

## Coast Guard Regulations for Boat Lighting



The Coast Guard requires lights on all boats between sunset and sunrise.

The United States Coast Guard sets regulations for all vessels that travel any waterway in the U.S. Lights on boats perform the same function they do on automobiles, and more. Lights not only alert other boats to your location, they tell them what kind of boat you are on. Each type of boat has specific regulations to make it easy to recognize.

### **Power Boat Light Requirements**

1. Boats under power include sailboats with an optional engine. Boats less than 39.4' need either a white masthead light and white stern light or a single all-around white light. On boats less than 39.4' lights are required on each side, a separate light on each side (red on the port side, and green on the starboard side) or a single red/green light with the beams oriented in the proper directions. Boats over 39.5' must have separate masthead and stern white lights. Other lights requirements for larger boats are the same as for smaller ones. Boats more than 164' require a second masthead light positioned higher than the original forward white light.

### **Sailboat (Powerless) Light Requirements**

2. All sailboats must have red/green side lights and a white stern light regardless of size. These may appear as a single tri-color light above mid-ship on the mast as long as all beams are oriented properly, i.e., red on the port side, green on the starboard side and white to the rear, or they can all be individual lights in the appropriate positions.

### **Visibility**

3. Size determines the visibility distance required on boat lights. The masthead light and stern light (or the single all-around light) on boats under 39.4' must be visible at a distance of two nautical miles in a 112.5-degree arc. On boats over 39.5' the masthead must be visible at a distance of three nautical miles; stern lights, or the all-around light, stays at two miles. Side lights on boats less than 39.4' require a visibility of one nautical mile; the distance increases to two nautical miles on boats over 39.5'.

## Placement

4. Stay away from fancy fittings, in-hull lights or other unusual light fixtures either manufacturer installed or user installed. Some manufacturers attempt to make their boats stand out from others by creating unique designs for the lighting. Situations where lights are flush mounted or sunk into the hull obstruct the visibility of these types of configurations. Many of these fancy styles are not functional, and they are illegal. They do not comply with visibility requirements set by the U.S. Coast Guard.

## State Boating Laws

5. States make their own laws regarding many boating regulations and have some that may not exist in other states. You are responsible for knowing what the laws are in the state where you plan on boating. However, those areas where the Coast Guard clearly demands compliance are not negotiable within each state. Lights, safety gear and other Coast Guard requirements are in effect regardless of where you are boating and are identical in all states. This is important because it allows boaters to recognize what they are looking at when they see light configurations in the dark, when it may be impossible to see any other part of another boat. The Coast Guard enforces all boating laws in all states. You must always allow a Coast Guard vessel to approach and officers to board your boat.

## Lightvessel



[Lightship Finngrundet](#), now a [museum ship](#) in [Stockholm](#). The day markers can be seen on the masts.

[Fehmarnbelt Lightship](#), now a [museum ship](#) in [Lübeck](#)

A **lightvessel**, or **lightship**, is a [ship](#) which acts as a [lighthouse](#). They are used in waters that are too deep or otherwise unsuitable for lighthouse construction. Although there is some record of fire beacons placed on ships in Roman times, the first modern lightvessel was off the [Nore](#) sandbank at the mouth of the [River Thames](#) in [England](#), placed there by its inventor Robert Hamblin in 1732. The type has become largely obsolete; some stations were replaced by lighthouses as the construction techniques for the latter advanced, while others were replaced by large automated [buoys](#).

A crucial element of lightvessel design is the mounting of a light on a sufficiently tall [mast](#). Initially this consisted of oil lamps which could be run up the mast and lowered for servicing. Later vessels carried fixed lamps, which were serviced in place. [Fresnel lenses](#) were used as they became available, and many vessels housed these in small versions of the lanterns used on lighthouses. Some lightships had two masts, the second holding a reserve beacon in case the main light failed.

Initially the [hulls](#) were constructed of wood, with lines like those of any other small merchant ship. This proved to be unsatisfactory for a ship that was permanently anchored, and the shape of the hull evolved to reduce rolling and pounding. As iron and steel were used in other ships, so were they used in lightvessels, and the advent of steam and diesel power led to self-propelled and electrically lighted designs. Earlier vessels had to be towed to and from station.

Much of the rest of the ship was taken up by storage (for oil and the like) and crew accommodations. The primary duty of the crew was, of course, to maintain the light; but they also kept record of passing ships, observed the weather, and on occasion performed rescues.

In the early 20th century, some lightships were fitted with warning bells, either mounted on the structure or lowered into the water, the purpose of which was to warn of danger in poor visibility and to permit crude estimation of the lightship relative to the approaching vessel. Tests conducted by [Trinity House](#) found that sound from a bell submerged some 18 feet (5.5 m) could

be heard at a distance of 15 miles (24 km), with a practical range in operational conditions of 1–3 miles.

### Mooring



Lightship *Portsmouth* (LV-101) shows its mushroom anchor. It can be seen at downtown [Portsmouth, Virginia](#), and is a part of the [Naval Shipyard Museum](#).

Holding the vessel in position was an important aspect of lightvessel engineering. Early lightships used [fluke anchors](#), which are still in use on many contemporary vessels. These were not very satisfactory, since a lightship has to remain stationary in very rough seas which other vessels can avoid, and these anchors are prone to dragging.

Since the early 19th century, lightships have used [mushroom anchors](#), named for their shape, which typically weigh 3-4 tons. They were invented by [Robert Stevenson](#). The first lightvessel equipped with one was an 82-ton converted fishing boat, renamed *Pharos*, which entered service on 15 September 1807 near to [Bell Rock](#) and had a 1.5 ton anchor. The effectiveness of these anchors improved dramatically in the 1820s, when cast iron anchor chains were introduced (the [rule of thumb](#) being 6 feet of chain for every foot depth of water).

### Appearance



LV-11 (originally British lightship Trinity House) is docked in [Rotterdam, Netherlands](#), as "Breeveertien" serving as a restaurant.



The North Carr Lightship showing large foghorn

As well as the light, which operated in the fog and also at night, from one hour before sunset to one hour after sunrise, early lightvessels were equipped with red (or very occasionally white) day markers at the tops of masts, which were the first things seen from an approaching ship. The designs varied: filled circles or globes, and pairs of inverted cones being the most common among them.

Later lightships, for purposes of visibility, normally had bright red hulls which displayed the name of the station in white upper case letters; relief light vessels displayed the word RELIEF instead. A few ships had differently coloured hulls. For example, the [Huron Lightship](#) was painted black since she was assigned the black buoy side of the entrance to the Lake Huron Cut. The lightvessel that operated at Minots Ledge, Cohasset, Mass. from 1854 until 1860 had a light yellow hull to make it visible against the blue-green seas and the green hills behind it.

### **Lightvessel service**

The first lightvessel conversion to [solar power](#) was made in 1995, and all vessels except the '20 class' have now been converted. The '20 class' is a slightly larger type of vessel that derives its power from diesel electric generators. Where a main light with a visible range in excess of 20 nautical miles (37 km) is required, a '20 class' vessel is used, as the main light from a Trinity House solar lightvessel has a maximum range of 19 nautical miles (35 km).

The first [United States](#) lightship was established at [Chesapeake Bay](#) in 1820, and the total number around the coast peaked in 1909 with 56 locations marked. Of those ships, 168 were constructed by the [United States Lighthouse Service](#) and six by the [United States Coast Guard](#), which absorbed it in 1939. From 1820 until 1983, there were 179 lightships built for the U.S. government, and they were assigned to 116 separate light stations on four coasts (including the [Great Lakes](#)).

The first United States lightships were small wooden vessels with no propelling power. The first United States iron-hulled lightship was stationed at Merrill's Shell Bank, Louisiana, in 1847. Wood was still the preferred building material at the time because of lower cost and ability to withstand shock loading. Wooden lightships often survived more than 50 years in northern waters where the danger of rotting was reduced. Lightvessel 16 guarded Sandy Hook and Ambrose stations more than 80 years. Lightvessel 16 had both an inner hull and an outer hull with the space between filled with salt to harden the wood and reduce decay. Several lightships built with composite wood and steel hulls in 1897 proved less durable than either wood or steel.

The first modern steel lightship in United States service was lightvessel 44 built in 1882. One of the last United States wooden hulled lightships built, lightvessel 74, went into service at Portland, Maine, in 1902. The first United States lightships with steam engine propulsion were built in 1891 for service on the Great Lakes where seasonal ice required prompt evacuation of light stations to avoid destruction of the lightships.



Some lightships, like this one in [Amsterdam](#), were also equipped with a [foghorn](#) for audible signals at foggy times.