ConfidentCaptain
oceanpros

AIDS TO NAVIGATION

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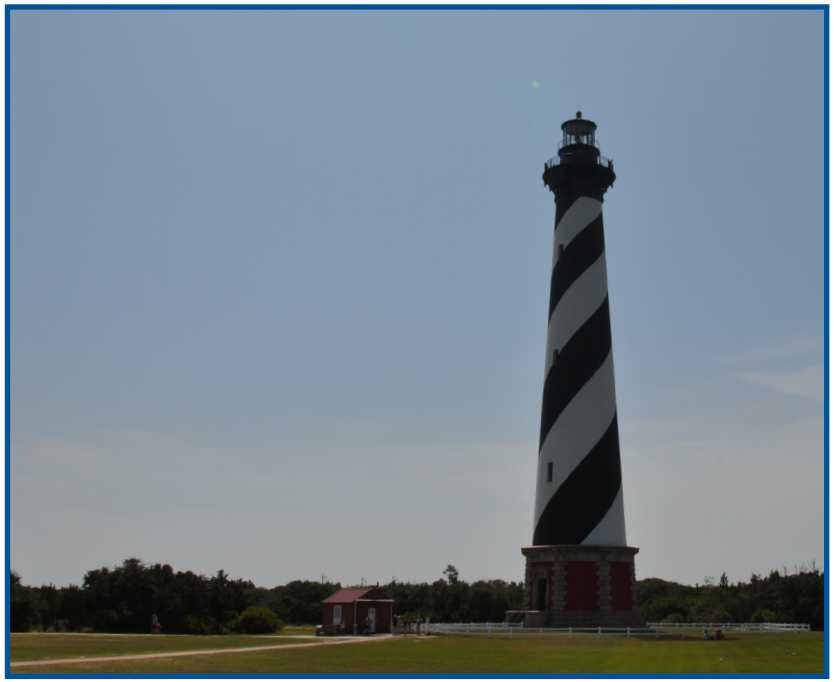
Navigation is piloting

Ship's position is determined by bearings taken on visible objects whose exact location is given on the chart.

Aids to navigation include:

- Lighthouses
- Lightships
- Minor lights
- Buoys
- Day beacons



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A buoy is a floating navigational aid, moored to the seabed.

Can be lighted or unlighted
- Lighted buoys can be red, green, white or yellow

Unlighted buoys can be classified by their shape
- Can Buoys: Cylindrical shape, floating vertically
- Nun Buoys: Cylindrical body topped with a cone shaped head, with the pointed end facing upward

The color of the buoys can be solid or banded in horizontal lines or vertical stripes.
- Red, green, yellow, white and black are all used

Keep in mind that due to currents, tides, ice, wind, etc., buoys may not always be in their charted positions.

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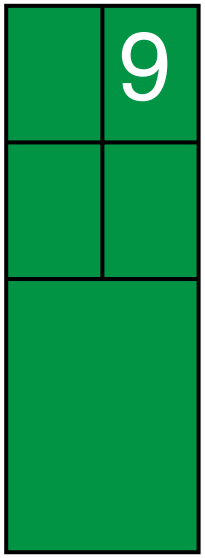
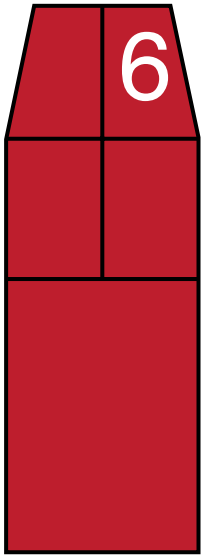
BUOYS

Floating navigational aids, moored to the seabed
- Unlighted buoys: shapes

Cans



Nuns



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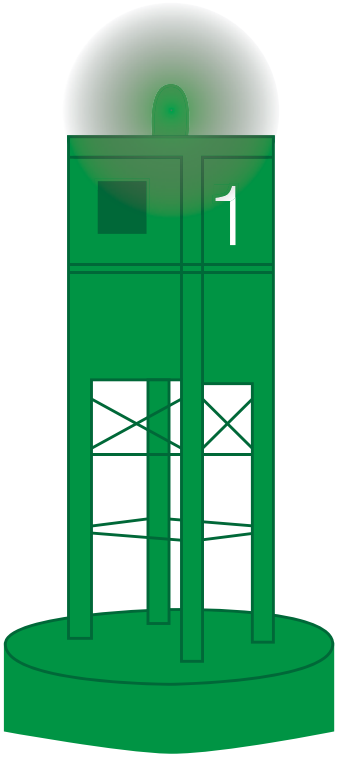
BUOYS

Lighted buoys: Red, green, white or yellow



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SOUND BUOYS

Effective in areas of fog or reduced visibility

Bell Buoys: Bell buoys have steel towers with a bell inside that uses the motion of the water to operate.

Gong Buoys: Similar in structure to a bell buoy but multiple gongs instead of a bell. Different tones

Whistle Buoys: Operate by compressed air which produces a whistle sound. Also uses the motion of the water to operate.

Horn Buoys: Are electrically operated and not often used.

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FLASHING LIGHTS

Quick Flashing: Flash at least 60 times per minute

Group Flashing: Two quick flashes followed by a brief darkness, followed by a single quick flash and then a longer interval of darkness.

Morse Code (A) Flashing: Quick flash followed by a brief darkness, then a longer flash and a longer period of darkness. This is repeated every 8 seconds

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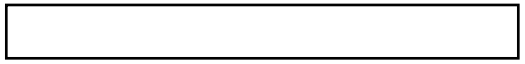
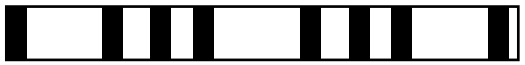
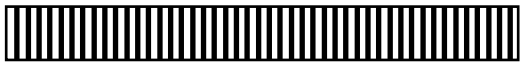
Description	Characteristic	Chart Abbreviation
Alternating		Alt. R.W.G
Fixed		F.
Flashing		Fl.
Group flashing		Gp. Fl.(2)
Occulting		Occ.
Group occulting		Gp Occ(3)
Quick Flashing		Qk.Fl.
Very quick flashing		V.Qk.Fl.
Isophase		Iso.
Morse		Mo.(letter)

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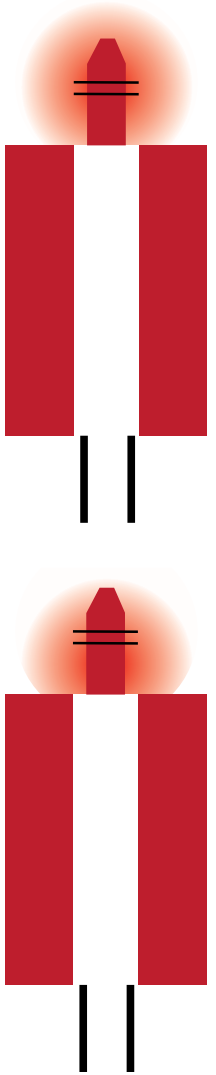
BEACON

A Fixed Aid:

- Lighted or unlighted

Range:

- Pair of beacons, arranged so when the are lined up perfectly, you know you are in the channel.



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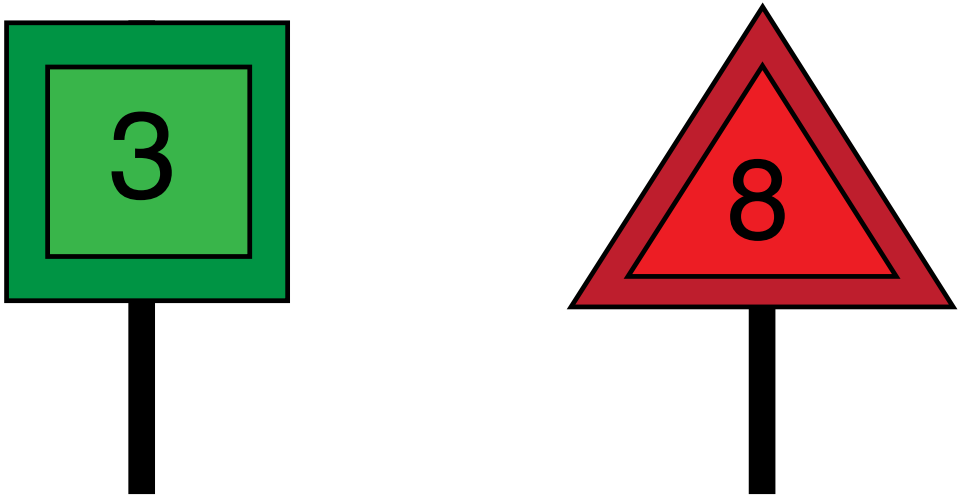
DAY MARKS

Daytime indicators of a navigational aid include:

- color
- shape
- numbers – top marks

At night the indicators include the color of the light, the length of its flash and the pattern of the flashing.



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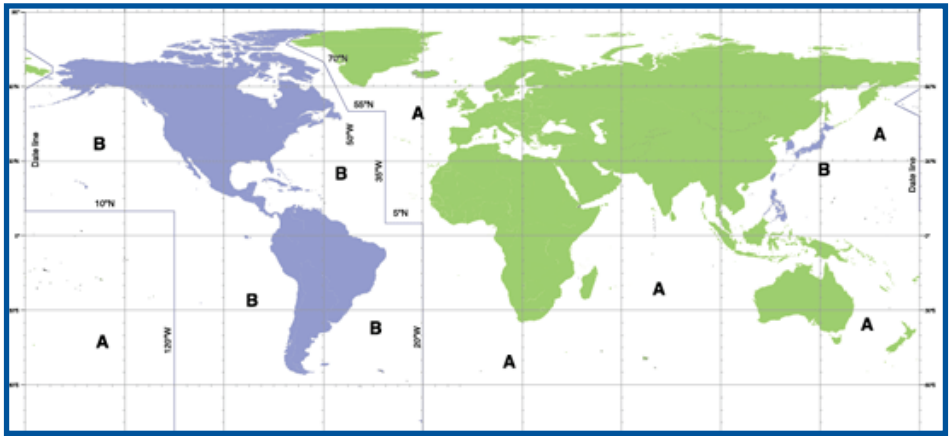
International Association of Lighthouse Authorities (IALA)

Region B: North & South America, Japan, Korea, Philippines
- Red buoys on the starboard side
- Red buoys have even numbers and triangle shapes
- Green buoys have odd numbers and square shapes

Region A: Most of the world
- Red buoys on the port side
- Red buoys have even numbers and square shapes
- Green buoys have odd numbers and triangle shapes



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THE IALA "B" SYSTEM

The United States uses a lateral buoyage system that conforms to the colors and shapes established by the IALA.

In this system all buoy characteristics are determined by their position in the channel or waterway as navigating inland from the sea.

This is called the "Conventional Direction of Buoyage."

Keep in mind when navigating certain inland waterways, it can often become confusing as to whether you are traveling seaward or not.

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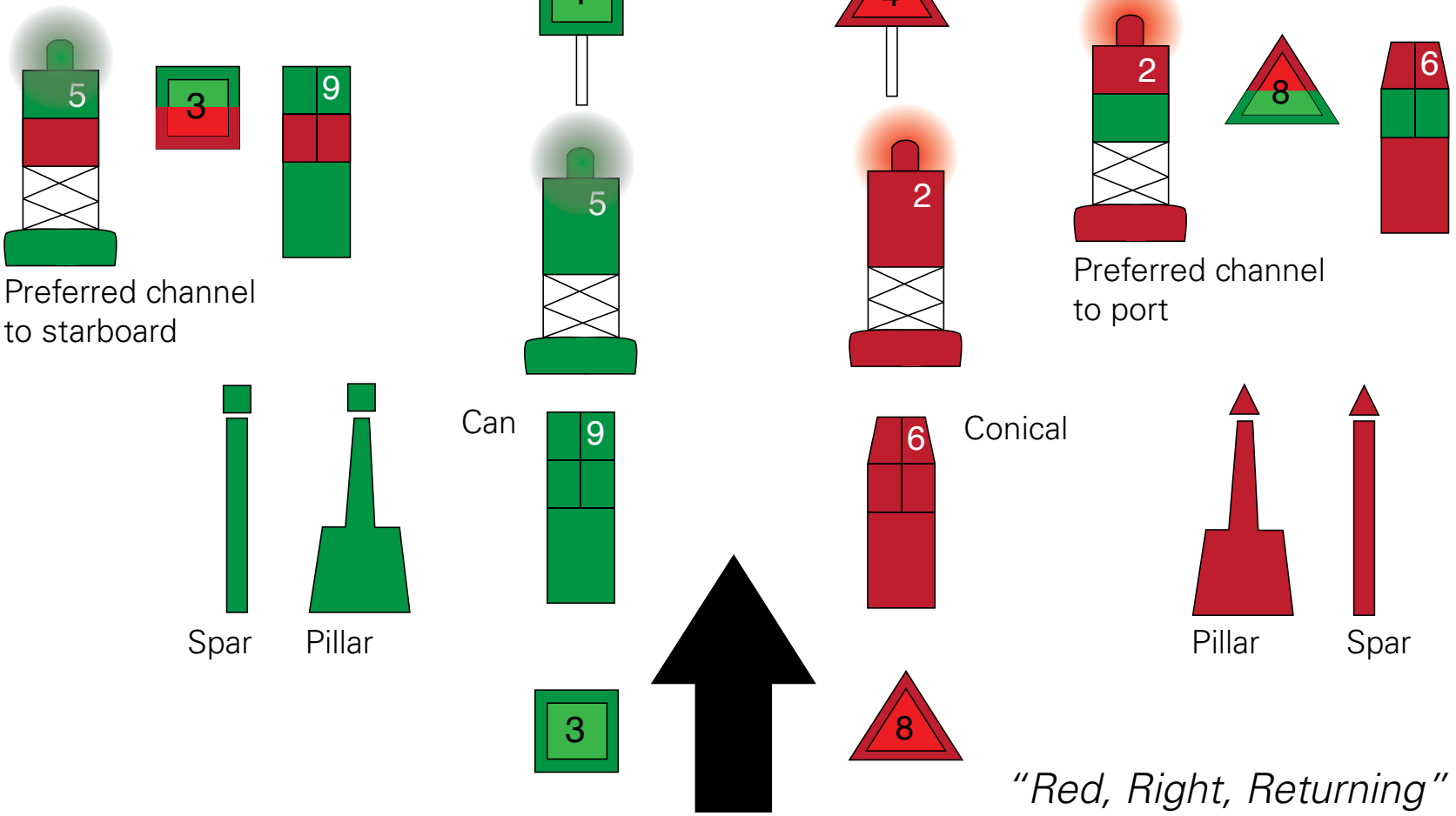
IALA B



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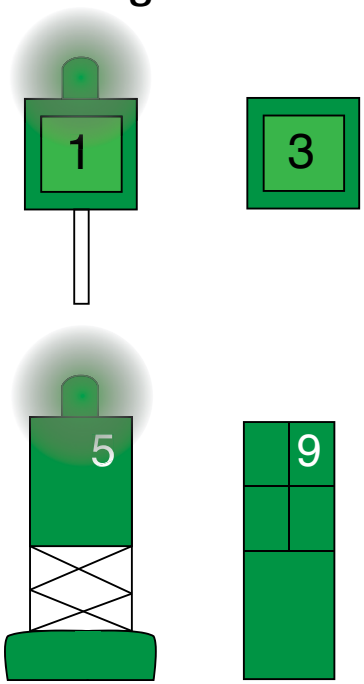
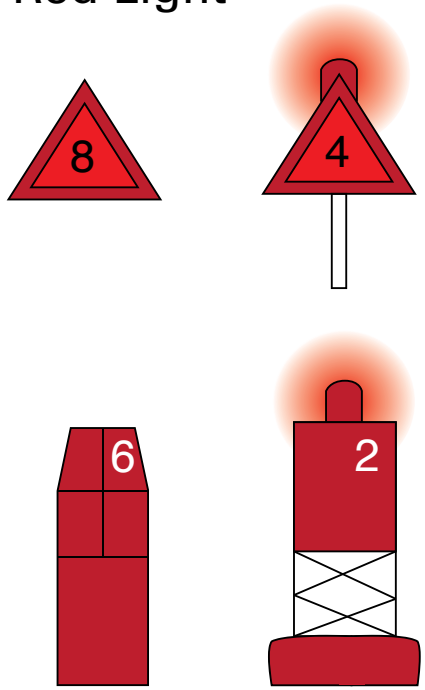
LATERAL MARKS

Port Hand Marker:
- Green
- Squares & Cans
- Odd Numbers
- Green Light



Starboard Hand Marker:
- Red
- Triangles & Nuns
- Even numbers
- Red Light



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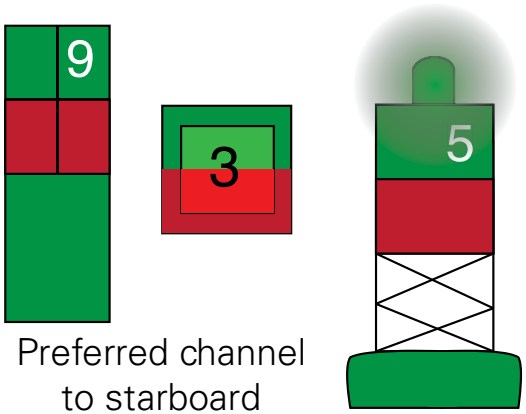
PREFERRED CHANNEL MARKER

Also known as '<u>junction buoy</u>'

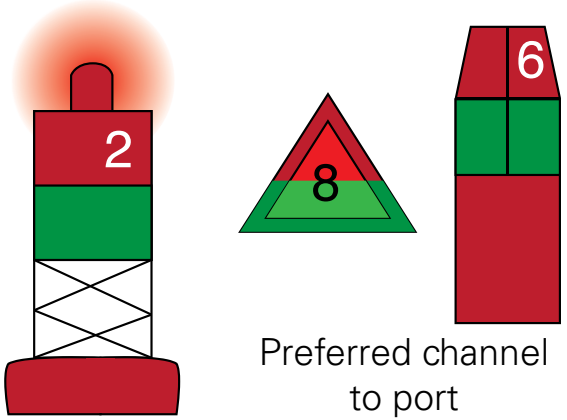
Color: red and green horizontally banded
- upper color is preferred channel

Character: letter

Light: same as preferred channel, but different flash
- composite group flashing (2 + 1)



Preferred channel to starboard



Preferred channel to port

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SAFE WATER MARK

Indicates navigable water all around the mark

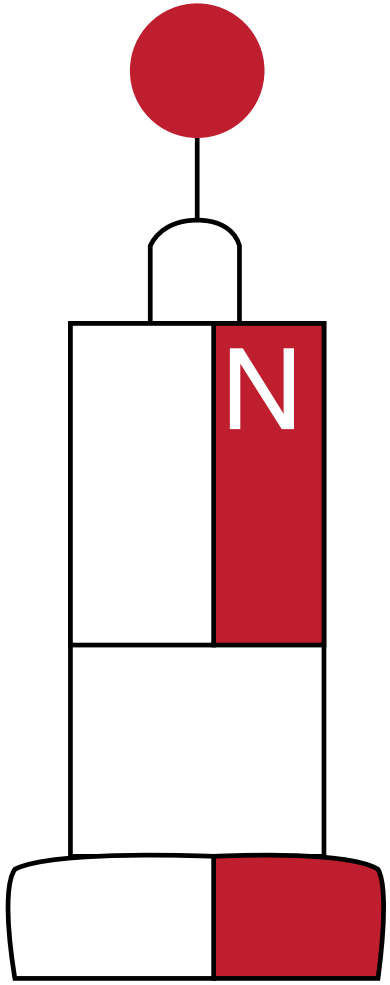
Color: red and white vertically striped

Topmark (Buoy) Octagon (dayboard)

Character: letter

Light: white

- Characteristic Morse Alpha: Mo (A)



ISOLATED DANGER MARK

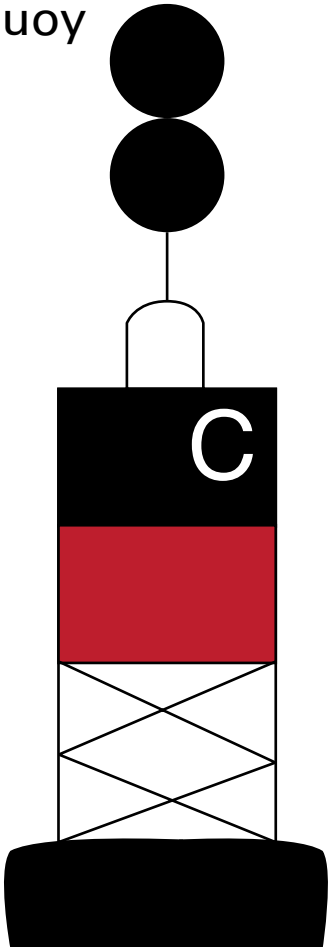
Marks isolated danger or obstructions underneath buoy

Color: Black and red horizontally banded

Shape: two black balls on top

Character: Letter

Light: White
- Characteristic: Group Fl (2) 5s



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SPECIAL MARK

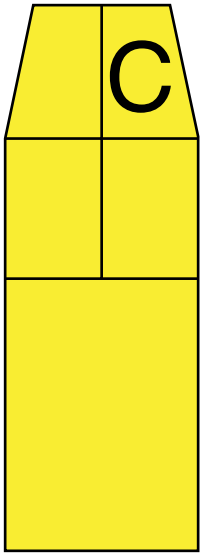
Indicates special areas such as an anchorage, traffic separation scheme, swimming area, etc.

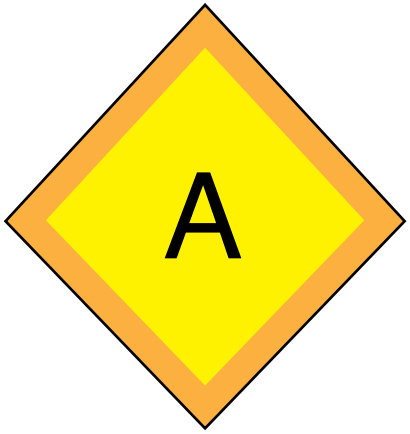
Color: yellow

Shape: various

Character: letter

Light: yellow
- fixed or flashing
- slow flashing preferred





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INFORMATION & REGULATORY MARK

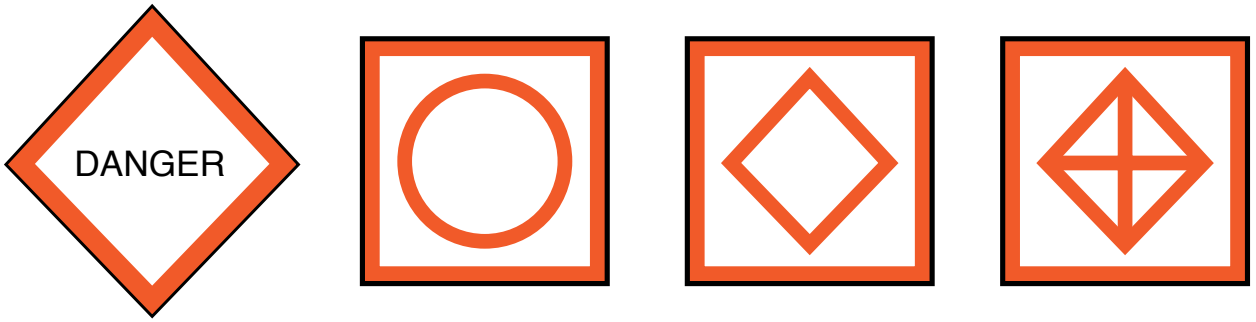
Alerts you of possible dangers, restricted operation area or exclusion areas. Examples include submerged pipes or cables, no-wake zones, etc.

Color: White with orange border

Shape: Various
- Diamond: Danger
- Circle: Restricted Operations
- Diamond with cross: Exclusion Area

Character: Black Letters

Light: White



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INFORMATION & REGULATORY MARK

Vessel Exclusion Area

Explanation may be placed outside the crossed diamond shape, such as dam, rapids, swim area, etc.

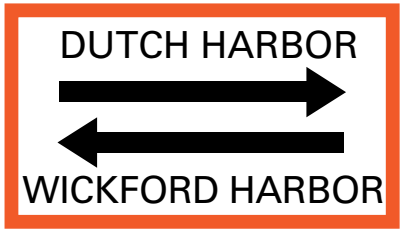
Danger

The nature of danger may be indicated inside the diamond shape, such as rock, wreck, shoal, dam, etc.

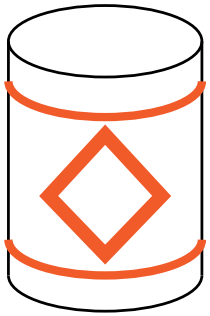
Controlled Area

Tye of control is in the circle, such as slow, no wake, anchoring, etc.

Information



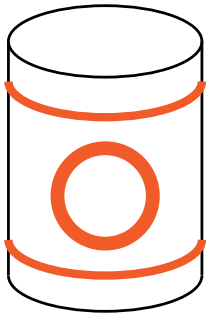
For displaying information such as directions, distances, locations, etc.



Buoy used to display regulatory markers.

May show white light. May be lettereed.

All are recognized by their horizontal orange bands at top and bottom



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LIGHTS

The main sources of information when it comes to light aids are:

- The chart in which the light is shown
- The USCG Light List
- The DMAHTC List of Lights

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CARDINAL SYSTEM BUOYAGE

Four buoys with specific topmarks, stripes and flashing sequences are used to coincide with the four Cardinal Compass directions to mark isolated danger spots and to indicate the safe side to pass.

For example, the north Cardinal mark indicates safe water to the north of the mark.

The west Cardinal mark indicates safe water to the west of the mark.

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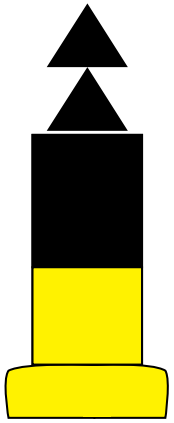
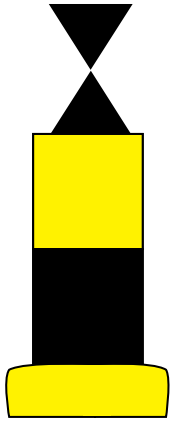
CARDINAL BUOYAGE

North Cardinal

Quick or Very Quick Flashing Q or VQ
Continuous Flashing



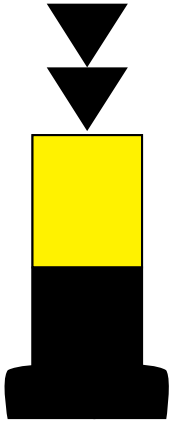
West Cardinal
Q(9) or VQ(9)



DANGER
AREA

East Cardinal

Q(3) or VQ(3)



South Cardinal
Q(6) or VQ(6) +LFL
Six quick flash plus a long flash

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LOCKS AND DAMS

When navigating through locks and dams it is important to know information on the lock regulations, sound and light signals, and radio communications which can be found in the coast pilot.

Lights and sound signals are used to communicate with vessels wishing to navigate the locks.

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BRIDGES

Bridges across navigable waters are generally marked with red, green, and white lights for nighttime navigation.

- Red lights when closed, to mark piers, and other obstructions

- Green lights when open, and mark center line on fixed bridges

- White lights are used to mark preferred channel-3 vertical above green

- The main may be marked lateral red and green lights adjunct pier should be marker with yellow

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GPS - GLOBAL POSITIONING SYSTEM

A space-based radio-navigation system consisting of satellites orbiting the earth, monitoring stations on earth, and individually owned receivers.

This system is used to provide accurate information on time and location and is very useful for nautical navigation.

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VISUAL RANGE OF LIGHTS

Luminosity Intensity
- Distance a light can be seen in clear conditions

Curvature of the earth
- Depends on height of light and observer

Geographic Range –Tables
- Distance is in meters

Luminous Range
- Doesn't take into account curvature of earth, interference from background light, or observer's height.
- Luminous Range Diagram

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RADAR

An object detection system

Unlike most navigation systems, radar signals begin at the vessel.

The system emits high- frequency waves that scatter when they come in contact with an object and thus reflect back.