

2.1 IALA Buoyage

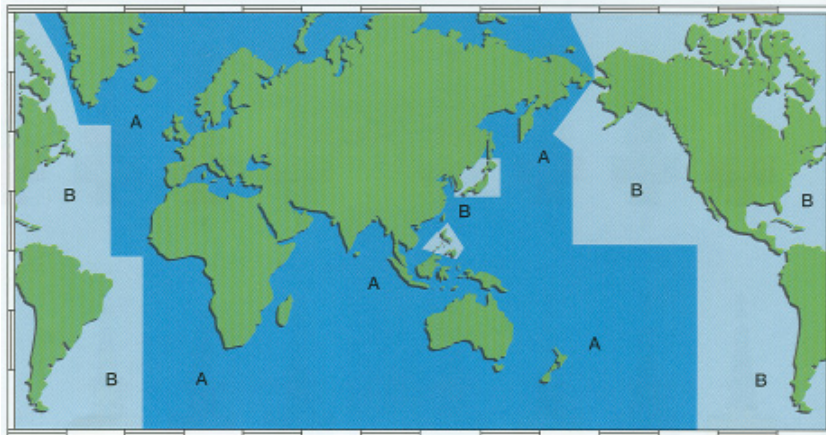
02	Cardinal Marks Corrected	04.01.2010	CWQ
01	UPDATE	03.03.2008	CWQ
00	RELEASE	11.19.2007	CWQ
Rev	Description	Date	By

A. General

Standards for aids to marine navigation are defined by the regional or local regulatory authority governing the deployment location. The majority of authorities have adopted recommendations or regulations developed by international organizations. Several recognised recommending organisations and approvals services are identified below, right.

Since its adoption in 1980 by Lighthouse Authorities from 50 countries and the representatives of 9 international organisations concerned with aids to marine navigation, the IALA Maritime Buoyage System has been the international standard for the deployment of buoys and buoy lights. The System divides the world into two maritime regions, designated A and B, and specifies the rules for buoyage within each region. The rules are essentially the same for both regions, except for their use of lateral marks.

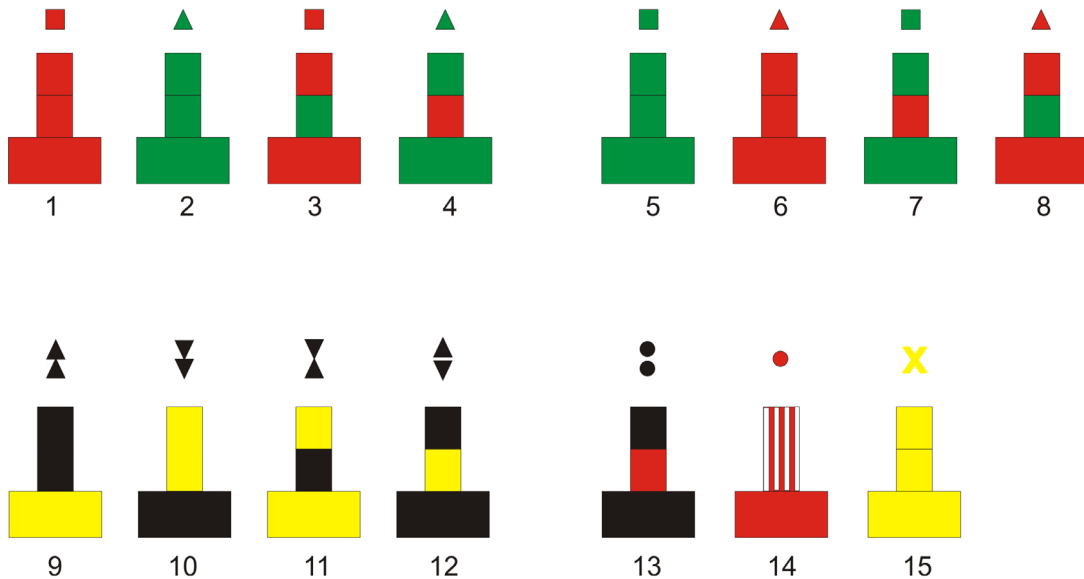
Region A encompasses Europe, Australia, New Zealand, Africa, the Gulf, and some Asian countries. Region B includes the countries of North, Central, and South America; Japan; Korea; and the Philippines. For detailed information about the IALA Maritime Buoyage System, refer to IALA publications “Maritime Buoyage System” and “Maritime Buoyage System Guidelines.”



A. Following the sense of a “conventional direction of buoyage (normally the direction of the flood stream), lateral marks in Region A, use red and green colours by day and night to denote the port and starboard sides of channels respectively.

B. In Region B, these colours are reversed with lateral marks using green and red colours by day and night to denote the port and starboard sides of channels respectively.

B. Buoy Configurations



No	Type of Buoy (Region)	Description	Topmark	Light Colour
1	Port Hand Mark (A)	Red	Single red can	Red
2	Starboard Hand Mark (A)	Green	Single green cone, point upward	Green
3	Preferred Channel to Starboard (A)	Red with one broad horizontal band	Single red can	Red
4	Preferred Channel to Port (A)	Green with one broad red horizontal band	Single green cone, point upward	Green
5	Port Hand Mark (B)	Green	Single green can	Green
6	Starboard Hand Marks (B)	Red	Single red cone, point upward	Red
7	Preferred Channel to Starboard (B)	Green with one broad red horizontal band	Single green can	Green
8	Preferred Channel to Port (B)	Red with one broad green horizontal band	Single red cone, point upward	Red
9	North Cardinal Mark (A & B)	Black above yellow	2 black cones, one above the other, points upward	White
10	South Cardinal Mark (A & B)	Yellow above black	2 black cones, one above the other, points downward	White
11	West Cardinal Mark (A & B)	Yellow with a single broad horizontal black band	2 black cones, one above the other, point to point	White
12	East Cardinal Mark (A & B)	Black with a single broad horizontal yellow band	2 black cones, one above the other, base to base	White
13	Isolated Danger Mark (A & B)	Black with one or more broad horizontal red bands	2 black spheres, one above the other	White
14	Safe Water Mark (A & B)	Red and white vertical stripes	Single red sphere	White
15	Special Mark (A & B)	Yellow	Single yellow "X" shape	Yellow

Notes:

- Lateral Mark Buoy: Topmarks for Lateral Mark buoys (1-8 above) are optional and use varies between local authorities
- Cardinal Mark Buoy: The double cone topmark is a very important feature of every Cardinal Mark buoy (9-12 above) by day and should be used wherever practicable.
- Isolated Danger Mark Buoy: The double sphere topmark is a very important feature of every Isolated Danger Mark buoy (13 above) by day and should be used wherever practicable.

C. Top Marks

The following Top Marks reflect the IALA Recommendation.

Lateral Marks

REGION A

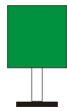
Port hand mark – single red can



Starboard hand mark – single green cone, point upwards

REGION B

Port hand mark – single green can



Starboard hand mark – single red cone, point upwards

Cardinal Marks

Northern Quadrant, two black cones, points upward



Eastern Quadrant, two black cones, one above the other, base to base

Western Quadrant, two black cones, point to point



Southern Quadrant, two black cones, points downward

Special Mark

Single yellow X shape



Isolated Danger Mark

Two black spheres



Safe Water Mark

Single red sphere



D. IALA Recommended Flash Characters for Region A or B

PORT [HAND] & STARBOARD HAND MARKS:	Any other than Composite Group Flashing (2+1)
PREFER RED CHANNEL PORT & STARBOARD:	Composite Group Flashing (2+1)
PREFERRED CHANNEL PORT:	Composite Group Flashing (2+1)]
NORTH CARDINAL MARK:	Quick (Q) or Very Quick (VQ) [Very quick or quick]
EAST CARDINAL MARK:	Q(3) 10 s or VQ(3) 5 s [Very quick (3) every 5 seconds or quick (3) every 10 seconds]
SOUTH CARDINAL MARK:	Q(6) + LFI 15 s or VQ(6) + LFL 10 s [Very quick (6) + long flash every 10 seconds or quick (6) + long flash every 15 seconds]
WEST CARDINAL MARK:	Q(9) 15 s or VQ(9) 10 s [Very quick (9) every 10 seconds or quick (9) every 15 seconds]
ISOLATED DANGER MARK:	Group Flashing (2) 10s or Group Flashing (2) 5 s [Group Flashing (2)]
SAFE WATER MARK:	Long Flashing(LFI) 10 s, Morse Code "A", Isophase or Occulting [Isophase, Occulting, one long flash every 10 seconds or Morse Code "A"]
SPECIAL MARKS:	Any other than those described for Cardinal Marks, Isolated Danger and Safe Water

E. Flash Characters

CHARACTER	ABBREVIATION	ILLUSTRATION
Fixed Flash	F	
Occulting	Oc	
Group Occulting	Oc(3)	
Composite Group Occulting	Oc(2 + 1)	
Isophase	Iso	
Flashing	FI	
Long Flashing	LFI	
Group Flashing	FI(3)	
Composite Group Flashing	FI(3 + 2)	
Quick	Q	
Group Quick	Q(3)	
Interrupted Quick	IQ	
Very Quick	VQ	
Group Very Quick	VQ(3)	
Interrupted Very Quick	IVQ	
Ultra Quick	UQ	
Interrupted Ultra Quick	IUQ	

F. Definition of Terms

TERM	DEFINITION
Alternating Light	A light showing different colours alternately.
Atmospheric Transmission Factor (Transmissivity)	A quantity characterising the transparency of the atmosphere to light emitted from a source. The atmosphere absorbs some of the emitted light. The amount of absorption depends upon prevailing atmospheric conditions. The atmospheric transmission factor (T) indicates the light transmission per nautical mile through the atmosphere.
Character	The rhythmic properties of a light that distinguish its appearance.
Direction Light	A light showing over a very narrow sector, forming a single leading light. This sector may be flanked by sectors of greatly reduced intensity or by sectors of different colours or character. Direction lights are also used to mark the limits of areas.
Eclipse	An interval of darkness between appearances of a light.
Effective Intensity	The luminous intensity of a flashing light calculated (by the Schmidt-Clausen Method) as a function of time during the course of a flash.
Fixed Light	A light showing continuously and steadily.
Flash	A relatively brief appearance of a light, in comparison with the longest interval of darkness in the same character.
Flashing Light	A light in which the total duration of light in a period is shorter than the total duration of darkness and the appearances of light (flashes) are usually of equal duration.
Geographical Range	The maximum distance at which light from a source can theoretically reach an observer, as limited only by the curvature of the earth, the refraction of the atmosphere, the elevation of the light, and the observer's height of eye.
Group Flashing Light	Flashing light in which the flashes are combined in groups, each including the same number of flashes, and in which the groups are repeated at regular intervals.
Group Occulting Light	Occulting light in which the occultations are combined in groups, each group including the same number occultations, and in which the groups are repeated at regular intervals.
Intensity	The quantity (in candelas) of light reaching the eye of an observer after the light emitted by a source has propagated through a colour filter (if used) and a lens/lantern glazing.
Interrupted Quick-Flashing Light	Quick-flashing light in which the rapid alternations are interrupted at regular intervals by eclipses of long duration.
Isophase Light	A rhythmic light for which the alternations of light and darkness are of equal duration.
Leading/Range Lights (Range Lights)	Two or more lights associated so as to form a leading line to be followed.
Luminous Range	The maximum distance at which a light can be seen at a given time, as determined by the effective intensity of the light and the meteorological visibility prevailing at that time. Luminous range takes no account of elevation, observer's height of eye, or curvature of the earth.
Nominal Range	The luminous range of a light when the meteorological visibility is 10 sea miles (T=0.74).
Occulting Light	A light in which the total duration of light in a period is longer than the total duration of darkness and the intervals of darkness (eclipses) are usually of equal duration.
Period	The interval of time between the commencement of two identical successive cycles of the character of a rhythmic light.
Quick-Flashing Light	A light in which flashes are repeated at a rate of not less than 50 flashers per minute.
Rhythmic Light	A light that exhibits a sequence of intervals of light and darkness, repeated at regular intervals
Sector Light	A light presenting different appearances, either of colour or character, over various parts of the horizon of interest to marine navigation.
Ultra Quick-Flashing Light	A light in which flashes are repeated at a reate of not less than 160 flashes per minute.
Very Quick-Flashing Light	A light in which flashers are repeated at a rate of not less than 80 flashes per minute.