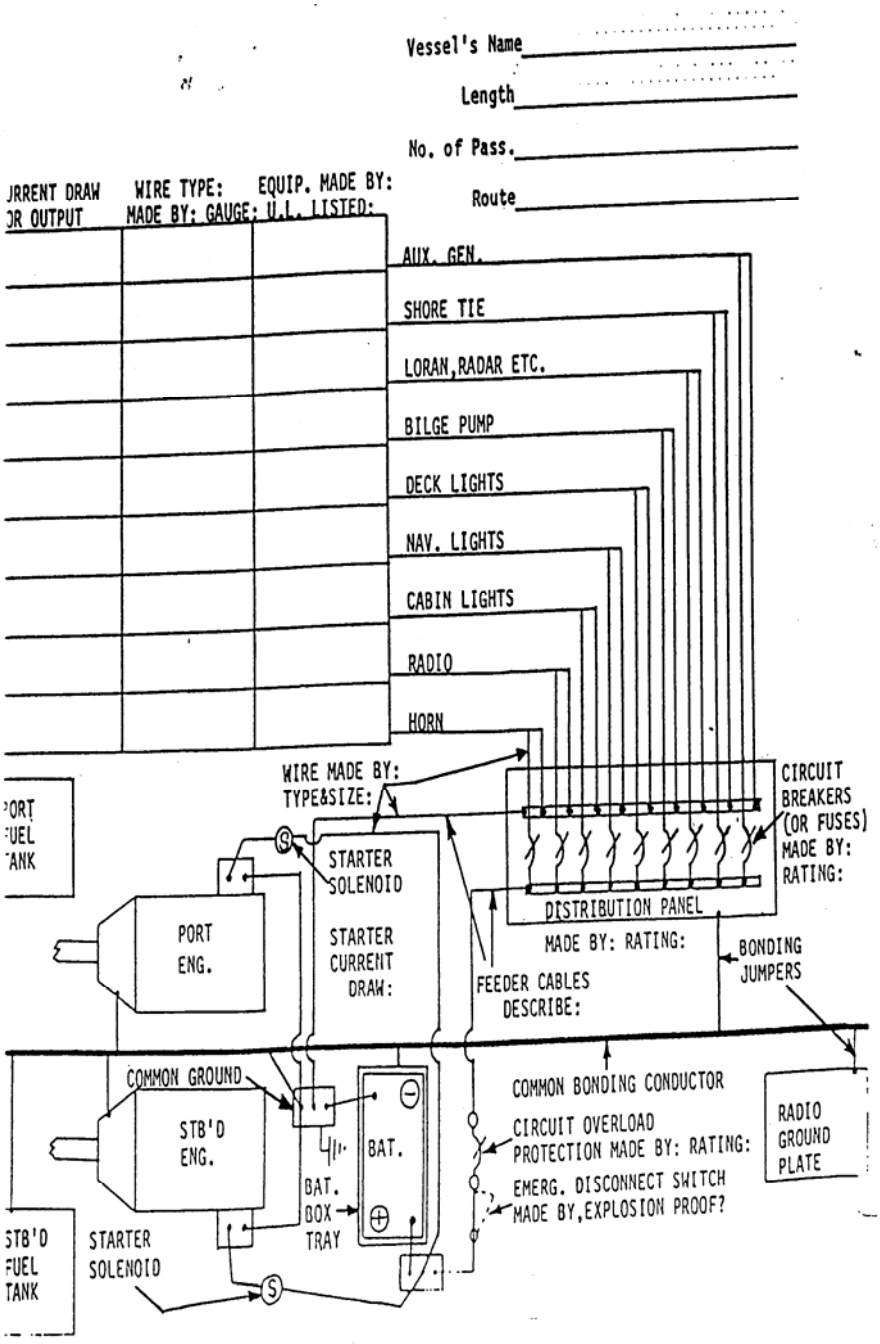
Regulations regarding electrical systems are divided into two different sets of requirements as listed below.

Systems operating at potentials:

- less than 50 volts - 33 CFR 183.430
- 50 volts. or more - 46 CFR 183.340

Electrical Installation *(Continued)*

Example



Fuel Tanks

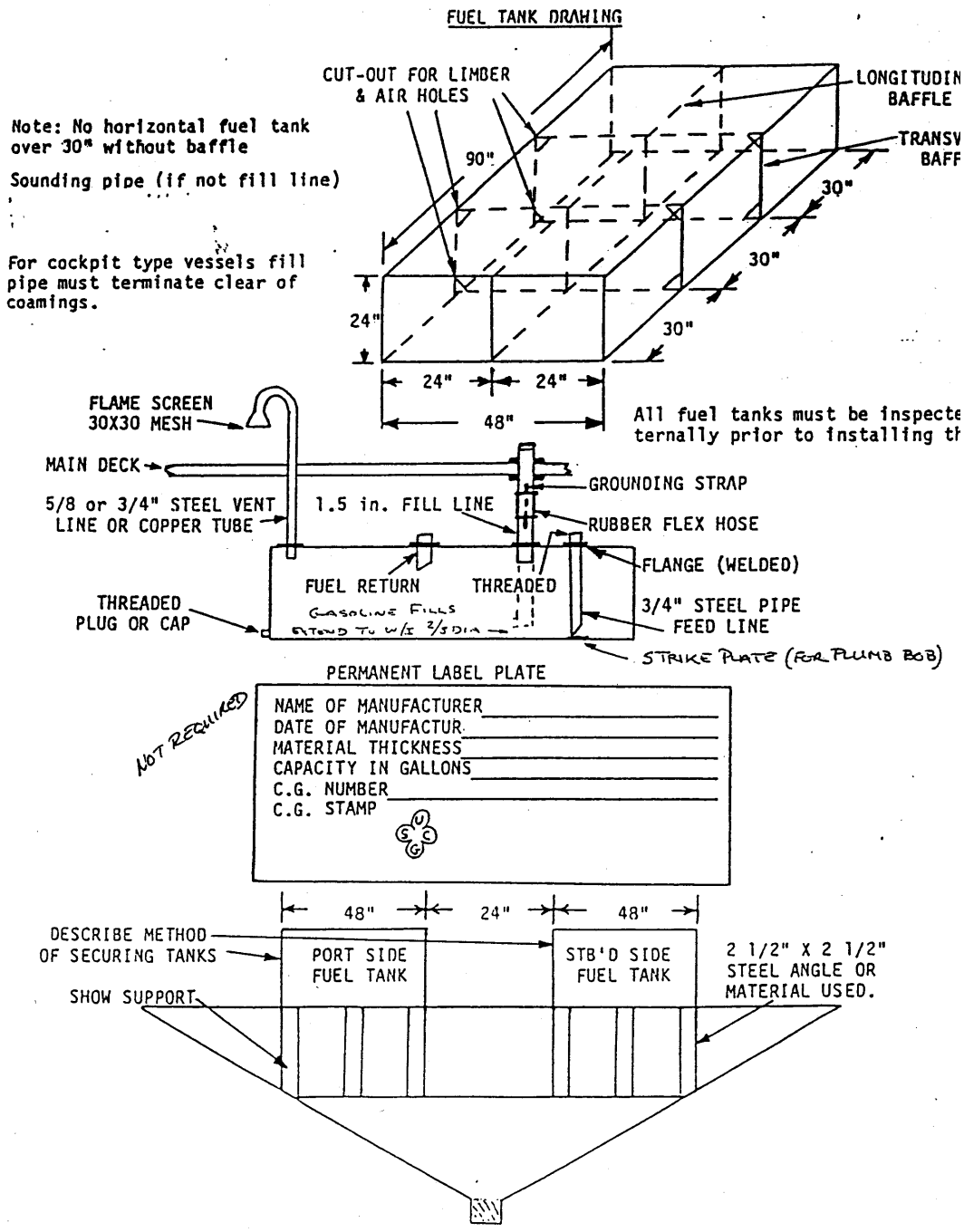
Information to be Included

Plans must show:

- Dimensions
- Capacity
- Thickness of material
- Type of material
- Method of assembly
- Location of baffles
- Connection of vent, fill and supply lines
- Means of securing tanks to prevent movement
- Means or type of coating material, if used. (Both internal and external)

Fuel Tanks *(Continued)*

Example



Piping Systems

Information to be Included

Plans must show all piping systems including:

- Engine cooling
- Ballast
- Fuel
- Drinking water
- Exhaust cooling
- Bilge
- Hydraulic
- Marine Sanitation Device* system

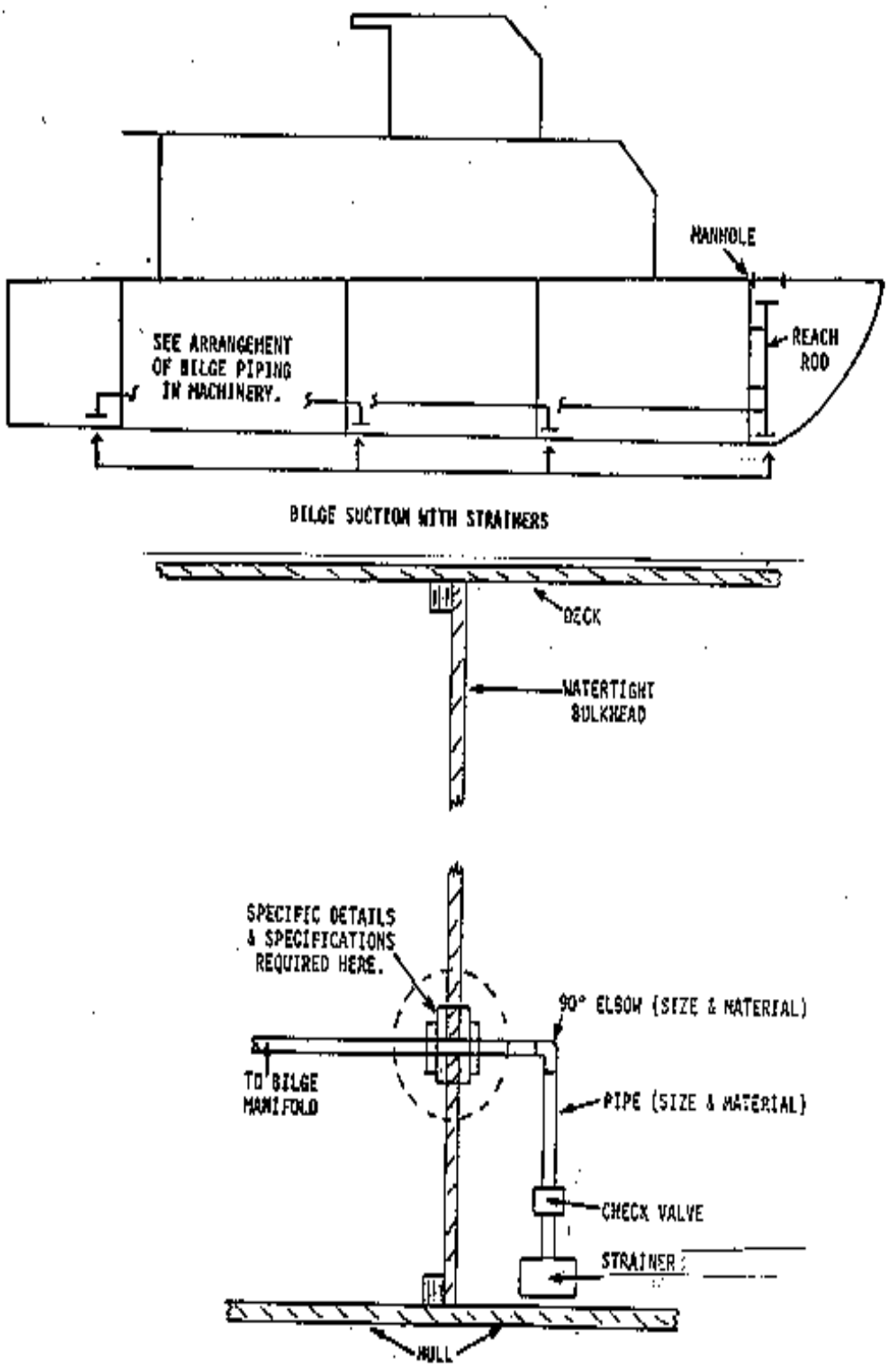
All component parts of each system are to be shown, including:

- Piping size
- Valves
- Filters
- Flexible fuel hose
- Piping material
- Pumps
- Strainers

The length of flexible fuel hose, model number and manufacture must be listed and must be Coast Guard approved. Flexible hose in excess of 30 inches is permitted as long as the hose meet SAE standard J-1942 and the end fittings meet SAE J-1475.

Piping Systems *(Continued)*

Example



Bulkhead and Deck Penetrations, and Shell Connections

Information to be Included

You must submit complete details of all piping and cable penetrations and all through-hull fittings.

Drawings must show

- Material specification for fittings
- Method of installation
- Location of valves
- Methods of sealing penetrations

Inclusion of these details on other plans instead of a separate plan is acceptable.

Skin Valves

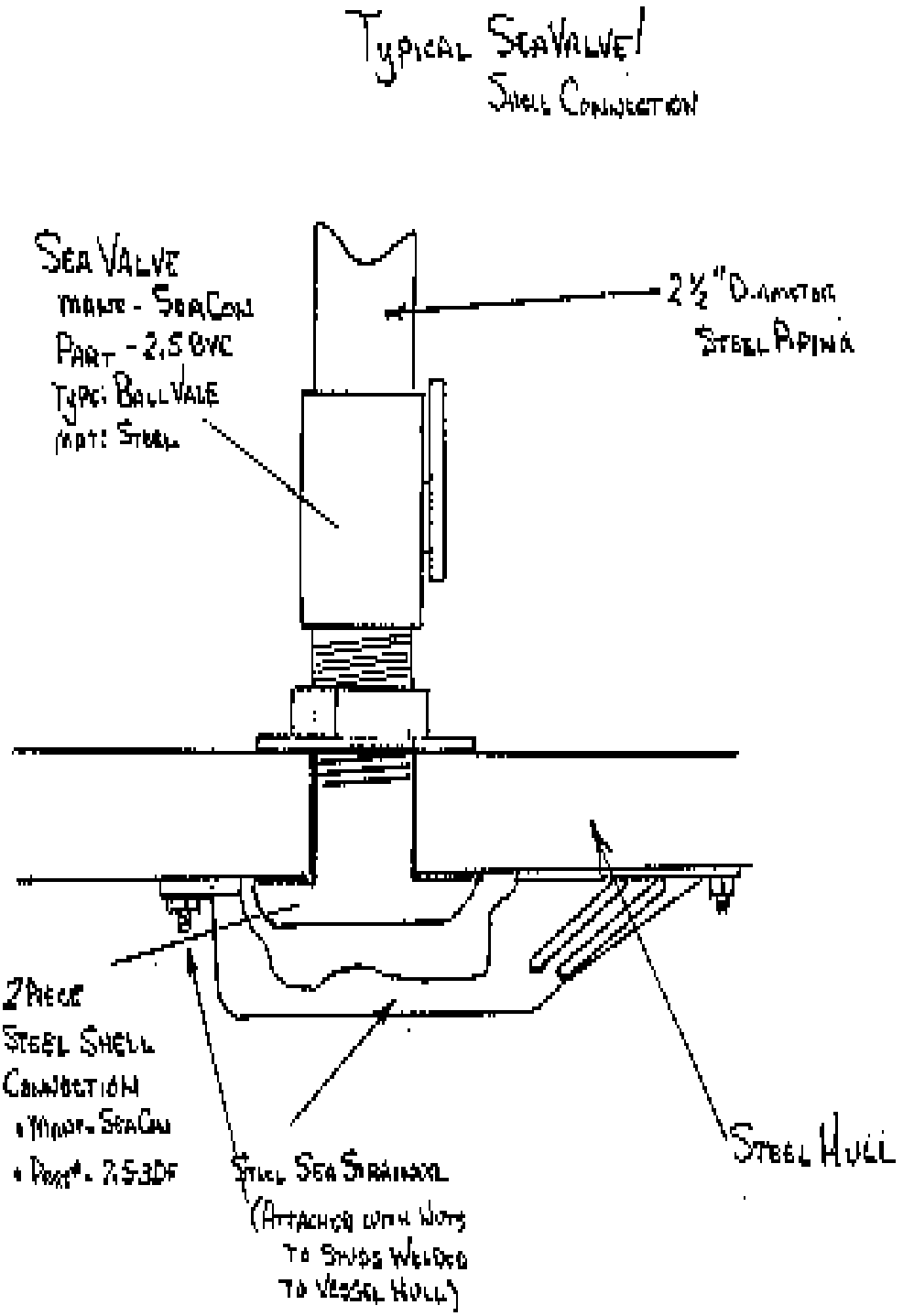
All shell connections within six inches of the waterline and below are required to be fitted with a sea valve.

Sea valves and shell connections are required to be metal.

In the case of non-metallic hull, materials which can be demonstrated to afford an equal degree of strength and heat resistivity as that of the hull may be considered on a case by case basis.

Bulkhead and Deck Penetrations and Shell Connections *(Continued)*

Example



SECTION 3

LIFE SAVING EQUIPMENT REQUIREMENTS

Life Preservers - *46 CFR 180.71 - 180.78(T) and 46 CFR 117.71-78(K)*

Type Required	Only Type I life preservers with Coast Guard Approval Numbers 160.002, 160.005, and 160.055 are approved for all passenger carrying vessels.
Quantity Required	One **adult** type life preserver is required for each person your vessel is certified to carry. One **child** type life presever is required for each person aboard the vessel that is smaller than the lower size limit of the adult life jacket. In addition, at a minimum at least 10% of the number of adult life preservers must be of the approved child type and maintained aboard at all times.
Markings	You must clearly and legibly mark each life preserver with block capital letters with your vessel's name.
Reflective Material	Each of your life preservers must have at least 31 square inches of reflective material attached to the front, back, and reversible front and back sides.
Repairs	Only repairs made by the manufacture or an approved representive are authorized. **No "homemade" repairs will be acceptable on any life saveing equipment including life jackets.**

Life Preservers - *(Continued)*

Stowage

Your life preservers shall be distributed throughout the accommodation spaces in protected places convenient for all persons on board.

Each of your stowage containers must not be capable of being locked. If practicable, the container must be designed to allow the life jackets to float free.

If your life jackets are stowed more than 7 feet above the deck, a means for quick release of the stowage container must be provided.

If your life preservers are not readily visible to the passengers, the containers in which they are stowed shall be marked "Life Preservers" with the number contained therein, in at least *1-inch* letters.

Your children's life jackets must be labeled and stowed separate from your adult life preservers, so that child life jackets are not mistaken for adult life jackets.

Lifejacket Lights

Lights are not required for ferries or vessels with a COI endorsed only for routes that do not extend more than 20 miles form a harbor of safe refuge.

Note

The word life preserver, life jacket, and personal floation device (PFD) all have the same meaning.

Survival Craft *46 CFR 180.200 - 180.208(T) and 46 CFR 117.130-208*

Type Required

A sufficient number of life floats or inflatable buoyant apparatus must be carried as required by the chart on the following page.

Inflatable Buoyant Apparatus and Life Floats are required to be marked with CG Approval numbers. Inflatable life rafts of 6 person or greater in capacity can be substituted for either.

NOTE

(1) Great Lakes cold water in the MSU Toledo zone is from 16 Oct – 15 May.
(2) Ridged Boyant Apparatuses are no longer accepted and must be replaced with an approved survival craft as per the chart.
(3) Great Lakes requirements are the same as Limited Coastwise Routes.
(4) Great Lakes not more than 1 mile from shore or River routes, no survival craft are needed.

Survival Craft *(Continued)*

Quantity Required

Route	Water Temp	Vessel Constructed of	Subdivision	Floatfree 406 EPIRB	Survival craft required
Oceans Route	cold water	———	without subdivision	———	100% Inflatable Bouyant Apparatus
			with subdivision	———	100% Life Floats
	warm water	———	———	———	67% Inflatable Bouyant Apparatus
Coastwise Route	cold water	wood	without subdivision	———	67% Inflatable Bouyant Apparatus
			with subdivision	———	100% Life Floats
		other than wood	———	———	100% Life Floats
	warm water	———	———	———	100% Life Floats
Coastwise Route Not more than 3 miles from shore	———	———	without subdivision	without EPIRB	100% Life Floats
				with EPIRB	50% Life Floats
			with subdivision		50% Life Floats
Limited Coastwise Route	cold water	wood	without subdivision		67% Inflatable Bouyant Apparatus
			with subdivision		100% Life Floats
		other than wood	———		100% Life Floats
	warm water	———	———		50% Life Floats
Limited Coastwise Route Not more than 3 miles from shore	cold water	———	without subdivision	without EPIRB	100% Life Floats
				with EPIRB	50% Life Floats
			with subdivision		50% Life Floats
	warm water	———	without subdivision	without EPIRB	50% Life Floats
				with EPIRB	None
			with subdivision		None
Lakes, Bays, & Sounds	cold water	wood	without subdivision	———	100% Life Floats
			with subdivision	———	50% Life Floats
		other than wood	———	———	50% Life Floats
	warm water	———	———	———	None
Not more than 1 mile from shore	———	———	———	———	None
Rivers	cold water	———	without subdivision	———	50% Life Floats
			with subdivision	———	None
	warm water	———	———	———	None

Survival Craft *(Continued)*

Vessels on International Routes	Vessels on international routes are required to have life rafts or inflatable buoyant apparatus of sufficient total capacity to carry 100% of the persons on board.
Wooden Vessel	Wooden vessel, for the purposes of subdivision and lifesaving equipment requirements in this section, is defined as any traditionally-built, plank-on-frame vessel, where mechanical fasteners (screws, nails, trunnels) are used to maintain hull integrity.
Markings	Each life float or inflatable buoyant apparatus must be marked with the vessel's name and number of persons allowed on each. They shall be conspicuously marked or painted in letters and numbers at least 1-1/2 inches high.
Paddles	Each life float must be provided with two **paddles** not less than 4 feet long and must be lashed to the life float to which they belong.
Water Light	Each life float must be fitted with a **water light**, CG approval 161.010. It must be attached around the body of the life float by a 3/8 lanyard that is resistant to deterioration from ultra violet light and at least 18 feet long.

Survival Craft *(Continued)*

Painter

Each life float or inflatable buoyant apparatus must be fitted with a **painter** 100 feet long.

- The painter must have a breaking strength of at least 1500 lbs, except that if the capacity of the life float or inflatable buoyant apparatus is 50 persons or more, then the breaking strength must be at least 3,000 lbs.

- If synthetic, the painter must be of a dark color and certified to be resistant to deterioration from ultraviolet light.

- The painter must be stowed in such a way that it runs out freely when the life float or inflatable buoyant apparatus floats freely away from the sinking vessel.

  Note that if the vessel carries more than one life float, they may be grouped together to a single painter provided the combined weight of each group does not exceed 400 lbs. Each life float must be attached to the painter with line of equivalent strength as that required for the painter and of sufficient length so that each can float without contacting another life float.

Weak Link

The painter must be attached to the vessel with a **weak link** of the proper strength for the size of the life float(s) or inflatable buoyant apparatus unless the water less than the painter length.

Annual Servicing

Inflatable Apparatus are required to be serviced by an authorized servicing facility annually.

Survival Craft *(Continued)*

Stowage	Life floats must not be stowed in tiers more than 4’ high. When stowed in tiers, the individual flats must be kept apart by spacers. They also must be stowed to ensure they will float free in the event of an emergency.

Ring Life Buoys *46 CFR 180.70(T) and 46 CFR 117.70(K)*

Type Required	Your ring life buoys must meet CG approval 160.050. Those ring life buoys used on an oceans or coastwise route must be orange. All ring life buoys must be a minimum of 24 inches in diameter, except that vessels less than 26 feet long may use one ring life buoy of not less than 20 inches in diameter.
Quantity	A vessel of not more than 65 feet in length is required to carry one ring life buoy. The ring life buoy must have attached buoyant line. A vessel greater than 65 feet in length is required to carry 3 ring life buoys, one shall be fitted with a buoyant line.
NOTE	The bouyant line must be at least 60 feet in length, At least 5/16 inch in diameter and have a breaking strength of at least 1,124 pounds. If synthetic, it must be dark in color or of a type certified to be resistant to deterioration from ultraviolet light.
Markings	Each ring life buoy must be clearly marked with the name of the vessel. Each ring life buoy must be marked with retro-reflective material.

Ring Life Buoys – *(Continued)*

Water Lights

Your vessel must carry one water light which meets CG approval 160.010, unless the vessel is restricted to daylight operations as specified on your COI.

Each of your water lights must have a lanyard that attaches around the body of the ring life buoy with a length of line between 3 to 6 feet.

If you carry only one ring life buoy, the water light must be attached to the lanyard with a corrosion resistant clip. The clip must have a breaking strength of at least 50 pounds as arranged to allow the waterlight to be quickly disconnected from the ring buoy.

Stowage

Ring life buoys must be stowed so as to:

- Be readily accessible
- Be stowed in a way that it can be rapidly cast loose
- Not be permanently secured to the vessel in any way
- If the vessel is on an Oceans or Coastwise route, must be orange in color

Pyrotechnic Distress Signals 46 CFR 180.68(T) and 46 CFR 117.68(K)

General Requirements

Pyrotechnic distress signals are required on all small passenger vessels, except those on short runs of less than 30 minutes from the dock.

Pyrotechnic signals are marked with an expiration date and must be replaced prior to the expiration date and must be approved under 160.021 and 160.037.

Number Required

Oceans, Coastwise, Limited Coastwise, and Great Lakes routes must carry 6 hand red distress signals and 6 hand orange or 12 red distress signals. Lakes, Bays and Sounds or Rivers route, you are required 3 hand red flare distress signals and 3 orange smoke or 6 red distress signals.

Stowage Requirements

Your flares are required to be stored in a portable watertight container of bright color, marked in legible contrasting color, in at least 1/2" letters "DISTRESS SIGNALS" and stored at the primary Operating Station or, as an alternative, the signals may be stored in a pyrotechnic locker if it is located above the freeboard deck, away from heat, and in the vicinity of the operating station.

First Aid Kit *46 CFR 184.710(T) and 46 CFR 121.710(K)*

General Requirements

Vessels must carry either a Coast Guard approved kit approval series 160.041 or a kit with equivalent contents and instructions. For equivalent kits, the contents must be stowed in a suitable, watertight container that is marked "FIRST AID KIT". Items with expirations dates must not be expired.

Stowage Requirements

The FIRST AID KIT must be stowed in a location that is easily visible and readily available to the crew.

EPIRB *46 CFR 180.64 (T) and 46 CFR 117.64(K)*

General Requirements

Each vessel that operates on the high seas, or that operates beyond three miles from the coastline of the Great Lakes must have on board a FCC Type Accepted Category 1, 406 MHz EPIRB, installed to automatically float free and activate.

The battery and hydrostatic release must be dated and current. The EPIRB must be registered with NOAA, marked with the vessel name and the NOAA register certificate must be available for inspection.

Rescue Boat *46 CFR 180.210(T) and 46 CFR 117.210(K)*

General Requirements

Vessels greater than 65 feet in length are required to have a rescue boat unless it is determined that:

- The vessel is sufficiently equipped to allow the crew to recover a helpless person from the water.
- Recovery of a helpless person can be observed for the operating station.
- The vessel does not regularly engage in operations that restrict its maneuverability.

Vessels of not more than 65 feet are not required to carry a rescue boat unless:

- The vessel carries passengers on an open or partially enclosed deck; and
- The OCMI determines that the vessel is designed, arranged, or involved in operations so that the vessel itself cannot serve as an adequate rescue craft.

Acceptable Rescue Boats

In general, a rescue boat must be a small, lightweight boat with built-in buoyancy and capable of being readily launched and easily maneuvered.

In addition, it must be of adequate proportion to permit taking an unconscious person on board without capsizing.

On a vessel of more than 65 feet in length operating on *protected waters* a rescue boat approved under approval series **160.056** is acceptable.

On a vessel of more than 65 feet in length operating on *exposed or partially protected waters* which would include the Great Lakes, a rescue boat approved under approval series **160.151** is acceptable.

On a vessel of not more than 65 feet in length, the rescue boat must be acceptable to the OCMI

SECTION 4

FIRE FIGHTING AND DETECTING EQUIPMENT REQUIREMENTS

Power Driven Fire Pumps - *46 CFR 181.300(T) and 118.300(K)*

General Requirements

A self priming power driven fire pump is required on the following mechanically propelled small passenger vessels:

- Vessel ≤ 65 feet that is a ferry
- Vessel ≤ 65 feet carrying more than 49 passengers
- All vessels > 65 feet

Vessels not required to have a power driven fire pump must have at least 3 (2 1/2 gallon) buckets. Each bucket must have:

- A lanyard attached capable of reaching the water.
- Stenciled in a contrasting color "FIRE BUCKET".

Fire Pump Requirements

The pump may be driven off of a propulsion engine or other source of power and must be permanently connected to the fire main. This pump may also be connected to the bilge system so that it can serve as a fire pump and a bilge pump.

- Vessel ≤ 65 feet carrying more than 49 passengers and all vessels > 65 feet:
  - Minimum fire pump capacity 50 gallons per minute
  - Minimum pressure at the pump outlet 60 psi

Note: Subchapter K vessels pump must be capable of producing 50 psi at the highest hydrant.

  - Pressure gauge fitted at the pump outlet

- Vessel ≤ 65 feet that is a ferry carrying not more that 49 passengers:
  - Minimum fire pump capacity 10 gallons per minute
  - Pump must be capable of projecting a stream from the highest hydrant through the hose and nozzle a minimum distance of 25 feet

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Fire Main System - *46 CFR 181.310 & 181.320(T) and 46 CFR 118.310 & 46 CFR 118.320(K)*

General Requirements

All vessels required to have a power driven fire pump are required to have a fire main.

Piping used in the fire main system must constructed with ferrous materials.

Fire hydrants for all vessels shall be of sufficient number and so located that any part of the vessel may be reached with an effective stream of water from a single length of hose.

A length of fire hose will be attached to each hydrant at all times.

Fire Hoses and Nozzles

- Vessel $\leq$ 65 feet carrying more than 49 passengers and
- All vessels > 65 feet:
  - Fire hose must be commercial grade 1-1/2 inch lined fire hose (UL 19 approved), or equivalent:
    * Fire hose must be 50 feet in length.
    * Having fittings of brass or other corrosion resistant material.
  - The nozzle must be of a type approved in accordance with CG approval 162.027.
- Vessel $\leq$ 65 feet that is a ferry carrying not more that 49 passengers:
  - Fire hose and nozzle may be as required above, or garden hose of:
    * Good commercial grade, constructed with inner rubber tube, plies of braided fabric and outer rubber or equivalent cover.
    * Sufficient strength to withstand maximum pressure of the fire pump.
    * All fittings on hose must be of suitable corrosion resistant material.
  - Nozzle:
    * Capable of being changed between solid stream and spray pattern.
    * Corrosion resistant material.

Fixed Gas Fire Extinguishing Systems - *46 CFR 181.400, 46 CFR 181.410 & 181.420(T) and 46 CFR 118.400, 46 CFR 118.410 & 118.420(K)*

General Requirements

A fixed gas fire extinguishing system must be installed in the following locations on all vessels:

- A space containing propulsion machinery.
- A space containing an internal combustion engine of more than 50 hp (37.3 kw).
- A space containing machinery powered by gasoline or other fuels having a flash point of 110°F or lower.
- A space containing fuel tanks for gasoline or any other fuel having a flash point of 110°F or lower.
- Cargo spaces which are inaccessible during a voyage and used for combustible cargo. *(Only CO2 will be allowed).*
- A paint locker.
- A storeroom containing flammable liquids *(including liquor of 80 proof or higher where liquor is packaged in individual containers of 9.5 liter (2.5 Gallons) capacity or greater).*

Type System Required

Fixed gas fire extinguishing systems shall be approved by the Commandant and installed to the satisfaction of the OCMI.

Depending on the application, acceptable systems include CO_2, Halon and pre-engineered automatic discharged systems.

Fixed Gas Fire Extinguishing Systems - *(Continued)*

Amount of CO2 Gas Required

The number of pounds of CO2 required is calculated by determining the gross volume of the space and dividing by the factor as listed in the chart below.

Factor	Gross volume of compartment *(cubic feet)*	
	Over-	Not over-
15	- - - - - -	500
16	500	1,600
18	1,600	4,500
20	4,500	50,000
22	50,000	- - - - - -

Additional Requirements

46 CFR 181.410 and 118.410 prescribes the specific system requirements.

As previously mentioned, we recommend that you obtain a copy of the regulations if you plan to install a fixed gas fire extinguishing system. Also, you may want to refer to the Marine Safety Centers web site on fixed gas systems at: www.uscg.mil/hq/gm/mse4/firefixedtboat.htm

Portable Fire Extinguishers - 46 CFR 181.500(T) and 46 CFR 118.500(K)

General Requirements

The minimum number of portable fire extinguishers required shall be determined by using the table below

Space Protected	Minimum Number Required	Type Extinguisher permitted		
		CG Class	Medium	Minimum Size
Operating Station	1	B-I, C-I	Halon Carbon dioxide Dry chemical	2.5 Pounds 4 Pounds 2 Pounds
Machinery Space	1 for each	B-II, C-II located just outside exit	Carbon dioxide	15 Pounds
Open Vehicle Deck	1 for every 10 vehicles	B-II	Foam Halon Carbon dioxide Dry chemical	2.5 Gallons 10 Pounds 15 Pounds 10 Pounds
Accomodation Space	1 for each 250 square feet or fraction thereof	A-II	Foam Dry chemical	2.5 Gallons 5 Pounds
Galley, Pantry, Concession Stand	1 for each	A-II, B-II	Foam Dry chemical	2.5 Gallons 10 Pounds

Extinguishers must be UL approved for marine use and must be mounted on the approved marine mounting bracket.

Location

Extinguishers must be placed near the space protected.

Fire Axe - *46 CFR 181.600(T) and 46 CFR 118.600(K)*

General Requirement

Each vessel more than 65 feet in length is required to be equipped with one fire axe.

The fire axe must be located in or adjacent to the pilothouse and must be marked with vessel name.

Fire and Smoke Detection Systems - *46 CFR 181.400 & 181.450(T) and 118.400(K)*

General Requirement

The following spaces must be fitted with a **fire detecting system**, except when the space is protected by a fire extinguishing system that is capable of automatic discharge upon heat detection, or if the space is manned:

- A space containing propulsion machinery.
- A space containing an internal combustion engine of more than 50 hp (37.3 kw).
- A space containing an oil fired boiler.
- A space containing machinery powered by gasoline or other fuels having a flash point of 110°F or lower.
- A space containing fuel tanks for gasoline or any other fuel having a flash point of 110°F or lower.

Smoke Detecting System

Each overnight accommodation space on a vessel with overnight accommodations for passengers must be fitted with an **independent modular smoke detecting and alarm unit**.

The unit must be:

- UL Standard 217 and be listed as a "Single Station Smoke Detector-Also suitable for use in Recreational Vehicles".
- Contain an independent power source.
- Alarm on low power.

SECTION 5

VESSEL CONTROL REQUIREMENTS

Compass - *46 CFR 184.402(T) and 46 CFR 121.402(K)*

General Requirements

All vessels except for those listed below, are required to have installed a suitable magnetic compass designed for marine use, mounted at the primary operating station.

Except on a vessel limited to daylight operations, the compass must be illuminated.

The following vessels need not be fitted with a compass:

- Vessels in river service
- Non-self propelled vessels
- Vessels operating in protected waters with short restricted routes

Radars - *46 CFR 184.404(T) and 46 CFR 121.404(K)*

General Requirements

A vessel must be fitted with a FCC type accepted general marine radar system for surface navigation with a radar screen mounted at the primary operating station if all of the following apply:

For Subchapter T Vessels

- The vessel is self propelled;
- The vessel has an oceans, coastwise, limited coast wise or Great Lakes Route and
- The vessel carries more than 49 passengers.

For Subchapter K Vessels

- All vessels which fall under the applicability of 46 CFR 114.110(K) are required to have a radar with the following exceptions:
- A ferry on a rivers route less than 1 mile from shore
- A vessel operated on a short restricted route, when the cognizant OCMI (Officer In Charge Marine Inspection) has determined a radar is not necessary.

The radar and its installation must be suitable for the intended speed and route of the vessel.

Radios - *46 CFR 184.502(T) and 46 CFR 502(K)*

General Requirements

Radiotelephones are required to be installed as listed below:

If vessel route is:	Then vessel is required:
Less than 1,000 feet from shore	None
1000' from shore to 20 nautical miles from shore	VHF-FM
Greater than 20 miles from shore	VHF-FM and Single Side Band

The installation of all radiotelephones shall be in accordance with Federal Communication Commission (FCC) regulations set forth in 47 CFR Part 80.

Licenses

The vessel master must hold a **FCC Marine Radio Operators Permit** if the vessel has a radiotelephone (Radio).

The vessel must be issued an **FCC Station License** for any of the following if installed on the vessel.

- Radiotelephones
- Radars
- EPIRBS

The vessel must also have on board a valid **Safety Radio Telephone Certificate** which is issued by the FCC to prove proper installation of the radio transmitting equipment or a copy of the servicing agreement as per the Great Lakes Agreement.

Emergency Broadcast Placard

A durable placard must be posted next to all radiotelephone installations with emergency broadcast instructions and information specific to the individual vessel. Specific instructions for the wording of the Emergency Broadcast Placard can be found in 46 CFR 184.510(T) and 46 CFR 510(K).

Sound Signals - *Navigation Rules (Comdtinst M16672.2B) Rules 32 & 33*

General Requirements

Vessels 12 meters (39.4 feet) in length and over shall be provided with a whistle and a bell.

Vessels less than 12 meters are not required to have a whistle or bell but if not carried, the vessel shall be provided with some other means of making an efficient sound signal.

Whistle

The whistle shall be capable of being operated from the vessel's control station and make a sound as listed in the table below.

Length of Vessel		Fundamental Frequency Range (Hz)	Audibility Range in (Nautical Miles)
Meters	Feet		
12m or more but less than 20m	39.4' or more but less than 65.6'	250-525	.5
20m or more but less than 75m	65.6 or more but less than 246.1'	250-525	1.0
75m or more but less than 200m	246.1' or more	130-350	1.5

Bell

The bell shall be made of corrosion resistant material and designed to give a clear tone. Use the chart below to determine the minimum size required.

Length of Vessel		Diameter of bell mouth shall be not less than
Meters	Feet	
12m or more but less than 20m	39.4' or more but less than 65.6'	200mm or 7.9"
20m or more	65.6' or more	300mm or 11.8"

Where practicable, a power driven bell striker is recommended to ensure constant force, but manual operation is also acceptable.

The mass of the striker shall be not less than 3 percent of the mass of the bell.

Required Charts and Publications - *46 CFR 184.420(T) and 46 CFR 121.420(K)*

General Requirements

Each vessel is required to have on board the following as is appropriate for the vessels route:

- Charts of large enough scale to make safe navigation possible
- U.S Coast pilot or similar publication
- Coast Guard light list
- Notices to mariners
- Tide tables (If applicable)
- Current tables or a river current publication issued by the U.S. Army Corps of Engineers or river authority (If applicable)
- U.S. Coast Guard Navigation Rules COMDTINST M16672.2c

Extracts from the publications may provided instead of the complete publication.

Internal Communication Systems - *46 CFR 184.602 - 184.610(T) and 46 CFR 121.602-610(K)*

Pilot House/ Machinery Space

A vessel equipped with pilot house control must be equipped with a fixed two way communication system between the operating station to the location where the means of controlling the propulsion machinery is located. *(This is to provide communication to manually control the propulsion machinery should the normal control system fail).*

If the vessel is equipped with an auxiliary means of steering, it must also have a fixed two way communication system.

A fixed two way communication system is not required when:

- The vessel has two screws
- The locations listed above are sufficiently close together that direct voice communications is possible to the satisfaction of the OCMI.

The OCMI may accept hand held portable radios.

Public Address System

Each of the following vessels is required to have a fixed public address system operable from the operating station capable of being heard in all passenger and crew locations.

- A vessel greater than 65 feet in length.
- A vessel with more than one passenger deck.
- A vessel with overnight accommodations.

Vessels $\leq$ 65 feet may use a bull horn if audible throughout the accommodation spaces during normal operating conditions to the satisfaction of the OCMI.

Vessels carry $\leq$ 49 passengers are not required a public address system if a public announcement made from the operating station without amplification can be heard throughout the accommodation spaces to the satisfaction of the OCMI.

Propulsion Engine Control Systems - *46 CFR 184.620(T) and 46 CFR 121.620(K)*

General Requirements

A vessel must have two independent means of controlling each propulsion engine. Control must be provided for the engine speed, direction of shaft rotation, and engine shutdown.

One means may be the ability to readily disconnect the remote engine control linkage to permit local operation at the engine. Communication must be provided between the engine and the control station as determined by the OCMI.

A multiple engine vessel with independent remote propulsion controls need not have a second means of controlling each engine.

Engine Shutdown

In addition as required above, a vessel must have a reliable means of shutting down a propulsion engine from the operating station, which is independent of the engine's speed control.

Loss of Power to the Control System

A propulsion engine control system, including pilot house control, must be designed so that a loss of power to the control system does not result in an increase in shaft speed or propeller pitch.

SECTION 6

STABILITY & SUBDIVISION REQUIREMENTS

Stability Tests - *46 CFR 170-174*

Simplified Stability Test

Prior to being certificated, a vessel must have undergone a stability test.

The following vessels are allowed to undergo a ***simplified stability test***.

- Vessel $\leq$ 65 feet and
- Carries less than 150 passengers or
- Carries less than 12 on an international voyage or
- It has not more than one deck above the bulkhead deck.

Upon completion of a satisfactory simplified stability test, our office will issue a stability letter.

Inclining Experiment

All other vessels are required to undergo a full ***inclining experiment.*** This will normally require the owner to employ the services of a Naval Architect. This test is not covered in this handout as it is beyond the ability of most owners to conduct themselves. The Coast Guard Inspector is only a witness to the experiment and all results must be submitted to the U.S. Coast Guard Marine Safety Center (MSC) for review. The results will be evaluated and, if satisfactory, the stability letter will be issued by the MSC.

Posting the Stability Letter

All pages of the original stability letter are required to be posted aboard the vessel behind glass or clear plastic in the pilot house.

Stability Tests - *(Continued)*

Conducting the Simplified Stability Test

A simplified stability test can normally be completed in one day, and is one of the last items to be completed prior to issuing a COI. All modifications to the vessel must have been completed and all required equipment and any fixed ballast must be aboard the vessel for this test.

This is a pass-fail test. You are encouraged to maximize the number of persons to be carried on the vessel, as well as test for the most stringent and/or flexible routes envisioned for the vessel's operation.

The following chart shows the steps of a simplified stability test. The vessel owner is responsible for providing all necessary weights and the manpower to move the weights.

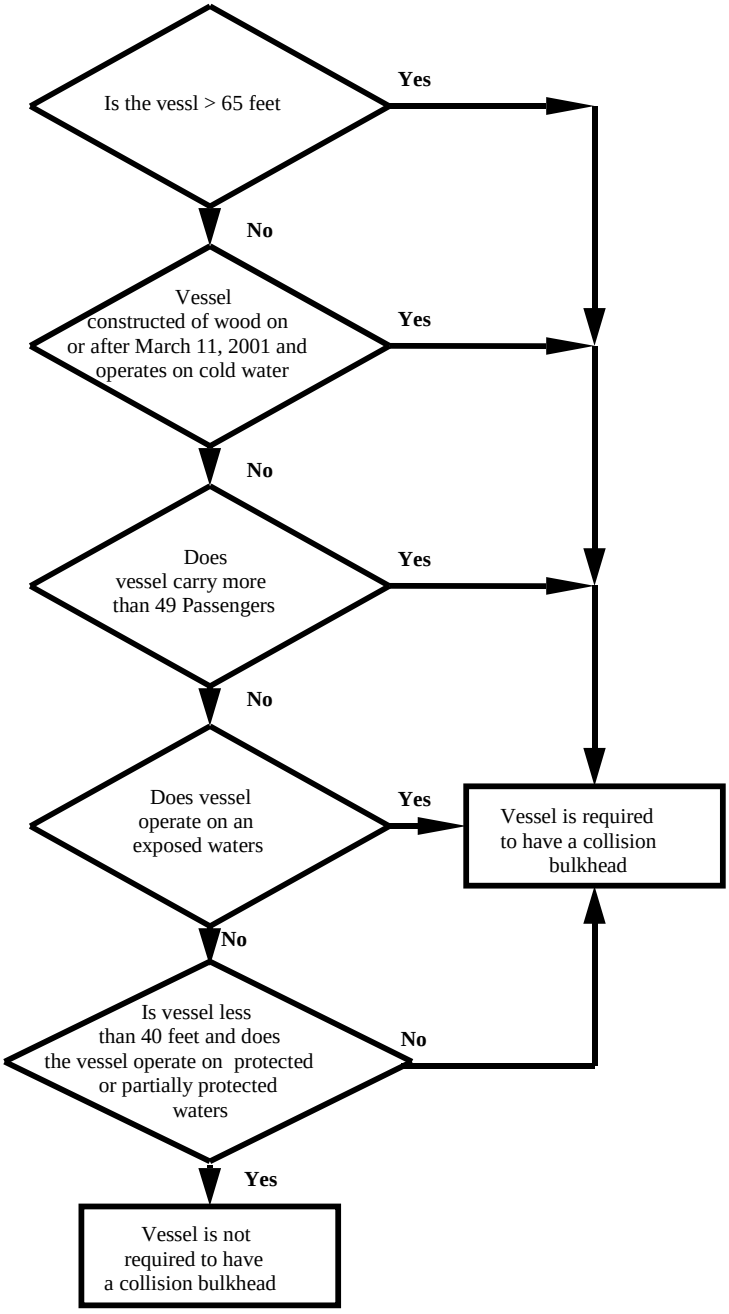
Step	
1	Prior to the Coast Guard Inspector's arrival ● All fuel and water tanks must be approximately three quarters full. If tanks have cross connection valves these valves must be open. ● The owner must have all weights used to simulate passengers at the vessel (eg sand bags or water barrels or other weights). A scale to prove weight must also be present. ● Vessel mooring lines must slacked off so that they do not interfere with the vessels listing during the test.
2	On arrival the inspector will determine where the weights shall be distributed aboard the vessel so as to obtain the normal operating trim. ● The total weight placed aboard the vessel will be determined by muliplying the number of persons the vessel will carry times 160 pounds, except that on vessels with protected water routes, the number will be 140 pounds per person. ● All weights must be positioned so that the center of gravity of the weight is approximately 2.5 feet above the deck. If necessary the owner will need to provide a means of elevating the weights to the proper height.
3	Once all weights are distributed the Inspector will take several measurements of the vessel and make a temporary mark on the hull. This mark is the maximum allowable immersion line. ● The inspector will then calculate the maximum required heeling moment and advise the owner of how much weight must be moved and how far.
4	Once all weights have been moved the Inspector will examine the mark that was made on the hull. If the mark is not submerged the vessel has passed the stability test. If the mark is submerged the Inspector may do additional tests with less weight in an attempt to find where the vessel will pass.
5	Once satisfactory a stability letter will be issued by our office specifying the amount of persons allowed on board for each operational route.

Collision Bulkheads - *46 CFR 179.210 & 179.310*

General Requirements

A collision bulkhead is a watertight bulkhead installed at the forward part of the vessel to protect the vessel from flooding in case of damage to the bow.

To determine if your vessel is required to have a collision bulkhead use the chart below.



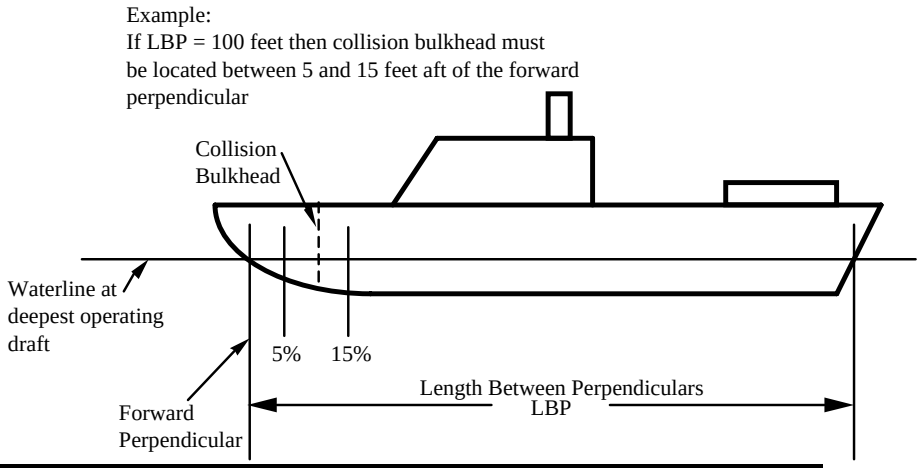
Note: See Section 1, page 12 for definitions of vessel routes.

Collision Bulkheads - *(Continued)*

Calculating the Location of the Collision Bulkhead

The location of the collision bulkhead is determined by first determining the Length Between Perpendiculars (LBP), LBP is the horizontal distance measured between perpendiculars taken at the forward most and after most points on the waterline corresponding to the deepest operating draft.

The collision bulkhead must be located between 5% and 15% of LBP as measured aft of the forward perpendicular.



Construction Requirements

The collision bulkhead must

- Installed in a single plane, with no recess or step, up to the bulkhead deck.
- Must not be fitted with any type of penetration or opening except penetrations may be made if they are located as high and as far inboard as practicable and they have a means to be watertight and extend to the weather deck, may not have a watertight door in it
- If not required to comply with one or two compartment standard of flooding may have an opening sized such that:
- the lowest edge of the opening cannot be more than 12" down from the bulkhead deck &
- there must be at least 36 inches of intact collision bulkhead below the lower edge of the opening.

Subdivision Bulkheads - *46 CFR 179.212 - 179.230 & 179.320(T) and 46 CFR 170-174*

General Requirements

In addition to a collision bulkhead, if your vessel carries more than 49 passengers you must also have transverse watertight bulkheads that subdivide your vessel.

Transverse watertight bulkheads are placed at strategic locations throughout the vessel so that flooding damage is minimized should your vessel become damaged below the waterline.

A form called simplified subdivision is available from the Inspections Department. If your vessel requires subdivision bulkheads, you can work through this form with the inspector assigned to your project. This form will be very useful in determining the placement of bulkheads below the main deck.

Watertight Doors in Subdivision Bulkheads

The use of watertight doors in subdivision bulkheads is very restricted. Watertight doors are normally only allowed in vessels that operate within 20 miles from land and are used to separate a machinery space from an accommodation space.

All watertight doors must be kept closed except when a person is passing through them.

A hinged watertight door must be fitted with a quick action-closing device operable from both sides of the door and have an indication light at the operating station (bridge) showing whether the door is open or closed.

Watertight doors are only allowed in subdivision bulkheads that separate a machinery space from an accommodation space, and only as allowed by the OCMI.

Hatches - *46 CFR 178.360*

General Requirements

All hatches exposed to the weather must be watertight, except the following hatches may be weathertight:

- On a watertight trunk that extends a minimum of 12 inches above the weather deck
- On a cabin top
- Each hatch on a vessel that operates only on protected waters

Securing Devices and Keeper Chains

All hatch covers are required to:

- Have securing devices
- Be attached to the hatch frame or coaming by hinges, captive chains or other devices.
- Operable from either side

Watertight Definition

The term watertight means to effectively resist the passage of water when subjected to a hose test of 30 psi, with no leakage of water.

Weathertight Definition

Weathertight means that in any sea condition, water will not penetrate into the vessel.

The test for weathertight consists of hose testing for several minutes and allowing no more than a slight seepage of water to pass.

Watertight Coamings - *46 CFR 179.360(d)*

General Requirements

Watertight coamings are required at the base of all weathertight doors located in a deckhouse or a companionway that give access into the hull, if it is located in:

- a cockpit
- a well deck
- an exposed location on a flush deck vessel.

If the door is a hinged watertight door, the watertight coaming need only be sufficient to accommodate the door.

Height of the Coaming

The coaming height requirement is based on the vessel's route.

Route	Height of Coaming
Exposed or partially protected waters	6 inches
Protected waters	3 inches

Note: See Section 1, page 12 for definitions of vessel routes.

Hull Penetrations - *46 CFR 179.350*

General Requirements for Sea Valves

Except for engine exhausts, each inlet or discharge pipe that penetrates the hull within six inches of the vessel's deepest operating draft must have a positive action valve or cock that is located as close to the hull as possible.

This is required to prevent water from entering the vessel if the pipe fractures or otherwise fails.

The valve must be constructed of metal or equivalent material. Cast iron is not allowed because of brittleness. "Sea cocks" must be equipped with a positive means of locking the cock into the body; cotter pins may not be used to achieve this end. Valves, which use resilient seats, must meet the requirements above.

If the valve is inaccessible, then it must be operable from the weather deck or other accessible location about the bulkhead deck and labeled at the operating point for identity and direction of closing.

Drainage of Weather Decks - *46 CFR 178.410 - 178.450 46 CFR 116.1110(K)*

General Requirements

The regulations identify 4 types of vessels:

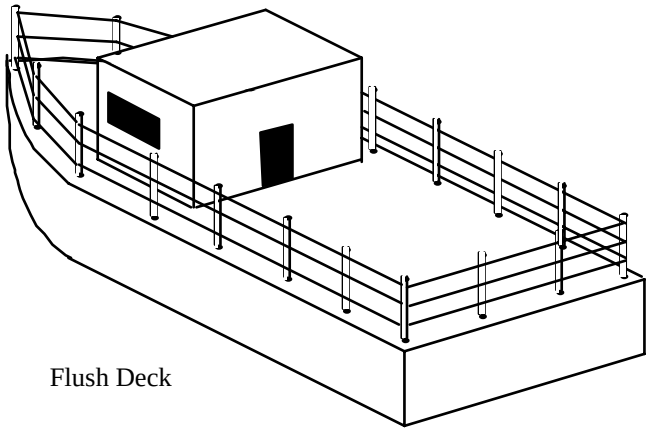
- Flush deck
- Cockpit deck
- Open boat
- Well deck

The regulations require that a vessel be provided with a means for rapidly clearing water from the decks. This is accomplished by the natural design of the vessel or the installation of freeing ports or scuppers.

A collection of a small quantity of water can drastically affect a vessel's stability.

Drainage of a Flush Deck Boat

"Flush deck" means a continuous weather deck which is watertight and flush with the side shell of the hull.



Flush Deck

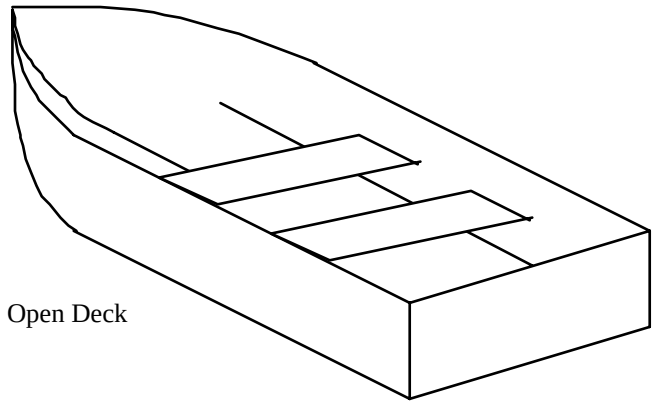
The weather deck must be watertight.

The forward 1/3rd may have solid bulwarks if there is sufficient sheer to ensure drainage of water aft and if bulwarks do not form a well on all sides to trap water.

Drainage of Weather Decks - *(Continued)*

Drainage of a Open Boat

"Open boat" means a vessel not protected from entry of water by means of a complete deck.



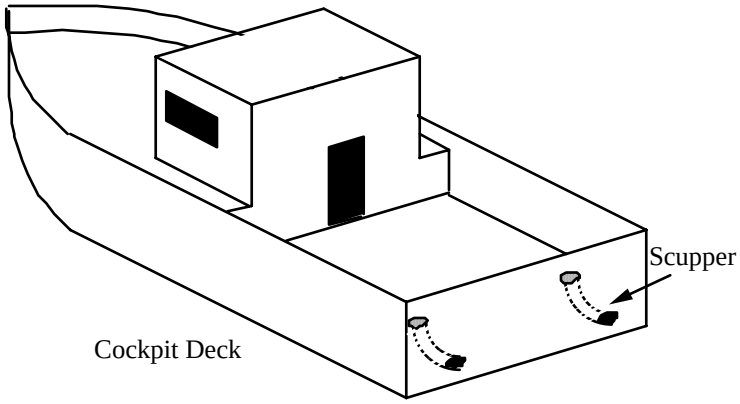
Open Deck

The deck within the hull of an open boat must drain to the bilge. Overboard drainage of the deck is not permitted.

Drainage of Weather Decks - *(Continued)*

Drainage of a Cockpit

"Cockpit" means an exposed recess in the weather deck extending no more than 1/2 of the length of the vessel measured over the weather deck.



The cockpit must be watertight, except that:

- there may be a watertight door with coaming
- there may be vent openings if:

    - the vessel operates on protected or partially protected waters
    - the openings are located as high as possible in the side of the cockpit the height of the opening does not exceed 2".

The cockpit must be designed to be self bailing.

Scuppers with a minimum area based on the area of the cockpit must be located to allow rapid clearing of water in all probable conditions of list and trim. Scuppers are drains located at the base of a cockpit.

The formula is located in 46 CFR 178.450.

Drainage of Weather Decks - *(Continued)*

Height of a Cockpit Deck

The cockpit deck of a vessel that operates on exposed or partially protected waters must be at least 10" above the deepest subdivision loadline, unless the vessel complies with:

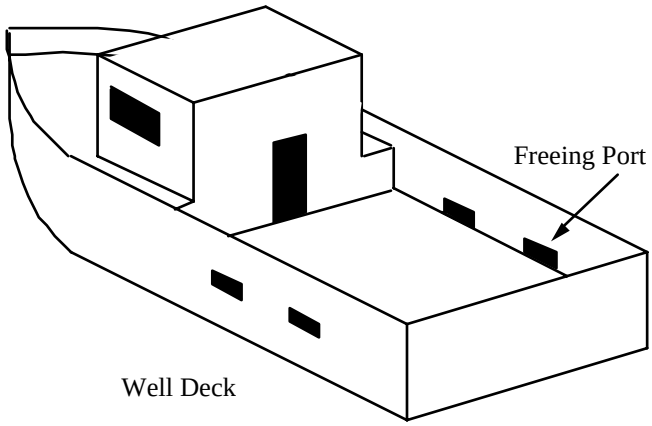
- Intact stability requirements (171.050)
- Type II subdivision requirements (171.070, 171.072 & 171.073) and
- Damage stability requirements (171.080)

For vessels that do not operate on exposed or partially protected waters the cockpit deck must be located as high as practicable above the deepest subdivision loadline.

Drainage of Weather Decks - *(Continued)*

Drainage of a Well Deck

"Well deck" means a weather deck fitted with solid bulwarks that impede the drainage of water over the sides or an exposed recess in the weather deck extending 1/2 or more of the length of the vessel.



Each deck must be watertight.

The bulwarks that form a well must be provided with **freeing ports** and will be determined by using the formula listed in 46 CFR 178.450.

SECTION 7

MISCELLANEOUS REQUIREMENTS

Bilge & Bilge Level Alarm Systems - *46 CFR 182.500 - 182.540(T) and 46 CFR 119.500-540 & 46 CFR 56.50(K)*

Introduction

Vessels of at least 26 feet in length must be fitted with individual bilge suction lines and bilge suctions for each watertight compartment.

The space forward of the collision bulkhead need not be fitted with a bilge suction line if a hand operated bilge pump or other equipment can be used to remove water and if the equipment is provided aboard the vessel.

Bilge Piping

Bilge piping sizes must be as follows:

- Vessel $\leq$ 65 feet
  - not less than 1 inch.

- Vessel > 65 feet
  - not less than 1 1/2 inches.

Except when individual bilge pumps are provided for separate spaces, individual bilge suction lines must be led to a central control point or manifold and provided with a stop valve at the control point or manifold and a check valve.

Bilge Suctions

Bilge suctions shall be fitted with suitable strainers having an area of not less than 3 times the bilge pipe diameter.

Bilge & Bilge Level Alarm Systems - *(Continued)*

Submersible Electric Bilge Pumps

Submersible electric bilge pumps may be used on a vessel that is not a ferry and is ≤ 65 feet in length carrying less than 49 passengers provided:

The pump:

- is UL approved, (or approved by another independent laboratory acceptable to the OCMI).
- services only one watertight compartment.
- is permanently mounted
- is equipped with a strainer that can be readily inspected and cleaned.
- Individual power pumps used for separate spaces must be:
- controlled from a central control point and have a light or other visual means at the control point to indicate operation.

Flexible tube or hose may be used instead of fixed piping for the pump discharge line.

- The line must:
- be suitably supported.
- not penetrate a watertight bulkhead.
- be of good quality and suitable for the intended use.
- be highly resistant to salt water, petroleum oil, heat and vibration.

Hull penetrations must be:

- placed as high above the waterline as possible.
- fitted with a sea valve at the hull penetration if within 6” of the vessels deepest draft.
- Valve must be of equivalent or greater strength as the hull material
- Must not be constructed out of **cast iron.**

Bilge & Bilge Level Alarm Systems - *(Continued)*

Bilge Pumps for Fixed Bilge Systems

A vessel must be provided with bilge pumps as listed below.

Number of Passengers	Length of Vessel	Bilge pumps required	Min. Capacity Required (Gal. per minute)
Any number	Over 65'	2 fixed power	50 GPM
More than 49 passengers and all ferry vessels	65' and less	1 fixed power and 1 portable hand	25 GPM 5 GPM
Carrying 49 or less passengers other than ferry vessels	26' up to 65'	1 fixed power and 1 portable hand or:	10 GPM 5 GPM
		1 fixed hand and 1 portable hand	10 GPM 5 GPM
	Less than 26'	1 portable hand	5 GPM

Each fixed power bilge pump:

- must be self priming
- may be driven off the main engine or other source of power.
- must be permanently connected to the bilge manifold and may connect to the fire main. (If of sufficient capacity, a power bilge pump may also serve as a fire pump).

Where two fixed power bilge pumps are installed, they must be driven by different sources of power. If one pump is driven by the main engine, the other must be driven by another source of power, such as batteries. In a twin engine vessel, each pump may be driven off of a different engine.

Bilge & Bilge Level Alarm Systems - *(Continued)*

Hand Operated Bilge Pumps

The Hand Operated Bilge Pump must be:

- capable of pumping the minimum quantity of water as listed in the chart.
- capable of pumping water from the bilge to overboard, but not necessarily, from all watertight compartments at the same time.
- provided with suitable suction and discharge hose capable of reaching the bilges of each watertight compartment and pumping the water over the side.

Note: A second power pump is an acceptable alternative to a hand pump, if it is supplied by a source of power independent of the first power bilge pump.

Bilge High Level Alarms

Vessels of 26 feet and over are required to have a Bilge High Level Alarm that indicates a visible and audible alarm at the vessels operating station, in each of the following unmanned spaces. The sensor shall be located near the centerline of the vessel as close as possible to lowest point of the bilge.

- A space with a thru hull fitting below the deepest load waterline.
- A machinery space bilge, bilge well or other spaces subject to flooding from sea water piping within the space.
- A space with a non-watertight closure, such as a space with a non-watertight hatch on the main deck.

Vessels constructed of wood must have bilge high level alarms in each watertight space in addition to those required above.

Automatic Bilge Pump Indicator

A visual indicator must be provided at the vessel's operating station to indicate when any automatic bilge pump is operating.

Diesel Fuel System Requirements - *46 CFR 182.435 - 182.480 & 182.720(T) and 46 CFR 119.435-470 and 46 CFR 119.700-730(K)*

Integral Fuel Tank Construction

Fuel tanks integral with the vessel's hull are allowed if the hull material is

- Steel
- Aluminum
- FRP (Sandwiched construction cannot be used, unless the core material used is closed cell polyvinyl chloride.)

Independent Fuel Tank Construction

Independent fuel tanks can be constructed of

- Nickel-copper
- Copper-nickel
- Copper
- Copper-silicon
- Steel
- Iron
- Aluminum
- FRP

Table 182.440(a)(1) and Table 119.440(a)(1) list thickness and construction requirements based on fuel tank capacity.

Metal tanks must have baffles at least every 30 inches, that are welded or brazed to the side of the tank. Baffles must have air holes at the top and limber holes at the bottom.

Diesel Fuel System Requirements - *(Continued)*

Fuel Tank Fill Piping

Fuel tank fill and sounding piping must be a minimum of 1.5 inches in diameter.

There must be a means of determining the amount of fuel either by sounding through a separate sounding tube, fill pipe or by a marine type fuel gage.

They must run as directly as possible, preferably in a straight line from the deck connection to the top of the tank. And so arranged that overflow of fuel will not run into the vessel.

If flexible hose is used it must:

- be suitable for the intended service
- overlap the metallic pipe ends at the least 1.5 times the pipe diameter and must be secured at each end by double hose clamps.
- if a non conductor, be provided with a method to make the fuel tank electrically continuous with the fill pipe.

Fuel Supply Piping

Fuel supply piping shall be of copper, nickel copper, or copper nickel having a minimum wall thickness of 0.035 inch except that piping of other materials such as seamless steel pipe or tubing which provides an equivalent level of safety may be used. Aluminum pipe must be a minimum of schedule 80 and is acceptable for use on aluminum vessels only.

Fuel lines shall be accessible, protected from mechanical damage, and secured against excessive movement and vibration by the use of metal straps with no sharp edges.

Where fuel lines pass through watertight bulkheads, they shall be protected by close fitting ferrules or stuffing boxes.

Diesel Fuel System Requirements - *(Continued)*

Fuel Supply Hose as Supply Line

Flexible hose may be used as supply line provided it is fitted with suitable connection fittings and meets the requirements of 46 CFR 56.60-25

Flexible hose runs shall be visible, easily accessible, protected from mechanical damage, and shall not penetrate watertight bulkheads.

Flexible non-metallic may be used for fuel supply, the hose shall meet SAE standard J-1942 "Hose and Hose Assemblies for Marine Applications", or be specifically approved by the Commandant. The hose must either be factory assembled requiring no further adjustment of the fittings of the hose or fittings meeting SAE J-1475 or equivalent shall be used. If special equipment is required such as crimping machines, it must be of the type and design specified by the manufacturer.

Flexible Hose at the Engine

A flexible hose (less than 30” in length) or loop of tubing shall be installed in the fuel supply line at or near the engine to protect the line from vibration.

The hose must meet the requirements as listed above or hose USCG approved type A1, A2, B1 or B2 is acceptable. The line must be attached using double hose clamps on each end, unless an approved fitting is used.

Fuel Shutoff Valves

Fuel shutoff valves shall be installed on the fuel supply piping at the fuel tank and at the engine.

The fuel shut off valve at the tank must be accessible from outside the fuel tank space, preferably on the weather deck. The location is required to be labeled in 1" high letters, indicating the purpose of the valve and direction of operation. If reach rods are installed in the weather deck, some form of flame impingement protection shall be provided for the handle.

Diesel Fuel System Requirements - *(Continued)*

Fuel Strainers

Suitable metal marine type strainers meeting the requirements of the manufactures shall be fitted in the fuel supply line in the engine compartment.

Drip pans fitted with flame screens are required under each fuel strainers other than those mounted on the engine.

Fuel Tank Vents

Fuel tanks shall be fitted with a vent pipe at its highest point under normal operating conditions.

The minimum net cross-sectional area of the vent pipe shall be as follows:

- Not less than 5/8" O.D. tubing (.035" wall thickness-20 gage), if the fill pipe terminates at the top of the tank.
- Not less than 3/4" O.D. tubing (.035" wall thickness-20 gage), if the fill pipe extends into the tank.

The discharge end must be fitted with a removable flame screen of corrosion resistant wire of 30 X 30 mesh and be located:

- On the hull exterior, as high as practicable above the waterline and away from any hull opening, or
- Terminate in U-bends as high above the weather deck as practicable and away from any living quarters or below deck spaces.
- So installed as to prevent water contamination during normal operating conditions.

Gasoline Fuel System Requirements - *46 CFR 182.435 - 182.480 & 182.720(e)*

Note

Gasoline propelled vessels can be certified for carrying passengers. Although they are similar to diesel fuel systems, due to the increased flammability, there are additional requirements.

Included is the requirement to install a fixed fire extinguishing system in the machinery space, a vapor detection system, forced ventilation for the engine space, as well as differences in the fuel system.

If certifying a gasoline propelled vessel, the inspector assigned to you will assist with the additional requirements in the Code of Federal Regulations.

Ventilation System Requirements - *46 CFR 182.465 & .470(T) and 46 CFR 119.465 & .470(K)*

Compartments Containing Machinery

Spaces containing machinery shall be fitted with at least two ducts to furnish natural or mechanical supply and exhaust ventilation.

One duct shall extend to a point near the bottom of the compartment, so installed that the ordinary collection of water in the bilge will not trap the duct.

Where forced ventilation is installed, the duct extending near the bottom shall be the exhaust.

For diesel machinery the total inlet and outlet area of each duct shall be not less than one square inch for each foot of beam of the vessel. This minimum shall be increased if ducts are also used to provide air for the engine intakes.

Ducting Material

All duct material shall be of rigid permanent construction and made of the same material as the hull or of a non combustible material and must be reasonably gastight.

The ducts must lead as direct as possible and be securely fastened and supported.

Commercial grade dryer ducting is not acceptable.

Duct Cowls

All supply ducts for ventilation shall be provided with cowls or scoops having a free area not less than twice the required duct area.

If the mouth of the duct is screened the area must be increased to compensate for the area of the screen.

Closure Devices

Provisions must be made for closing all supply duct cowls or scoops and exhaust duct discharge openings for a space protected by a fixed gas extinguishing system.
All closure devices must be readily available and mounted in the vicinity of the vent.
Dampers may not be fitted in a supply duct

Ventilation System Requirements - *46 CFR 182.465 & .470(T)*

Compartments Containing Diesel Fuel Tanks

Unless provided with ventilation as stated above, enclosed compartments containing diesel fuel tanks and no machinery shall be provided with a goose neck vent of not less than 2 1/2 inches in diameter. Openings shall not be located adjacent to possible sources of vapor ignition.

In small compartments, a vent of not less than 1 1/2 inches may be used. Compartments that are adequately ventilated are not required to have goose neck vents installed.

Ventilation requirements for Gasoline engines

Due to the increased explosion risk of gasoline, the requirements for ventilation are more complicated and 46 CFR 182.460 shall be followed.

Marine Sanitation Devices - *46 CFR 184.704 & 33 CFR 159.7*

General Requirements

Vessels are not required by regulation to have a toilet or Marine Sanitation Device (MSD). If installed the installation must be as follows:

MSD's are classified as a Type I, II, or III. Type I and II treat the sewage so that it can be pumped overboard. Type III MSD's are holding tanks and can only be pumped ashore or in the territorial seas, beyond 3 miles from shore.

Vessels less than 65 feet are allowed to use a Type I, II or III MSD, all other vessels are required to use a Type II or III.

MSDs must have a Coast Guard certified label and be certified for inspected vessels.

Type I and II MSD's must have the operating manual and treatment chemicals on board.

MSD Piping

Type I and II MSD's can be piped for discharge of treated sewage overboard. Note that state and local laws may have "No Discharge Zones" in which no sewage may be pumped overboard. Operators should check with state and local authorities as to the laws in your area of operation.

Federal Regulations do not allow the pumping of untreated sewage overboard within 3 miles of the mainland shore or on the Great Lakes.

Vessels with Type III MSD's with routes restricted inside the 3-mile limit cannot be piped overboard but must be piped to a pump out connection on the deck.

Placard Required

Operators on Ocean or Coastwise routes greater than 3 miles from shore shall install a placard at the Y-valve that states; "This valve to remain locked in the closed position when within 3 miles of the mainland shore or upon the Great Lakes."

Steering System Requirements - *46 CFR 182.600 - .620(T) and 46 CFR 119.600, 46 CFR 58.25 and 46 CFR 110-111(K)*

Main Steering

A self propelled vessel must be provided with a main steering gear that is:

- of adequate strength and capable of steering the vessel at all speeds.
- designed to operate at maximum astern speed without being damaged or jammed and,
- capable of moving the rudder from 35 degrees on one side to 30 degrees on the other side in not more than 28 seconds with the vessel moving ahead at maximum service speed.

Auxiliary Steering

The steering must be designed so that transfer from the main steering gear or control to the auxiliary steering be achieved rapidly. Any tools or equipment necessary to make the transfer must be readily available.

The following vessels are not required to have auxiliary steering:

- main steering gear and controls are provided in duplicate.
- multiple screw propulsion with pilot house control for each screw.
- no regular rudder is fitted and steering action is obtained by a change of setting of the propelling unit.
- normal means of steering is a hand tiller and rudder.

Railing Requirements - *46 CFR 177.900(T) and 46 CFR 116.900(K)*

General Requirements

Rails or equivalent protection are required near the periphery of all weather decks accessible to passengers or crew. Equivalent protection may include lifelines, wire rope, chains and bulwarks, which provide strength and support equivalent to fixed rails.

Deck rails must withstand a 200 pound load in any direction and a 50 pound per foot load applied to the top rail in any direction.

Ferry or Excursion Type Operations

Vessels engaged in ferry or excursion type operations including but not limited to sightseeing trips, dinner and party cruises, and overnight cruises, shall have rails a minimum of 39 1/2 inches high.

On this type of vessel the space below the upper rail is required to be fitted with:

- bulwarks,
- chain link fencing or wire mesh that has openings of not more than 4 inches in diameter, or
- bars, slats, rail courses, or and equivalent spaced at intervals of not more than 4 inches.

Sport Fishing Vessels

On sport fishing vessels where it can be shown that higher rails would interfere with normal operations, rails of at least 30 inches may be permitted.

Courses must not be more than 12 inches.

When the vessel is not being used in this capacity, the vessel must comply with the applicable railing requirement.

Railing Requirements - *(Continued)*

Water Taxies, Pilot Boats, Dive Boats	Where the principle business of a vessel requires the discharge of personnel in a seaway, the OCMI may accept alternatives for those areas of a deck where passengers or cargo are discharged and for which removable rails, lifelines or chain would hinder discharge operations.
Vessels Subject to 1966 International Loadline Rules	Rail height shall not be less than 39 1/2 inches. Courses must not be more than 15 inches.
All Other Vessels	All other vessels not mentioned above shall have a minimum rail height of 36 inches. Courses must not be more than 15 inches. Sailing vessels, small vessels of the open launch type and other vessels not specifically covered elsewhere, shall have rails or equivalent protection as considered necessary by the OCMI.

SECTION 8

OPERATIONS

Marine Casualties and Investigations-*46 CFR 4*

What is a marine casualty?

Any casualty or accident involving any vessel other than a public vessel. The casualty occurs upon the navigable waters of the United States. This includes any accidental grounding, or occurrence involving a vessel, which results in damage by or to the vessel, gear, injury or loss of life. It includes collisions, strandings, groundings, heavy weather damage, fires, explosions, **failure of gear and equipment**, and any other damage which might effect or impair seaworthiness of the vessel, also included are injury or loss of life while diving from a vessel using underwater breathing apparatus.

Reporting Procedures

Marine casualties are required to be reported to the local Coast Guard by the owner, agent, master, operator, or person in charge. There are two types of reports required: **IMMEDIATE** and **WRITTEN**.

Immediate Report

An **IMMEDIATE** report to the nearest Coast Guard Marine Safety Office, Marine Inspection Office, or Coast Guard Group Office is required after addressing the resultant safety concerns. **IMMEDIATE** reports are required for the following casualties:

- Unintended groundings, or unintended strike of (allision with) a bridge;
- An intended grounding or bridge allision causing a hazard to navigation, the environment, or the safety of a vessel;
- A loss of main propulsion or steering;
- A loss of life;
- Injuries requiring professional medical treatment (treatment beyond first aid), and for crewmembers aboard commercial vessels, any injury rendering the individual unfit to perform their duties;
- Any occurrence causing damage in excess of $25,000 (to include the cost of labor and material required to restore the property to its condition before the occurrence).

Marine Casualties and Investigations *(Continued)*

Written Report

WRITTEN reports are required: In addition to the immediate notification, a WRITTEN report is required to be filed by owner, agent, master, operator, or person in charge with in five days of the incident. This WRITTEN report must be delivered to Coast Guard Marine Safety Office or Marine Inspections Office. It must be provided on a Form CG-2692 (Report of Marine Accident, Injury or Death), supplemented as necessary by appended Forms CG-2692A (Barge Addendum) and CG-2692B (Report of Required Chemical Drug and Alcohol Testing Following a Serious Marine Incident).

Serious Marine Incident

The term **SERIOUS MARINE INCIDENT** includes the following events involving a vessel in commercial service: Any marine casualty or accident required to be reported to the Coast guard which results in any of the following:

- One or more deaths;
- An injury to a crewmember, passenger, or other person which requires professional medical treatment beyond first aid. In the case of crewmembers aboard vessels in commercial service, any injury which renders the individual unfit to perform their routine duties;
- Damage to property in excess of $100,000 (to include the cost of labor and material required to restore the property to its condition before the occurrence);
- Actual or constructive loss of any vessel subject to inspection (as defined in 46 USC 3301)

Marine Casualties and Investigations *(Continued)*

Serious Marine Incidents

SERIOUS MARINE INCIDENTS require drug and alcohol testing.

For each marine casualty requiring a report, the marine employer shall determine whether there is evidence of alcohol or drug use by individuals directly involved in the casualty. It is the responsibility of the marine employer to file a written report (46 CFR 4.05-12) which:

- Identifies the individuals for whom evidence of drug or alcohol use has been obtained;
- Specifies the method used to obtain such evidence, such as personal observation of the individual, or by chemical testing of the individual.

As discussed earlier, a Form CG-2692B (Report of Required Chemical Drug and Alcohol Testing Following a Serious Marine Incident).

Crew Requirements - *46 CFR 185.402(T) - 122.402(K)*

Licenses

Each licensed individual employed upon the vessel shall have his or her original license on board and available for examination at all times when the vessel is underway.

Crew Training

The owner, master, or operator of your vessel shall instruct each crewmember on their responsibilities, upon first being employed and prior to getting underway for the first time. Additional training shall be conducted once a month if practicable but is mandatory once in every three months, those members' responsibilities as listed on the emergency instruction placard (Fire fighting, Man overboard, and Abandon ship) or the vessel station bill (vessel greater than 65 feet). Senior Deckhands shall be trained in accordance with Coast Guard NVIC 1-91, which is available from this office.

- Each drill must be conducted as if it were an actual emergency and be as detailed as possible.
- All training and drills must be logged or documented and must be available for review on request.
- Training entries shall include the date of training and general description of the drill and training.
- We recommend that all training log entries be in red ink or highlighted to speed up the review process.
- The above frequency is the minimum required. However, the master shall conduct more drills as necessary to ensure the crew can properly respond and that they possess adequate knowledge to combat any emergency.
- While not specifically required, it is further recommended that flooding drills be conducted to ensure crew is familiar with the vessels de-watering system.

Passenger Safety Requirements - *46 CFR 185.502(T) - 122.502(K)*

Passenger Count

The master of the vessel shall keep a correct, written, count of all passengers that embark on the vessel. Prior to departing on a voyage, the exact passenger count (not ticket sales) must also be available ashore at the vessels normal berthing location.

Passenger Orientation

Prior to getting underway, or shortly there after, the master of the vessel shall ensure that a suitable public announcement is made informing the passengers of the following for trips greater than 30 minutes.

- Location of all emergency exits.
- Stowage locations of life jackets, survival craft, and life ring buoys.
- Must demonstrate the proper method of donning the life jackets.
- Location of instruction placards for lifejackets and other life saving devices.

Documentation

Required Documents

The following is a list of the required documents, instructions, placards, and licenses that are required to be conspicuously displayed onboard the vessel and available for passenger and Coast Guard inspection:

- Certificate of Inspection.
- Vessel Stability Letter.
- U.S. Coast Guard Small Passenger Vessel Decal.
- Lifejacket Donning Instructions.
- Emergency Procedures.
- Station Bill (if greater than 65’in length or carries 5 or more crewmembers).
- Emergency Broadcast Instructions (located adjacent to the radio).
- Oil Discharge Placard (located by bilge pump controller).
- Garbage Discharge Placard.
- Instructions to activate the installed fire suppression system (if installed).

The following items shall be onboard the vessel and made available to the U.S. Coast Guard upon request.

- Certificate of Documentation (if > then 5 net ton).
- Vessel Log.
- FCC Radio Operators License and FCC Station License (if applicable)
- Senior Deck Hand Designation Letter (if applicable).
- Crew Training Documentation (if not in vessel log).
- NOAA EPRIB registration
- Great Lakes radio servicing certificate.

Notification of Repairs - *46 CFR 176.700 - 182.480 & 182.700*

Repairs and Alterations

Repairs to the hull, machinery, or equipment that effect the safety of the vessel must not be undertaken without the approval of the local Marine Safety Office. If emergency repairs are required, the operator must notify the local Coast Guard Marine Safety office as soon as practicable. Repairs that effect the safety of the vessel include, but are not limited to:

- Replacement, repair, or refastening of deck or hull plating, planking or structural members.
- Repair of cracks in deck frames or deck plates.
- Repair or replacement of electrical wiring.
- Repair or replacement of fuel lines or tanks.
- Repair or replacement of boilers or other pressure vessels.
- Repair or replacement of steering system.
- Repair or replacement of propulsion system.
- Repair or replacement of power supply system.
- Repairs that affect vessel stability.
- Repairs or alterations to vessel's lifesaving equipment.
- Repairs or alteration to the vessel's fire detection or suppression systems.
- Repairs that affect the vessel's de-watering capability.

If the above repairs are non-emergency then plan submittal and review will be required before repairs or alterations are started. Upon completion of repairs, inspection by this office may be required prior to the vessel being placed back in service.

SECTION 9

POLLUTION

Pollution Response

Introduction

The primary pollution response laws enforced by the U.S. Coast Guard on the Inland Rivers are:

- Federal Water Pollution Control Act (FWPCA)
- Clean Water Act (CWA)
- Oil Pollution Act of 1990 (OPA)
- Comprehensive Environmental Response Compensation and Liability Act of 1980 (CERCLA)

Federal Water Pollution Control Act (FWPCA)

This is the Coast Guard's basic authority for investigating maritime oil pollution discharges into or upon U.S. navigable waters.

Clean Water Act (CWA)

The CWA amended the FWPCA, giving the Coast Guard further pollution authority and was designed to eliminate all water pollution by the 1990's.

Oil Pollution Act of 1990 (OPA)

The Oil Pollution Act of 1990 (OPA) amends the FWPCA/ CWA. It provides:

- A $1 billion oil spill clean up fund
- Increased authority to direct and control oil spill cleanups
- Increase Coast Guard responsibilities for developing contingency plans
- Increased spillers liabilities

Comprehensive Environmental Response Compensation Liability Act (CERCLA)

This act is more comprehensive than the FWPCA and should be used for response to all hazardous substance releases.

Note: CERCLA does not apply to oil spills.

Pollution Reporting Requirements

Introduction

The following is the Who, When, What, Where, How, and why for reporting a pollution discharge/release.

Who

Anyone may report a discharge/release.

The owner, operator, or person in charge of the facility or vessel must make a report.

Note: The report must be made to the National Response Center (NRC) at 1-800-424-8802. In addition, the local Coast Guard unit and State/Local agencies should be notified of the discharge/release.

When

The report must be made as soon as there is knowledge of the incident.

What, Where, How, and Why

The report needs to include the following:

- What was discharge/released?
- Where did the discharge/release take place?
- How much was discharged/released.
- Is the discharge/release secured?
- What action is being done to contain the discharge/release?
- What was the cause of the discharge/released?

Use of Dispersants

Introduction

Often dispersants are improperly used. Members of the Marine Community often ask, "Why can't I use a detergent (e.g. Dawn or Joy) to clean spilled oil from the water?" Detergent does not remove the oil, it only causes it to settle to the bottom of the waterway and disperses the visual sheen.

Regulation

The use of dispersants is covered in 33 Code of Federal Regulations part 153.305: Methods and Procedures for the Removal of Discharged Oil.

Max penalty for violating 33 CFR 153.305.

- $27,500 per violation

Proper Use of Dispersants

Although dispersants have an important role in pollution response, their use needs to be approved by the Federal On Scene Commander (Coast Guard or Federal EPA) in accordance with the National Contingency Plan.

Proper Response Actions

The best response to an oil spill on water is to secure the source of the spill, use containment boom, apply sorbent pads, and notify the local Coast Guard and the National Response Center (1-800-424-8802), as soon as possible.

In general, the use of dish soap as an dispersant is not authorized

Penalties

Introduction

Upon completion of a pollution investigation the Coast Guard has several options to pursue Administrative, Civil or Criminal violations against the Responsible Party.

Administrative Penalty Options

1. Letter of Warning
2. Notice of Violation (Ticket)
   - Up to $5,000
3. Report of Violation
   - Class I ($11,000 per violation)
   - Class II ($11,000 per day the violation continues)

Civil and Criminal Options

1. Report of Violation
   - $27,500 per day of violation or;
   - $1,000 per barrel of oil discharged

2. Violation was the result of Gross Negligence or Willful Misconduct.
3. Including but not limited to intentional discharge.
   - Not less than $100,000 or;
   - Not more than $3,000 per barrel of oil spilled or;
   - 5 years imprisonment

Additional Penalties

1. Failure to provide notification of a discharge.
   - $27,500 per violation or;
   - 5 years imprisonment or;
   - Both

2. Failure to properly carry out removal of the discharge.
   - $27,500 per violation or;
   - An amount up to 3 times the costs incurred by the Coast Guard to conduct the cleanup.

SECTION 10

DRUG TESTING PROGRAM OVERVIEW

Required Elements of a Drug Testing Program

Introduction

As of December 21, 1990, Federal Regulations require that you have a random selection drug testing program in force.

This handout is designed to ***briefly*** explain the major points of the Coast Guard's drug & alcohol testing program. **This handout does not provide all of the information necessary to develop a fully compliant program.** To receive more detailed information for regulatory compliance, please contact the Drug & Alcohol Program Inspector (DAPI) at 419-418-6031.

Element Required

Every drug test program must consist of the following elements.

- Pre-employment, Random, Reasonable Cause, & Post Accident testing
- Background checks for all new employees
- Use of a Federally Certified Testing Laboratory
- Designated Medical Review Officer
- Employee Assistance Program (EAP) Training & Education

Certified Lab 49CFR40

The *Lab* performs the tests on specimen collected for the following drugs:

- **Marijuana**
- **Cocaine**
- **Opiates**
- **Phencyclidine (PCP)**
- **Amphetamines**

The lab you select must be certified by the **Department of Health and Human Services (DHHS)**. The latest list of certified laboratories can be obtained by contacting 1-800-workplace

Required Elements of a Drug Testing Program *(Continued)*

Collection Site
46CFR4.06-20
46CFR16.301-330
49CFR40

The *Collection Site* is the place where the specimen is collected. Note some certified labs have designated which sites and persons they will allow to collect and maintain the required security and chain of custody.

The regulations are very specific in how specimens are collected, how specimen containers are sealed and transported, and how specimens are analyzed. A chain of custody must be maintained from the time of acceptance of the specimen to its testing.

We recommend that you contact several different labs listed to determine which has collection sites nearest you and which provide the service you desire. You must ensure that only DOT 5-panel (also called NIDA 5-panel) tests are conducted. No other type of drug test or custody and control form is acceptable.

Required Elements of a Drug Testing Program *(Continued)*

Medical Review Officer
46CFR16.370
49CFR40

A *Medical Review Officer (MRO)* must review drug test results, relay findings to the employer, and is authorized to notify the Coast Guard of positive test results.

The MRO must be a licensed physician who has knowledge of substance abuse disorders and has appropriate medical training to interpret and evaluate an individual's positive test results together with his or her medical history and any other relevant biomedical information.

Before an individual who has failed a required test may return to work, the Medical Review Officer shall determine that the individual is drug free and the risk of subsequent use of dangerous drugs by the person is sufficiently low to justify his or her returning to work. This determination is documented in a "Return to Work" letter signed by the MRO. In addition, the individual shall agree to be subjected to increased unannounced testing for a period as determined by the Medical Review Officer for a period of up to 60 months.

It is also important to remember that a Coast Guard licensed or documented mariner, who tests positive for drugs, will also face suspension & revocation action by the Coast Guard against their license or document, which may prohibit their working in positions requiring a license or document.

Required Elements of a Drug Testing Program *(Continued)*

Education and Training 46CFR16.401

Education

Education is accomplished by the posting and distribution of the following:

- Informational materials concerning substance abuse
- Community service hotline for crewmember assistance
- Employers policy regarding drug and alcohol use in the workplace

Training *(for employers, crewmembers and supervisory personnel)*

Training must address:

- The effects and consequences of drug and alcohol use on:
  personal health
  personal safety
  work environment

- The physical manifestations and behavioral cues that may indicate drug and alcohol use and abuse
- The training must be documented
- Supervisors (management and licensed mariners) are required to have a minimum of 60 minutes of EAP training
- All other crewmembers must receive EAP training, but there is no minimum time requirement

Tests Required by the Regulations

Introduction

You must ensure that your drug testing program provides for the following tests and have proof that the tests were accomplished.

- **Pre-employment Testing**
- **Random Testing**
- **Periodic Testing**
- **Post Casualty Testing**
- **Reasonable Cause Testing**

Who Must Be Tested

Any employee who is required aboard the vessel as prescribed by the Certificate of Inspection (COI) is required to be tested.

Example

- Master, Operator
- Navigator
- Lookout
- Deckhand who handles lines

Example of employees <u>not</u> required to be tested.

- Cook *
- Waiter, waitress *
- Dishwasher *
- Fish handler or cleaner *

** If any of the above also fills a position required by the COI or if they perform duties of deckhand, patrolman, watchman, or are specifically assigned the duties of warning, mustering, assembling, assisting or controlling movement of passengers during emergencies, they are required to be tested.*

Tests Required by the Regulations *(continued)*

Records

You must maintain records and have them available for Coast Guard inspection. Your records (in the form of a MRO signed custody & control form or MRO signed lab report) should list the date each of the following were accomplished

- **Pre-employment tests**
- **Periodic tests**
- **Random tests**
- **Post Casualty test**
- **Reasonable Cause tests**

Negative test results must be kept for 1 year. Positive test results must be kept on file for 5 years. Pre-employment test results must be kept for as long as a crewmember is employed with the company.

Tests Required by the Regulations *(Continued)*

Pre-employment Test
46 CFR 16.210

You must provide proof that employees hired after December 21, 1990 have passed a pre-employment drug test.

You may waive a pre-employment drug test if you can obtain documentation that shows:

- the new employee was subject to random DOT drug testing for 60 of the preceding 185 days, OR
- the new employee has passed a required DOT drug test w/in the preceding 6 months

Random Testing
46 CFR 16.230

Random testing was required as of **October 1 1991** for all crewmembers. Random means that every crewmember of a given population has an equal chance of selection, each time a random selection is made. This chance of selection shall be such that an employee's chance of selection continues throughout his or her employment.

Random testing must be unannounced and the dates for the tests must be spread reasonably throughout the calendar year or operating season.

You must ensure that crewmembers are tested on a random basis at an annual rate of not less than 50 percent.

Example:

An employer with over ten employees could assign each employee with a number 1 thru 10. Then 5 times during the year all 10 numbers would be placed in a hat and 1 number drawn. The crewmember with that number would take the test.

Periodic Test
46 CFR 16.220

A periodic test is required when an employee holding a Coast Guard license or document applies for renewal.

This testing requirement does not apply to employees such as deckhands who do not possess a license or document.

Tests Required by the Regulations *(Continued)*

Post Casualty Testing
46 CFR 4.06

The employer must be prepared to drug and alcohol test all crewmembers engaged or employed aboard a vessel involved in a serious marine incident. Alcohol tests (breath or blood only) must be done within 2 hours of the accident (once emergent concerns have been addressed). Drug testing (DOT 5-panel urine) must be done as soon as practicable, not to exceed 24 hours after the incident.

If the vessel has a route that would keep it from returning to its collection site within 24 hours, required equipment and specimen containers must be kept aboard the vessel.

Reasonable Cause Test
46 CFR 16.250

A marine employer shall require any crewmember engaged or employed on board a vessel, who is reasonably suspected of using a dangerous drug to be chemically tested for dangerous drugs. The marine employer's decision must be based on a reasonable and articulable belief that an individual has used a dangerous drug based on direct observation of specific, contemporaneous physical, behavioral, or performance indicators of probable drug use. Where practicable, this belief should be based on the observation of the individual by two persons in supervisory positions.

Serious Marine Incident

A serious marine incident is defined as an incident that results in:

- death.
- injury requiring professional (beyond first aid) medical treatment, or that renders a crewmember incapable of performing their primary duties
- $100,000 or more in damage.
- loss of an inspected vessel.
- loss of an uninspected vessel greater than 100 GT
- discharge of more than 10,000 gallons of oil.
- release of a reportable quantity of a hazardous material.

Ensuring Your Program is in Compliance

Introduction

During your annual inspection a Coast Guard Marine Inspector will ask you about your drug testing program. The following checklist can be used to ensure that your program meets federal requirements and prepare you to answer the Inspector's questions regarding your program.

Checklist

	Drug Testing Program Checklist
	Do you have records/proof:
	That your testing laboratory is DHHS certified
	Of pre-employment testing for all currently employed crewmembers And completed background checks.
	Of periodic testing - *required at license renewal*
	Of random testing - *50% per year*
	That crewmembers/supervisors have received EAP training
	That employer and supervisors have had training in substance abuse and Behavioral cues for detection of drug use. (Minimum of 60 minutes)
	Of a medical review physician active in your program
	Are you prepared to conduct:
	Post casualty testing within 24 hours of accident.(2 hours for alcohol)
	Reasonable Cause tests

This checklist is similar to the one carried by Coast Guard Marine Inspectors to check operators for compliance with federal regulations. ***This checklist is not complete and following it alone will not guarantee your program is in complete compliance with the provisions of 46 CFR Part 16.***

Failure to Comply

Failure to comply with the Drug Testing Requirements can be cause for loss of your COI, or a civil penalty action of up to $5,000 per violation, per continued day of violation, or the issuance of a Captain of the Port Order that would halt the operation of your vessel.