



Boating Safety Circular 75

What navigation lights must the operator of a 19-foot powerboat display on inland waters at night?

What navigation lights must the operator of a 40-foot cabin cruiser display on international waters during periods of reduced visibility, such as in fog or heavy rain?

What navigation lights must the operator of a 36-foot sailboat display in international waters at night when underway under both a mainsail and an auxiliary engine?

What type of vessel may carry two all-round lights in a vertical line at the top of the mast, the upper one red and the lower one green, in addition to sidelights and a sternlight?

We'd be surprised if many of our readers knew all the correct answers and didn't have to consult a copy of the Navigation Rules or some other source of boating safety information. There are many boat operators who, for various reasons, choose to ignore the significance of navigation lights to maritime safety. Our examinations at the boat shows also indicate that there are builders of boats who do not make things any easier for those who go boating at night and have to be able to determine whether they are the "Stand-on" or the "Give-way" vessel in crossing or passing situations.

We are therefore beginning this issue with an article about the Rules as they apply to navigation lights required for vessels less than 20 meters* (65.6 feet) in length. Included are discussions of the various operator or manufacturer noncompliances we have observed, and a review of articles covered in previous issues of the **Boating Safety Circular**.

* Those sections in the Navigation Rules involving larger vessels, vessels being pushed or towed, fishing vessels, etc. are marked with an asterisk and were omitted from this article for the sake of brevity.

Federal law requires the display of navigation lights on all vessels operating between sunset and sunrise or during periods of reduced visibility. Under ordinary conditions they tell boat operators something about each other's size, speed, course, kind of boat (sail, power, etc.) and mode of operation. Navigation lights also enable vessel operators to properly apply the Navigation Rules.

Although it is the boat operator's responsibility to carry and use navigation lights, most manufacturers choose to install them or offer them as optional equipment. However, during factory and boat show inspections Coast Guard standards personnel frequently observe that many manufacturers of recreational boats do not have a good understanding of the Rules governing proper installation of navigation lights. Some manufacturers are installing navigation lights which do not meet the requirements of the International or the Inland Rules.

Boat buyers and boat owners assume that the equipment installed on their boats at the time of purchase complies with all legal requirements. Deficient, shoddy and improperly installed equipment seriously endangers their lives as well as the lives of others who operate their boats at night.

In order to reduce the dangers to which the members of the boating public are exposed, under Coast Guard Recreational Boating Standards policy, both the boat manufacturer and the dealer are responsible

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for the adequacy of navigation lights that the manufacturer installs at the factory or the dealer installs. Any manufacturer or dealer who installs navigation lights prior to offering a boat for sale must:

(a) Install lights that satisfy the requirements of the International Rules; or

(b) Install lights that satisfy the Federal requirements of the Inland Rules; or

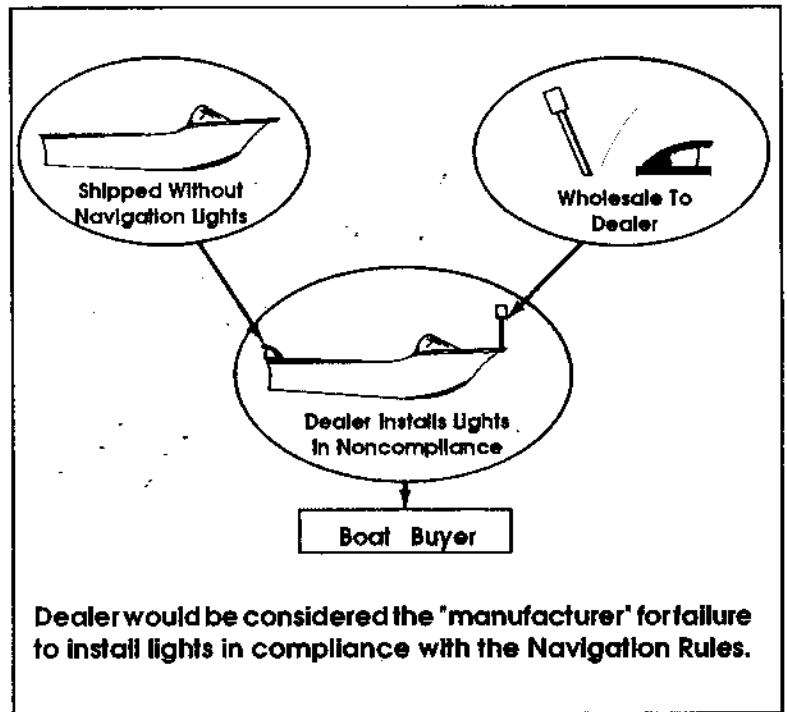
(c) Be able to prove that failure to install lights in a legal configuration was the result of a specific order to the contrary from the buyer.

Under this policy, boats that are manufactured with installed navigation lights that do not meet either Federal or international requirements, contain a defect that creates a substantial risk of personal injury to the public. Thus, such boats are subject to the defect notification requirements in 46 U.S.C. 4310. This policy is in the best interests of both the boat manufacturers, dealers and the boating public.

THE NAVIGATION RULES

The International Regulations for Preventing Collisions at Sea (72 COLREGS) became effective on July 15, 1977. The 72 COLREGS apply to all vessels upon the high seas and in all connecting waters navigable by seagoing vessels. They are published as regulations in Appendix A to Part 81 of Title 33 of the Code of Federal Regulations.

The Inland Navigation Rules were enacted by law on December 24, 1980, and became effective for all inland waters except the Great Lakes on December 24, 1981. The Inland Rules became effective on the Great Lakes on March 1, 1983. Rules 1 through 38 apply to all vessels used upon the inland waters of the United States, and to vessels of the United States on the Canadian waters of the Great Lakes, to the extent that there is no conflict with Canadian law. Three Annexes to the Rules which cover navigation lights were published as regulations in Parts 81, 84 and 89 of Title 33 of the Code of Federal Regulations.



A vessel operating on the waters of the United States may carry the lights prescribed by the International Rules (72 COLREGS) or the Inland Rules. It is important to note that with the exception of Annex V to the Inland Rules (Pilot Rules), the International and Inland Rules and Annexes are very similar in both content and format.

The Coast Guard publishes a manual, "Navigation Rules, International - Inland" (COMDTINST M16672.2B) which contains both the International and the Inland Rules. The manual contains requirements for navigation lights, shapes, sound signals, and maneuvering rules that must be followed by U.S. vessels navigating the high seas and U.S. inland waters.

A copy of the Navigation Rules must be carried on vessels (both commercial and recreational) 12 meters (39.4') or more in length.



See Changes to the Rules on Page 31.

See order form on Page 35

THE NAVIGATION RULES - INTERNATIONAL

RULE 1 - Application

(a) These Rules shall apply to all vessels upon the high seas and in all waters connected therewith navigable by seagoing vessels.

(b) Nothing in these Rules shall interfere with the operation of special rules made by an appropriate authority for roadsteads, harbors, rivers, lakes or inland waterways connected with the high seas and navigable by seagoing vessels. Such special rules shall conform as closely as possible to these Rules.

(c) *

THE NAVIGATION RULES - INLAND

RULE 1 - Application

(a) These Rules apply to all vessels upon the inland waters of the United States, and to vessels of the United States on the Canadian waters of the Great Lakes to the extent that there is no conflict with Canadian law.

(b)(i) These Rules constitute special rules made by an appropriate authority within the meaning of Rule 1(b) of the International Regulations.

(b)(ii) All vessels complying with the construction and equipment requirements of the International Regulations are considered to be in compliance with these Rules.

(c) *

Since a vessel complying with the International Rules is considered to be in compliance with the Inland Rules, the remaining references in the italic type face in the material in this article, are taken from the International Rules.

THE NAVIGATION RULES

RULE 20-Application:

(a) Rules in this Part shall be complied with in all weathers.

(b) The Rules concerning lights shall be complied with from sunset to sunrise, and during such times no other lights shall be exhibited, except such lights as cannot be mistaken for the lights specified in these Rules or do not impair their visibility or distinctive character, or interfere with the keeping of a proper look-out.

(c) The lights prescribed by these Rules shall, if carried, also be exhibited from sunrise to sunset in restricted visibility and may be exhibited in all other circumstances when it is deemed necessary.

(d) The Rules concerning shapes shall be complied with by day.

The excerpts of the Navigation Rules as they relate to navigation lights for various size vessels are stated in metric terms, i.e. meters vs. feet. The following conversion table may be helpful in understanding the Rules:

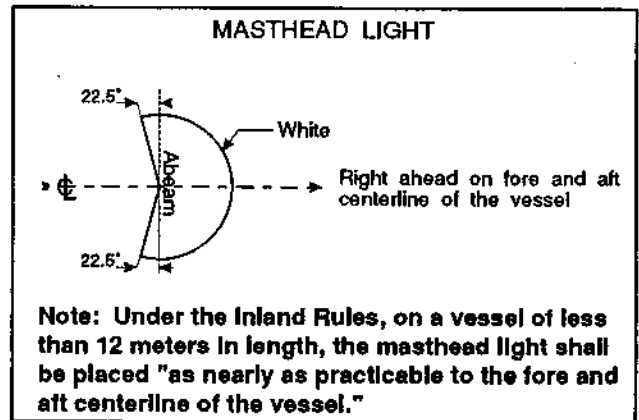
Metric Measure	U.S. Measure
20 meters	65.6 ft
12 meters	39.4 ft
7 meters	23.0 ft

(e) The lights and shapes specified in these Rules shall comply with the provisions of Annex I to these Regulations.

THE NAVIGATION RULES

RULE 21 - Definitions:

(a) "Masthead light" means a white light placed over the fore and aft centerline of the vessel showing an unbroken light over an arc of the horizon of 225 degrees and so affixed as to show the light from right ahead to 22.5 degrees abaft the beam on either side of the vessel.

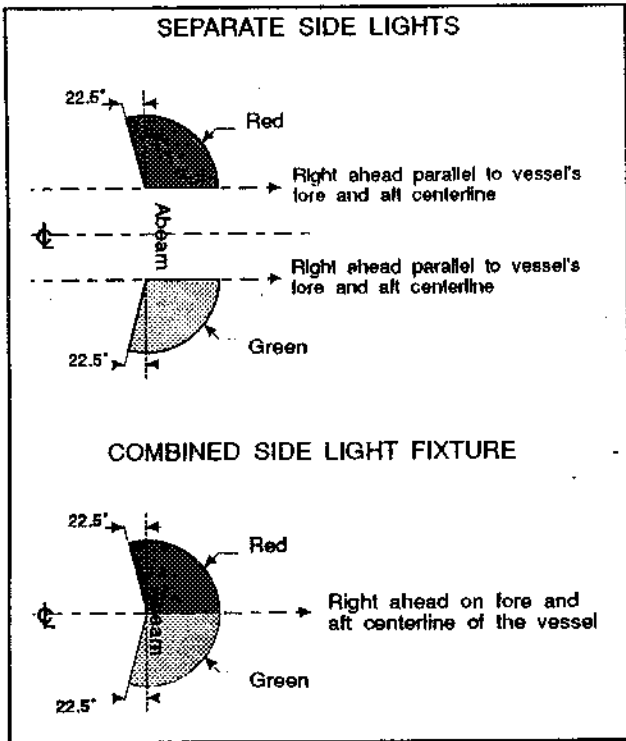


THE NAVIGATION RULES

RULE 21 - Definitions:

(b) "Sidelights" means a green light on the starboard side and a red light on the port side each showing an unbroken light over an arc of the horizon of 112.5 degrees and so fixed as to show the light from right ahead to 22.5 degrees abaft the beam on its respective side. In a vessel of less than 20 meters in length, the sidelights may be combined in one lantern carried on the fore and aft centerline of the vessel.

Note: Same for the Inland Rules, except that on a vessel of less than 12 meters in length, the sidelights when combined in one lantern, shall be placed as nearly as practicable to the fore and aft centerline of the vessel.

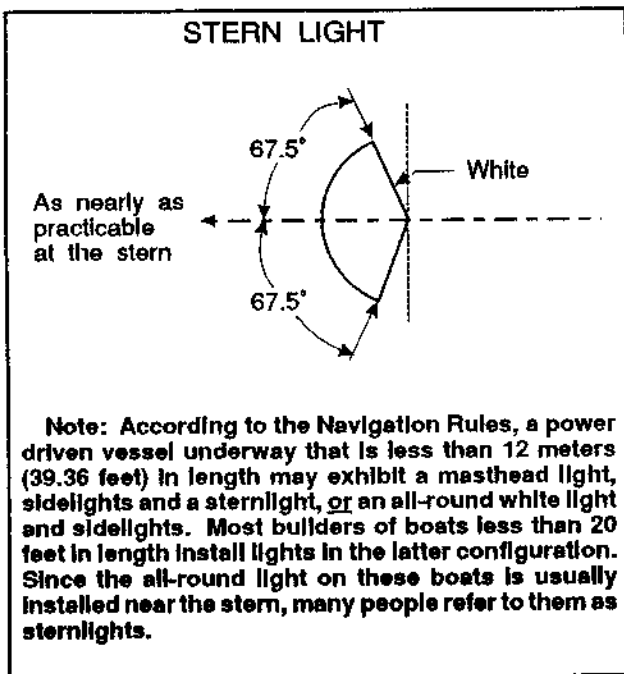


THE NAVIGATION RULES

RULE 21 - Definitions:

(c) "Sternlight" means a white light placed as nearly as practicable at the stern showing an unbroken light over an arc of the horizon of 135 degrees and so fixed as to show the light 67.5 degrees from right aft on each side of the vessel.

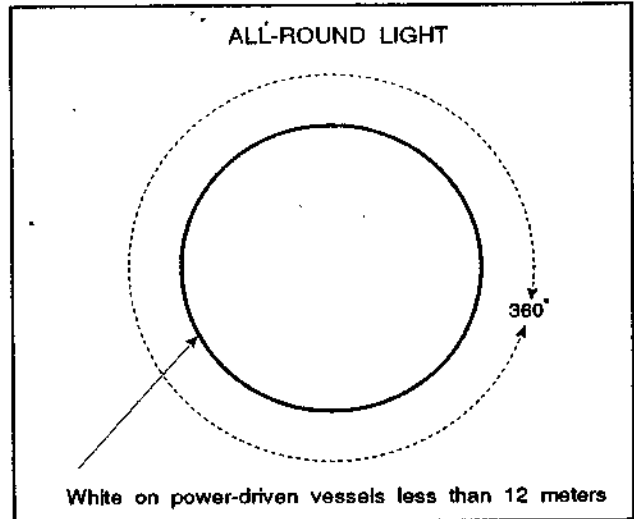
(d) "Towing light" means a yellow light having the same characteristics as the "sternlight" defined in paragraph (c) of this Rule.



THE NAVIGATION RULES

RULE 21 - Definitions:

(e) "All-round light" means a light showing an unbroken light over an arc of the horizon of 360 degrees."

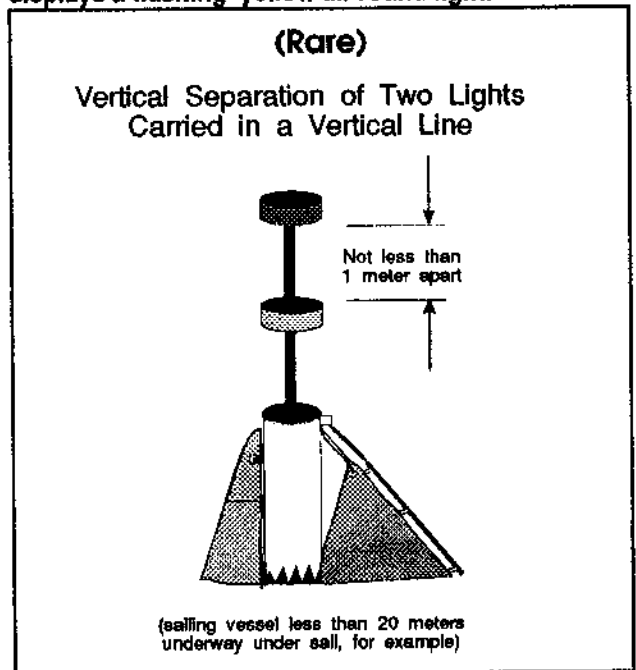


Notes:

The Rules allow for a maximum of six degrees of blockage by masts, topmasts or structures.

A sailing vessel less than 20 meters in length underway under sail may display a red and a green all-round light carried in a vertical line (Rule 25(c)). Such displays are rare because of the additional power drain and the required minimum one meter separation above the uppermost sail.

A hovercraft in the non-displacement mode (hovering) displays a flashing yellow all-round light.



THE NAVIGATION RULES

RULE 22 - Visibility of Lights

The lights prescribed in these Rules shall have an intensity as specified in Section 8 of Annex 1 to these Regulations so as to be visible at the following minimum ranges:

(a) * [applies to a vessel 50 meters or more in length]

(b) *In vessels of 12 meters or more in length, but less than 50 meters in length:*

a masthead light, 5 miles; except that where the length of the vessel is less than 20 meters, 3 miles

a sidelight, 2 miles;

a sternlight, 2 miles;

a towing light, 2 miles;

a white, red, green or yellow all-round light, 2 miles

(c) *In vessels of less than 12 meters in length:*

a masthead light, 2 miles;

a sidelight, 1 mile;

a sternlight, 2 miles;

a towing light, 2 miles;

a white, red, green or yellow all-round light, 2 miles

(d) *In inconspicuous, partly submerged vessels or objects being towed:*

a white all-round light, 3 miles.

THE BIGGER THE BETTER

During a recent trip to a powerboat show we were surprised by the minimal size navigation light fixtures many manufacturers are using, particularly on large, high performance boats capable of speeds well in excess of 40 miles per hour. Several of the high performance boats were equipped with the same minimum size combination sidelight fixtures as were used on much smaller, non-planing boats.

On a dark night with a clear atmosphere navigation lights tell boat operators something about each other's size, speed, relative course and kind of boat. More importantly, using their knowledge of navigation light displays, other vessel operators can properly apply the Rules of the Road. The Navigation Rules do not specify standards governing visibility based upon sizes of navigation light fixtures. Rather, visibility is expressed in terms of luminous intensity, i.e., range of visibility in nautical miles.

A power driven vessel less than 12 meters in length may display:

(a) A white masthead light visible two nautical miles, separate or combined sidelights visible one

nautical mile, and a white sternlight visible 2 nautical miles; or

(b) A white all-round light visible two nautical miles and separate or combined sidelights visible one nautical mile.

In many situations which require vessel operators to properly apply the Rules of the Road, navigation lights compete with the lights on other vessels, and with shore lights which have much greater ranges of visibility. A boat moving at 60 miles per hour is covering a mile in one minute. If the brightest navigation light such a boat displays is visible for as little as two nautical miles, there will be many situations where boat operators have less than two minutes to determine the size and speed of an approaching vessel and to take whatever steps might be necessary to avoid a collision. Allowable reaction time would be even shorter in confined waterways, heavy traffic, poor visibility and confusing shore lights. Instant maneuvering decisions must be made in these situations, and navigation lights must indicate relative course and vessel type at a glance.

We remind all boat manufacturers about the increasing numbers of high speed boats in use on our nation's waters. We urge all boat builders, particularly any builder of a boat that is faster than 40 miles per hour, to use at least the next higher minimum luminous intensity when selecting navigation light fixtures. We urge any owners replacing navigation lights, particularly those in congested areas and waters frequented by operators of high performance boats, to use larger and brighter navigation lights.

The main reasons why boat manufacturers use only the minimum size navigation light fixtures are probably because of esthetics or to reduce glare. Some manufacturers have begun offering retractable cleats. No violation exists between sunrise and sunset if a vessel has no lights or does not exhibit them. We believe it is also possible to design retractable navigation light fixtures. A large retractable fixture would be invisible during the day and could be fitted with screens that prevent glare when a vessel is operated at night.

As the average speeds at which recreational boats are operated increases, there's no question. When selecting navigation lights, the bigger -- the better.

VESSELS UNDER POWER

THE NAVIGATION RULES

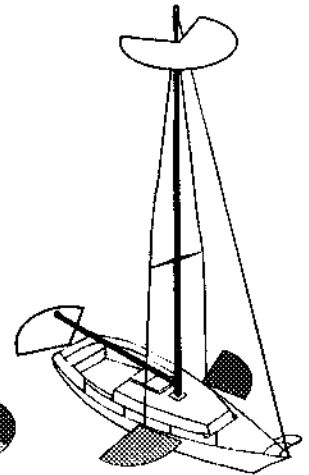
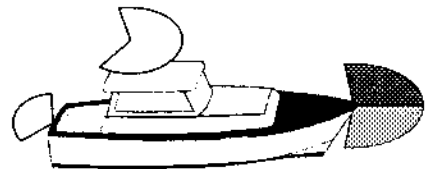
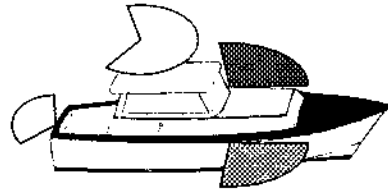
RULE 23 - Power-driven Vessels Underway

- (a) A power-driven vessel underway shall exhibit:
- (i) a masthead light forward;
 - (ii) a second masthead light abaft of and higher than the forward one; except that a vessel of less than 50 meters in length shall not be obliged to exhibit such light but may do so;
 - (iii) sidelights;
 - (iv) a sternlight.
- (b) An air cushion vessel when operating in the non-displacement mode [i.e., hovering] shall, in addition to the lights prescribed in paragraph (a) of this Rule, exhibit an all-round flashing yellow light.
- (c)(i) A power-driven vessel of less than 12 meters in length may in lieu of the lights prescribed in paragraph (a) of this Rule exhibit an all-round white light and sidelights;

Vessels Less Than 20 Meters in Length Underway Under Power¹

¹ Note: A sailing vessel underway under both sail and under power is considered a powered vessel.

Inland or International

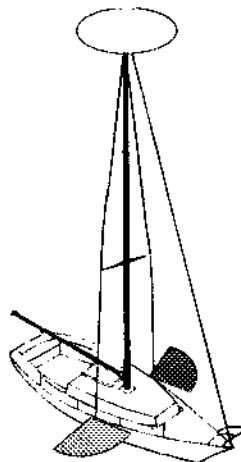
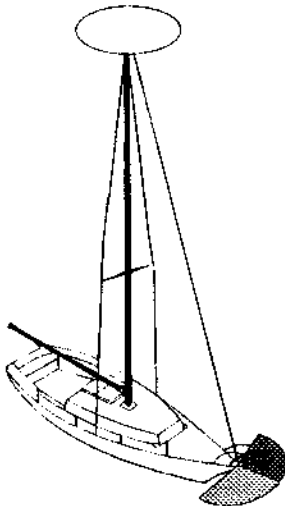
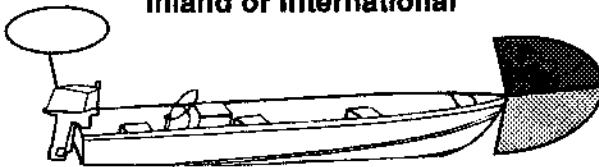


Sailboat under power

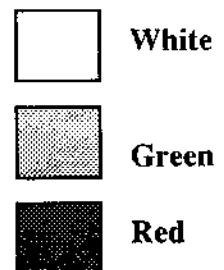
Vessels Less Than 12 Meters in Length Underway Under Power¹

¹ Note: Powered vessels less than 12 meters in length may display any of the arrays illustrated on this page.

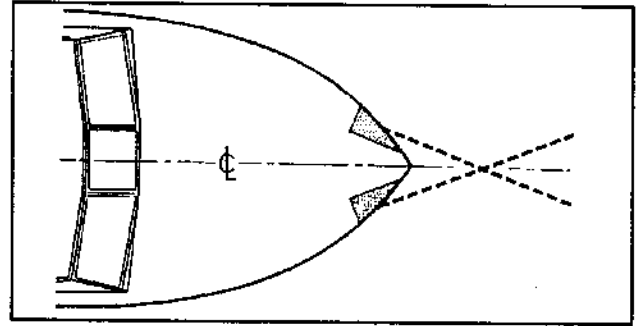
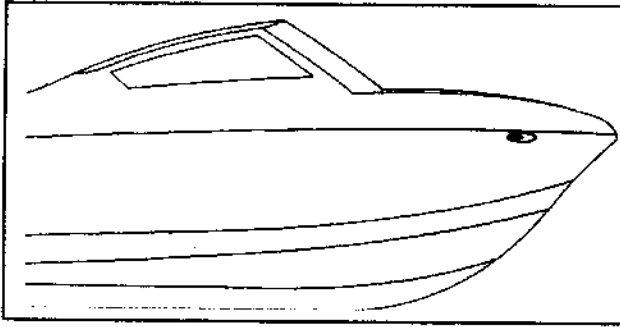
Inland or International



Sailboat under power

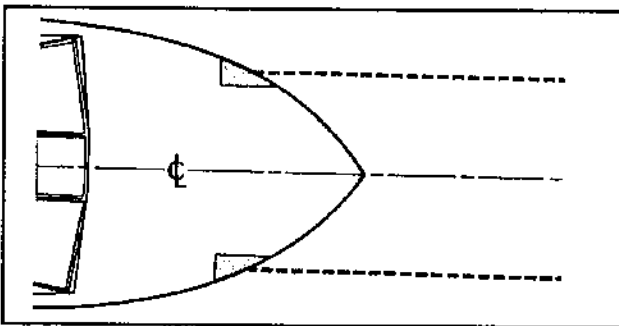


VESSELS UNDER POWER - PROBLEMS IN THE FIELD



Sidelights: One navigation light installation error which Coast Guard inspectors frequently find is the installation of flush mounted sidelights in the forward part of the hull of a boat, usually below the rub rail. As a result, the lights are installed "cross-eyed" and the operator of an approaching vessel may be confused about the relative direction in which these boats are travelling causing maneuvering errors.

Positioning: Sidelight fixtures must be installed parallel with the fore and aft centerline of the vessel and arranged to show an unbroken light from right ahead to 22.5 degrees abaft the beam, a total sector arc of 112.5 degrees. Sidelights that are installed in the contour of the bow without providing a mounting surface tooled to be parallel with the fore and aft centerline of the vessel are not in compliance with the Inland or International Navigation Rules.



Depending on the breadth of the vessel near the bow and how far aft from the vessel's stem the lights are mounted, this shift can be more than 20 degrees in some cases. Either fit wedge-shaped blocks between the fixture and the hull so as to make them parallel to the centerline of the vessel, or move the fixtures further aft where the curvature of the hull isn't so pronounced. However, installing the fixtures too far aft of the vessel's stem may result in the sidelights not being visible from a position dead ahead. Also, most of

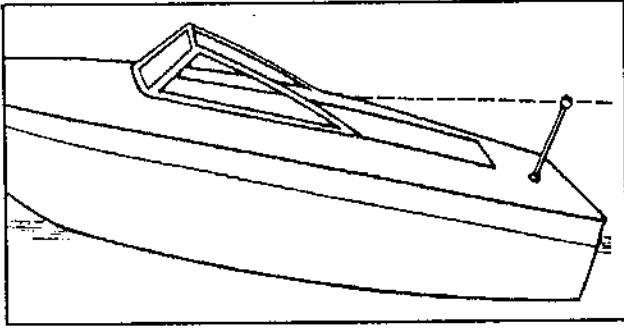
these flush mounted sidelights are installed below the vessel's rub rail. International Navigation Rules require that sidelights be installed above the uppermost continuous deck. Therefore this configuration is not in compliance with International Navigation Rules.

Intensity: Another factor in proper installation of sidelights on a power-driven vessel is that they must maintain their required minimum intensity in a vertical sector from 5 degrees above to 5 degrees below the horizontal. They must also maintain at least 60 percent of their minimum required intensity from 7.5 degrees above to 7.5 degrees below the horizontal. For vessels under sail, sidelights must maintain their required minimum intensity in a vertical sector from 5 degrees above to 5 degrees below the horizontal and at least 50 percent of their minimum required intensity from 25 degrees above to 25 degrees below the horizontal to allow for heel. Installing flush mounted sidelights, designed to be mounted to a vertical surface in the hull contour, without providing a mounting surface tooled to be vertical, shifts the vertical coverage sector. This also results in a noncompliance with the Navigation Rules.

The illustrations show examples of this type of installation. Many manufacturers use similar sidelight installations. This is a dangerous trend which is likely to end up costing somebody a pile of money when a plaintiff's attorneys go after everyone who might be liable for a serious collision.

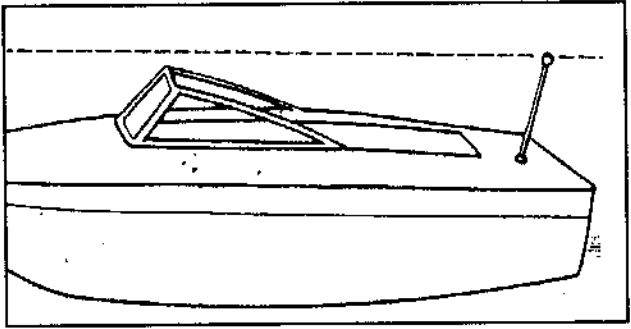
Visibility of sternlight: Some owners install davits on the stern of their boats to allow them to raise and carry a dinghy. Others rest the dinghy on its side on a swim platform. While these owners no longer have to tow the dinghy, many such installations fail to account for the fact that when the dinghy is aboard, it blocks visibility of the sternlight by an overtaking vessel.

VESSELS UNDER POWER - PROBLEMS IN THE FIELD



All-round lights: A boat's all-round (32 point, 360 degree) white running light is the most important of a small boat's navigation lights because it can be seen from any direction. The most common problem associated with this light is that it is frequently mounted on a staff that is too short. As a result, the light is obscured when the vessel is underway because of the tendency of the bow to rise when the boat is moving, or the light is obscured by canvas tops or other equipment owners add after purchasing a boat.

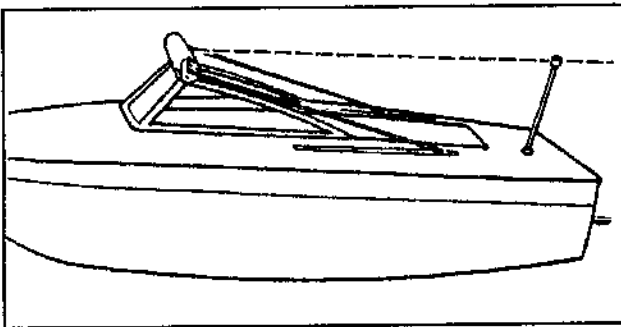
The most common type of all-round white light fixture features a telescopic staff attached near the stern of the boat. During the day the boat operator can lower the light fixture to where it is flush with the deck or gunwale and out of the way. The telescopic staff is a practical feature for the boat operator who wants the light fixture out of the way while trolling, docking or performing other



maneuvers. Owners are also urged to remember to fully extend the staff when turning on their boats' running lights.

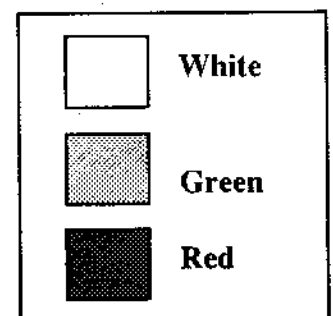
Combination masthead light and anchor light: Some navigation light fixtures consist of a combination masthead light and anchor light. The fixture can be carried on any vessel less than 50 meters in length. When underway, the masthead light sector (225°) in the fixture is switched on and displayed with sidelights and a sternlight (135°) in a separate fixture. When at anchor, the 135 degree aft sector of the combination masthead light and anchor light is switched on creating an anchor light and the sidelights and sternlight are turned off. The combination masthead light and anchor light is being improperly used because both sectors are being turned on in addition to a sternlight when the vessel is underway. Consequently, two white lights are seen when the vessel is viewed from astern, instead of the single required sternlight.

Combination sidelight fixtures on bass boats: Many bass boats are equipped with a combination sidelight fixture mounted on the stem. Dealers and owners who later add electric trolling motors must make sure the combination sidelight fixture is still visible.



At dusk the boat operator loosens a threaded sleeve, pulls up the rod and tightens the sleeve again. Unfortunately, the actual height to which the staff can be extended is usually dictated by the distance from the top of the gunwale to the deck beneath it.

If the all-round light is obscured from any direction, while at rest or underway, or by any part of the boat structure or its equipment, owners are urged to buy a longer staff, even if it will require the use of a removable staff, rather than one which



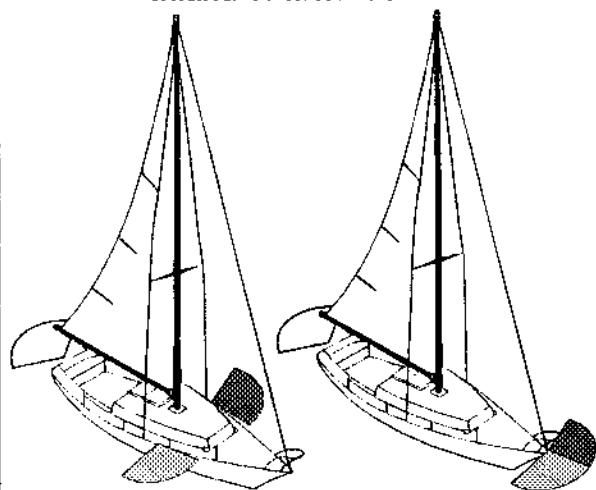
VESSELS UNDER SAIL

THE NAVIGATION RULES

RULE 25 - Sailing Vessels Underway and Vessels Under Oars

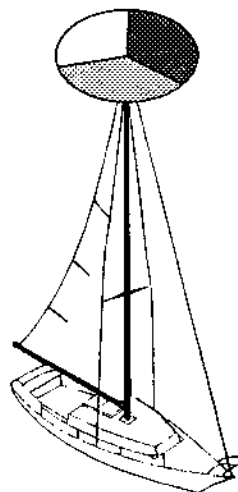
- (a) A sailing vessel underway shall exhibit:
- (i) sidelights;
 - (ii) a sternlight
- (b) In a sailing vessel of less than 20 meters in length the lights prescribed in paragraph (a) of this Rule may be combined in one lantern carried at or near the top of the mast where it can best be seen.
- (c) A sailing vessel underway may, in addition to the lights prescribed in paragraph (a) of this Rule, exhibit at or near the top of the mast, where they can best be seen, two all-round lights in a vertical line, the upper being red and the lower green, but these lights shall not be exhibited in conjunction with the combined lantern permitted by paragraph (b) of this Rule.
- (d)(i) A sailing vessel of less than 7 meters in length shall, if practicable, exhibit the lights prescribed in paragraph (a) or (b) of this Rule, but if she does not, she shall have ready at hand an electric torch or lighted lantern showing a white light which shall be exhibited in sufficient time to prevent collision.

Sailing Vessels Less Than 20 Meters In Length Underway Under Sail Inland or International

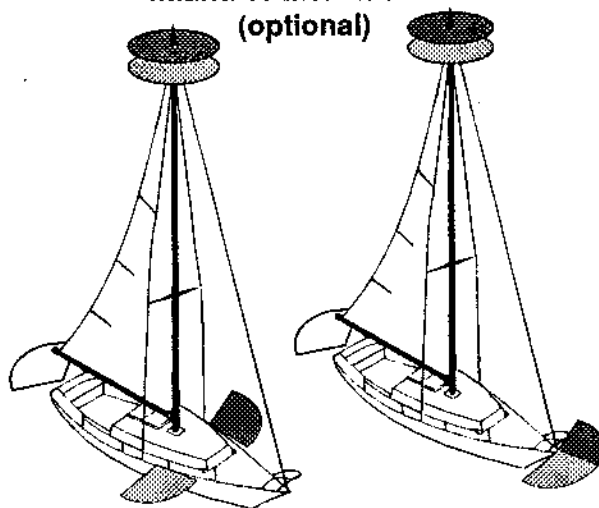


Tricolor light vs. sidelights and stern light: Because the tricolor light allowed on sailing vessels less than 20 meters under sail is displayed higher than sidelights and a sternlight, it is more visible from long distances. Thus the tricolor light is recommended for offshore sailors because large vessels can see it better. Although their lower display makes sidelights and a sternlight less visible, they give other vessel operators a better perception of vessel size and relative distance in crowded waterways.

Sailing Vessels Less Than 20 Meters In Length Underway Under Sail Inland or International



Sailing Vessels Less Than 20 Meters In Length Underway Under Sail Inland or International (optional)



Sailing Vessels Less Than 7 Meters In Length

Note: The operator of a sailing vessel less than 7 meters in length should shine the light on the vessel's sails when an approaching vessel is sighted.

