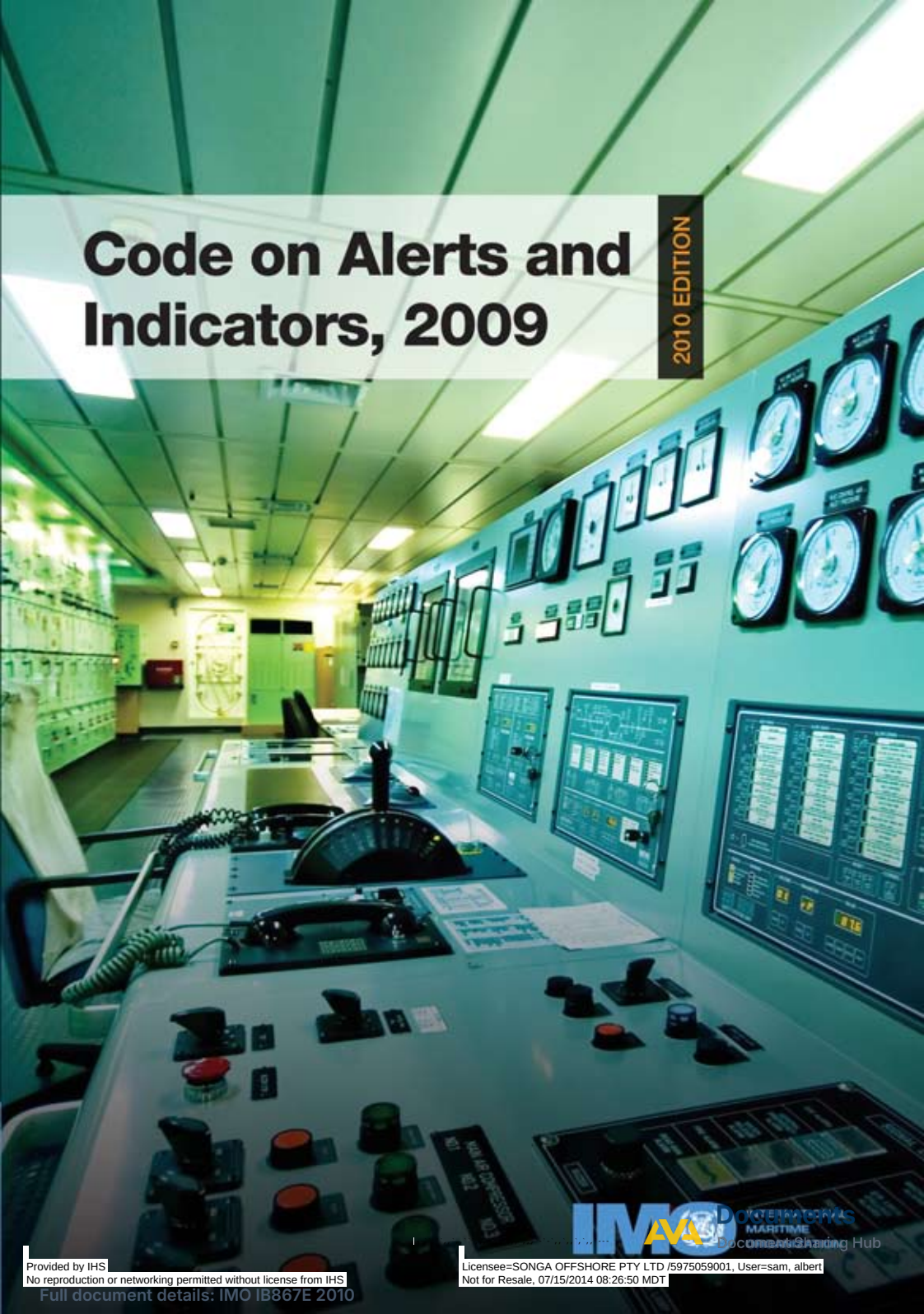


Code on Alerts and Indicators, 2009

2010 EDITION



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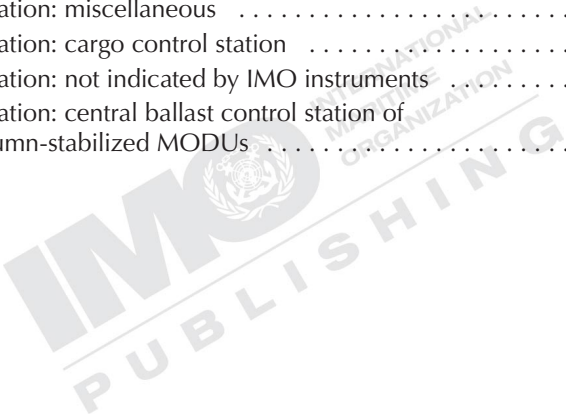
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Foreword

Taking into account changing technology and the continuing evolution of IMO instruments, the Code on Alerts and Indicators, 2009, was developed in accordance with a decision taken by the Maritime Safety Committee (MSC) at its seventy-ninth session. In December 2009, it was adopted by the Assembly at its twenty-sixth session by resolution A.1021(26).

The Code is intended to provide general design guidance and to promote uniformity of type, location and priority for those alerts and indicators required by various IMO instruments and will benefit designers and operators by consolidating in one document the references to priorities, aggregation, grouping, locations and types, including colours and symbols, of shipboard alerts and indicators.

The Code succeeds the Code on Alarms and Indicators, 1995, adopted by resolution A.830(19) in November 1995, which in turn succeeded the Code on Alarms and Indicators adopted by resolution A.686(17) in November 1991.



Resolution A.1021(26)
Adopted on 2 December 2009

CODE ON ALERTS AND INDICATORS, 2009

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety and the prevention and control of marine pollution from ships,

RECALLING ALSO that, by resolution A.830(19), it adopted the Code on Alarms and Indicators, 1995, incorporating therein provisions on alarms and indicators contained in respective IMO instruments,

RECOGNIZING the need to further update the provisions of the Code, thereby ensuring compliance with the requirements of the IMO instruments which have been adopted and/or amended since the Code was adopted and, thus, eliminate contradictions, ambiguities and unnecessary redundancies,

HAVING CONSIDERED the recommendations made by the Maritime Safety Committee at its eighty-sixth session and the Marine Environment Protection Committee at its fifty-ninth session,

1. ADOPTS the Code on Alerts and Indicators, 2009, set out in the annex to the present resolution;
2. RECOMMENDS Governments to:
 - (a) take appropriate action to implement the Code; and
 - (b) use the Code as an international safety standard for designing alarms and indicators for ships, ships' equipment and machinery;
3. REQUESTS the Maritime Safety Committee and the Marine Environment Protection Committee to keep the Code under review and update it as necessary;
4. REVOKES resolution A.830(19).



CODE ON ALERTS AND INDICATORS, 2009

1 Purpose and scope

1.1 The Code is intended to provide general design guidance and to promote uniformity of type, location and priority for those alerts and indicators which are required by the International Convention for the Safety of Life at Sea, 1974 (1974 SOLAS Convention), as amended; associated codes (BCH, Diving, FSS, Gas Carrier, 2000 HSC, IBC, IGC, IMDG, LSA, 2009 MODU, and Nuclear Ships Codes); the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL), as amended; the Torremolinos Protocol of 1993 relating to the Torremolinos International Convention for the Safety of Fishing Vessels, 1977 (1993 Torremolinos (SFV) Protocol); the Principles of Safe Manning; the Guidelines for inert gas systems (IGS); the Standards for vapour emission control (VEC) systems; the Performance standards for a bridge navigational watch alarm system (BNWAS); and the Revised performance standards for integrated navigation systems (INS).*

1.2 The Code will benefit designers and operators by consolidating in one document the references to priorities, aggregation, grouping, locations and types, including colours, symbols, etc., of shipboard alerts and indicators. Where the applicable IMO instruments do not specify the type and location of particular alerts, this information, as far as practicable, is presented in this Code to promote uniform application.

1.3 In order to achieve similar uniformity, the Code also serves as guidance for alerts and indicators included in IMO instruments other than those referred to in 1.1.

1.4 The management and presentation of alerts should conform additionally to the appropriate performance standards adopted by the Organization.

* See section 11 for a list of instruments to which the Code makes reference.

2 Application

The Code applies to shipboard alerts and indicators.

3 Definitions

3.1 *Alert.* Alerts announce abnormal situations and conditions requiring attention. Alerts are divided into four priorities: emergency alarms, alarms, warnings and cautions.

- .1** *Emergency alarm.* An alarm which indicates that immediate danger to human life or to the ship and its machinery exists and that immediate action should be taken.
- .2** *Alarm.* An alarm is a high priority of an alert. Condition requiring immediate attention and action, to maintain the safe navigation and operation of the ship.
- .3** *Warning.* Condition requiring no immediate attention or action. Warnings are presented for precautionary reasons to bring awareness of changed conditions which are not immediately hazardous, but may become so if no action is taken.
- .4** *Caution.* Lowest priority of an alert. Awareness of a condition which does not warrant an alarm or warning condition, but still requires attention out of the ordinary consideration of the situation or of given information.

3.2 The following alerts are classified as emergency alarms:

- .1** *General emergency alarm.* An alarm given in the case of an emergency to all persons on board summoning passengers and crew to assembly stations.
- .2** *Fire alarm.* An alarm to summon the crew in the case of fire.
- .3** *Water ingress detection main alarm.* An alarm given when the water level reaches the main alarm level in cargo holds or other spaces on bulk carriers or single hold cargo ships.
- .4** Those alerts giving warning of immediate personnel hazard, including:
 - .1** *Fire-extinguishing pre-discharge alarm.* An alarm warning of the imminent release of fire-extinguishing medium into a space.

.2 *Power-operated sliding watertight door closing alarm.* An alarm required by SOLAS regulation II-1/13.7.1.6, warning of the closing of a power-operated sliding watertight door.

.5 For special ships (e.g., high-speed craft), additional alarms may be classified as emergency alarms in addition to the ones defined above.

3.3 The following alerts are classified as alarms:

.1 *Machinery alarm.* An alarm which indicates a malfunction or other abnormal condition of the machinery and electrical installations.

.2 *Steering gear alarm.* An alarm which indicates a malfunction or other abnormal condition of the steering gear system, e.g., overload alarm, phase failure alarm, no-voltage alarm and hydraulic oil tank low-level alarm.

.3 *Control system fault alarm.* An alarm which indicates a failure of an automatic or remote control system, e.g., the navigation bridge propulsion control failure alarm.

.4 *Bilge alarm.* An alarm which indicates an abnormally high level of bilge water.

.5 *Water ingress detection pre-alarm.* An alarm given when the water level reaches a lower level in cargo holds or other spaces on bulk carriers or single hold cargo ships.

.6 *Engineers' alarm.* An alarm to be operated from the engine control room or at the manoeuvring platform, as appropriate, to alert personnel in the engineers' accommodation that assistance is needed in the engine-room.

.7 *Personnel alarm.* An alarm to confirm the safety of the engineer on duty when alone in the machinery spaces.

.8 *Bridge navigational watch alarm system (BNWAS).* Second and third stage remote audible alarm as required by resolution MSC.128(75).

.9 *Fire detection alarm.* An alarm to alert the crew in the onboard safety centre, the continuously manned central control station, the navigation bridge or main fire control station or elsewhere that a fire has been detected.

- .10** *Fixed local application fire-extinguishing system activation alarm.* An alarm to alert the crew that the system has been discharged, with indication of the section activated.
- .11** Alarms indicating faults in alert management or detection systems or loss of their power supplies.
- .12** *Cargo alarm.* An alarm which indicates abnormal conditions originating in cargo, or in systems for the preservation or safety of cargo.
- .13** *Gas detection alarm.* An alarm which indicates that gas has been detected.
- .14** *Power-operated sliding watertight door fault alarm.* An alarm which indicates low level in hydraulic fluid reservoirs, low gas pressure or loss of stored energy in hydraulic accumulators, and loss of electrical power supply for power-operated sliding watertight doors.
- .15** Navigation-related alarms as specified in the Revised performance standards for integrated navigation systems (INS) (resolution MSC.252(83), appendix 5).
- .16** For special ships (e.g., high-speed craft), additional alerts may be classified as alarms in addition to the ones defined above.

3.4 *Indicator.* Visual indication giving information about the condition of a system or equipment.

3.5 *Signal.* Audible indication giving information about the condition of a system or equipment.

3.6 *Required alert or indicator.* An alert or indicator required by IMO instruments referred to in 1.1. Any other alerts and indicators are referred to in this Code as non-required alerts or indicators.

3.7 *Call.* The request for contact, assistance and/or action from an individual to another person or group of persons, i.e. the complete procedure of signalling and indicating this request.

3.8 *Silence.* Manual stopping of an audible signal.

3.9 *Acknowledge.* Manual response to the receipt of an alert or call.

3.10 *Aggregation.* Combination of individual alerts to provide one alert (one alert represents many individual alerts), e.g., imminent slowdown or shutdown of the propulsion system alarm at the navigation bridge.

3.11 *Grouping.* A generic term meaning the arrangement of individual alerts on alert panels or individual indicators on indicating panels, e.g., steering gear alerts at the workstation for navigating and manoeuvring on the navigation bridge, or door indicators on a watertight door position indicating panel at the workstation for safety on the navigation bridge.

3.12 *Prioritization/Priority.* The ordering of alerts in terms of their severity, function, sequence, etc.

4 General

4.1 The presentation of alerts and indicators should be clear, distinctive, unambiguous and consistent.

4.2 All required alerts should be indicated by both audible and visual means, except the emergency alarms of 3.2 which should be indicated primarily by a signal. In machinery spaces with high ambient noise levels, signals should be supplemented by indicators, presented in accordance with 6.1. Signals and announcements may also be supplemented by indicators in accommodation spaces.

4.3 Where audible alerts are interrupted by public announcements the visual alert should not be affected.

4.4 A new alert condition should be clearly distinguishable from those existing and acknowledged, e.g., existing and acknowledged alarms and warnings are indicated by a constant light and new (unacknowledged) alarms and warnings are indicated by a flashing light and an audible signal. Audible signals should be stopped when silenced or acknowledged. At control positions or other suitable positions as required, alert systems should clearly distinguish among no alert (normal condition), alert, silenced and acknowledged alert conditions.

4.5 Alerts should be maintained until they are acknowledged and the visual indications of individual alerts should remain until the fault has been corrected. If an alert has been acknowledged and a second fault occurs before the first is rectified, the audible signal and visual indication should be repeated.

4.6 Alerts and acknowledged alerts should be capable of being reset only in case the abnormal condition is rectified.

4.7 The presentation and handling of alarms, warnings and cautions indicated on the navigation bridge should comply with the requirements of module C of resolution MSC.252(83) where applicable to ships with integrated navigation systems (INS) and, where fitted, with the requirements of a bridge alert management system.

4.8 Required alert systems should be continuously powered and should have an automatic change-over to a stand-by power supply in case of loss of normal power supply. Emergency alarms and alarms should be powered from the main source of electrical power and from the emergency sources of electrical power defined by SOLAS regulations II-1/42 or II-1/43 unless other arrangements are permitted by those regulations, as applicable, except that:

- .1 the power-operated sliding watertight door closing alarm power sources may be those used to close the doors;
- .2 the fire-extinguishing pre-discharge alarm power source may be the medium itself; and
- .3 continuously charged, dedicated accumulator batteries of an arrangement, location, and endurance equivalent to that of the emergency source of electrical power may be used instead of the emergency source.

4.9 Required rudder angle indicators and power-operated sliding watertight door position indicators should be powered from the main source of electrical power and should have an automatic change-over to the emergency source of electrical power in case of loss of normal power supply.

4.10 Failure of power supply of required alert and alarm systems should be indicated by an audible and visual alarm or warning.

4.11 Required alert and alarm systems should, as far as is practicable, be designed on the fail-to-safety principle, e.g., a detection circuit fault should cause an audible and visual alarm; see also FSS Code, chapter 9, paragraph 2.5.1.5.

4.12 Provision should be made for functionally testing required alerts and indicators. The Administration should ensure, e.g., by training and drills, that the crew is familiar with all alerts.

4.13 Required alert, alarm and indicator systems should be functionally independent of control systems and equipment, or should achieve equivalent redundancy. Any additional requirements for particular alerts in the IMO instruments applicable to the ship should be complied with.

4.14 Software and data for computerized alert and alarm systems should not be permanently lost or altered as a result of power supply loss or fluctuation. Provision should be made to prevent unintentional or unauthorized alteration of software and data.

4.15 Cables for fire and general emergency alarms and public address systems and their power sources should be of a fire-resistant type where they pass through high fire risk areas, and in addition for passenger ships,

main vertical fire zones, other than those which they serve. Systems that are self monitoring, fail-safe or duplicated with cable runs as widely separated as is practicable may be exempted provided that their functionality can be maintained. Equipment and cables for emergency alarms and indicators (e.g., watertight doors' position indicators) should be arranged to minimize risk of total loss of service due to localized fire, collision, flooding or similar damage.

4.16 To the extent considered practicable by the Administration, general emergency alarm, fire alarm and fire-extinguishing pre-discharge alarm should be arranged so that the audible signals can be heard regardless of failure of any one circuit or component.

4.17 Means should be provided to prevent normal operating conditions from causing false alerts, e.g., time delays because of normal transients.

4.18 The number of alerts and indicators which are not required to be presented on the navigation bridge should be minimized.

4.19 The system should be designed so that alerts can be acknowledged and silenced at the authorized control position. All alerts presented on the navigation bridge should be capable of being acknowledged and silenced as required in module C of resolution MSC.252(83) where applicable to ships with integrated navigation systems (INS) and, where fitted, with the requirements of a bridge alert management system.

4.20 In order to facilitate maintenance and reduce risk of fire or harm to personnel, consideration should be given to providing means of isolation of sensors fitted to tanks and piping systems for flammable fluids or fluids at high temperature or pressure (e.g., valves, cocks, pockets for temperature sensors).

5 Audible presentation of alerts and calls

5.1 Required alerts should be clearly audible and distinguishable in all parts of the spaces where they are required. Where a distinct difference between the various audible signals and calls cannot be determined satisfactorily, as in machinery spaces with high ambient noise levels, it is permitted to install common audible signal and call devices supplemented by visual indicators identifying the meaning of the audible signal or call.

5.2 The fire-extinguishing pre-discharge alarm should have a characteristic which can be easily distinguished from any other audible signal or call installed in the space(s) concerned. Audible signals of fire alarm and fire detection alarm should have a characteristic which can be easily distinguished from any other audible signal or call installed in the space(s).

5.3 Audible signals and calls should have characteristics in accordance with section 7.

5.4 In large spaces, more than one audible signal or call device should be installed, in order to avoid shock to persons close to the source of sound and to ensure a uniform sound level over all the space as far as practicable.

5.5 Facilities for adjusting the frequency of audible signal within the prescribed limits may be provided to optimize their performance in the ambient conditions. The adjustment devices should be sealed, to the satisfaction of the Administration, after setting has been completed.

5.6 Arrangements should not be provided to adjust the sound pressure level of required audible signals. Where loudspeakers with built-in volume controls are used, the volume controls should be automatically disabled by the release of the alert signal.

5.7 Administrations may accept electronically-generated signals, provided all applicable requirements herein are complied with.

5.8 Administrations may accept the use of a public address system for the general emergency alarm and the fire alarm provided that:

- .1 all requirements for those alerts of the LSA Code, FSS Code and the 1974 SOLAS Convention, as amended, are met;
- .2 all the relevant requirements for required alerts in this Code are met;
- .3 the system automatically overrides any other input system when an emergency alarm is required and the system automatically overrides any volume controls provided to give the required output for the emergency mode when an emergency alarm is required;
- .4 the system is arranged to prevent feedback or other interference; and
- .5 the system is arranged to minimize the effect of a single failure.

5.9 The general emergency alarm, fire alarm (if not incorporated in the general emergency alarm system), fire-extinguishing pre-discharge alarm and machinery alarm should be so arranged that the failure of the power supply or the signal-generating and amplifying equipment (if any) to one will not affect the performance of the others. Where common audible signals and call devices are installed in accordance with 5.1, arrangements should be provided to minimize the effect of such devices' failure.

5.10 The performance standards and functional requirements of the general emergency alarm are specified in the LSA Code, chapter VII, section 7.2. In addition, the sound pressure level should be in the 1/3-octave band about the fundamental frequency. In no case should the level of an audible signal in a space exceed 120 dB(A).

5.11 With the exception of bells, audible signals should have a signal frequency between 200 Hz and 2,500 Hz.

5.12 For the audible presentation of alerts on the navigation bridge, the requirements of resolution MSC.191(79), MSC/Circ.982, resolution A.694(17) and module C of resolution MSC.252(83) where applicable to ships with integrated navigation systems (INS), and, where fitted, the requirements of a bridge alert management system, should be observed.

5.13 For the audible presentation of navigational alerts on the bridge the sound pressure should be at least 75 dB(A) but not greater than 85 dB(A) at a distance of one metre from the systems. Alternatively, it may be allowed to adjust the sound pressure to at least 10 dB(A) above the ambient noise level, if the ambient sound pressure on the bridge can be determined. The upper noise level should not exceed 85 dB(A).

6 Visual presentation of indicators and calls

6.1 Supplemental visual indicators and calls provided in machinery spaces with high ambient noise levels and in accommodation spaces should:

- .1** be clearly visible and distinguishable either directly or by reflection in all parts of the space in which they are required;
- .2** be of a colour and symbol in accordance with tables 7.1.1 to 7.1.3;
- .3** flash in accordance with 6.2. Instead of individual flashing lights a single flash or rotating white light in addition to a permanent individual indication may be used for light columns;
- .4** be of high luminous intensity; and
- .5** be provided in multiples in large spaces.

6.2 Flashing indicators and calls should be illuminated for at least 50% of the cycle and have a pulse frequency in the range of 0.5 Hz to 1.5 Hz.

6.3 Visual indicators on the navigation bridge should not interfere with night vision. For the visual presentation of alerts on the navigation bridge the requirements of resolution MSC.191(79), module C of resolution MSC.252(83),

where applicable to ships with integrated navigation systems (INS), and, where fitted, the requirements of a bridge alert management system, should be observed.

6.4 Indicators should be clearly labelled unless standard visual indicator symbols, such as those in tables 7.1.1 to 7.1.3, are used. These standard visual indicator symbols should be arranged in columns for ready identification from all directions. This applies in particular to the emergency alarms in table 7.1.1. Standard visual indicator symbols may also be used on consoles, indicator panels, or as labels for indicator lights.

6.5 Indicator colours should be in accordance with ISO Standard 2412, as deemed appropriate by the Administration. Indicator colours on navigational equipment should be in accordance with resolution MSC.191(79), paragraph 5.7.

6.6 On mobile offshore drilling units (MODUs), where supplemental visual indicators are installed for general emergency alarms, the colour of these supplemental indicators may be amber, provided they flash with a pulse frequency of at least 4 Hz.

7 Characteristics

The emergency alarms, alarms and call signals listed should have the audible and visual characteristics shown in the tables of this section. All other alerts, indicators and call signals should be clearly distinct from those listed in this section, to the satisfaction of the Administration. These tables are not all-inclusive, and other alerts may be added by the Administration in a manner consistent with this Code.

Table 7.1.1 – Emergency alarms
(Note: See table 7.2 for audible signals)

Function	IMO instrument	Audible		Visual		Remarks
		Device	Code	Colour	Symbol*	
General emergency alarm	LSA 7.2.1 SOLAS III/6.4 SOLAS II-2/7.9.4	Whistle Siren Bell Klaxon Horn	1.a, 1.b	Green/ White	 passengers	Used for summoning passengers to the assembly stations.
					 crew	Used for summoning the crew to the boat stations. Sound levels in accordance with LSA Code 7.2.1.2, 7.2.1.3
Fire alarm	SOLAS II-2/7.9.4	Bell Klaxon Siren Horn	2, 1.b	Red		Used for summoning the crew to the fire stations on passenger ships.
	FSS 9.2.5.1	Bell Klaxon Siren Horn	2, 3.c, 3.d	Red		Horn/bell in machinery space, buzzer/bell elsewhere.
Fire-extinguishing pre-discharge alarm	FSS 5.2.1.3	Siren Horn	2	Red		Signal precedes release. Audible signal distinct from all others. When other fire-extinguishing mediums are used they should be clearly identifiable.
Power-operated sliding watertight door closing alarm	SOLAS II-1/13.7.1.6 and II-1/13.8.2	Horn Klaxon Bell	2	Red Green	No symbol allocated	Signal at door precedes and continues during door closing. At remote position; door open – red indicator; door closed – green indicator. Red indicator on navigation bridge flashes while door closes.
Water ingress detection main alarm	SOLAS XII/12.1, XII/12.2 and II-1/25.3	Bell Buzzer Horn	2	Red		For cargo holds used for water ballast and the ballast tanks, an alarm overriding device may be installed.

* For use with visual indicator columns (see appendix).