CHAPTER 13

SHIPBORNE NAVIGATIONAL SYSTEMS AND EQUIPMENT AND VOYAGE DATA RECORDERS

EU Directive on Electromagnetic Compatibility (2004/108/EC)

*Electrical and electronic equipment fitted to Community Craft that may either generate or be affected by electromagnetic disturbance shall meet the requirements of EU Directive **2004/108/EC**, as amended. Equipment complying with this directive should have an EC mark or CE marking in accordance with EU Directives **2004/108/EC** or 93/68/EEC (with Corrigendum).*

EU Directive on Electrical Equipment designed for use within certain voltage limits (73/23/EEC repealed by 2006/95/EC of 12 December 2006)

Electrical Equipment designed for use with a voltage rating of between 50 and 1000 volts for alternating current and between 75 and 1500 volts for direct current shall meet the requirements of EU Directive 73/23/EEC repealed by 2006/95/EC of 12 December 2006, except for specialised electrical equipment, for use on ships, which comply with the safety provisions drawn up by international bodies in which the Member States participate.

13.1 General

13.1.1 This chapter covers items of equipment which relate to the navigation of the craft as distinct from the safe functioning of the craft. The following paragraphs set out the minimum requirements.

13.1.2 The equipment and its installation shall be to the satisfaction of the Administration. The Administration shall determine to what extent the provisions of this chapter do not apply to craft below 150 gross tonnage.

In accordance with this Code, navigational equipment must conform to appropriate performance standards not inferior to those adopted by the IMO.

(Required Standards are specified in a table at the end of this Chapter).

Unless indicated otherwise, the standards specified for navigational equipment on United Kingdom HSC are the English Language version of the relevant European Standards published by the British Standards Institute (BSI) and have the status of a British Standard. These standards are in full agreement with the relevant Resolutions of the IMO.

Equipment conforming to the relevant British Standard in force immediately prior to publication of the European Standard may continue to be installed until further notice. That is, any reference to BS 7474 (echo-sounding equipment), for example, may be read as a reference to BS EN ISO 9875 (Marine echo-sounding equipment).

Until further notice, in view of the non-availability of new European Standards agreeing with Resolutions A.821(19) (Gyro-Compasses for High-Speed Craft) or A.820(19) (Radar

Equipment for High-Speed Craft), equipment conforming with the European Standard specified is to be installed.

The MCA advises that navigational equipment installed on United Kingdom HSC which is not the subject of a carriage requirement through the application of the HSC Code, but for which international standards have been developed should conform to those standards.

Reference should also be made to the following Annexes in the MCA publication Safety of Navigation Implementing SOLAS Chapter V, 2002 (2nd Edition June 2007) or subsequent amendments:

Annex 19 High Speed Craft Code - Chapter 13 Navigational equipment

Annex 20 Inspection and Survey of Navigational Equipment

13.1.3 The information provided by navigational systems and equipment shall be so displayed that the probability of misreading is reduced to a minimum. Navigational systems and equipment shall be capable of giving readings to an optimum accuracy.

13.2 Compasses

13.2.1 Craft shall be provided with a magnetic compass which is capable of operating without electrical supply, and which may be used for steering purposes. This compass shall be mounted in a suitable binnacle containing the required correcting devices and shall be suitable for the speed and motion characteristics of the craft.

13.2.2 The compass card or repeater shall be capable of being easily read from the position at which the craft is normally controlled.

13.2.3 Each magnetic compass shall be properly adjusted and its table or curve of residual deviations shall be available at all times.

Refer to Annex 13 Magnetic Compasses and Annex 20.5 Magnetic Compasses of MCA publication Safety of Navigation Implementing SOLAS Chapter V, 2002 (2nd Edition June 2007))or subsequent amendments, operating, maintaining and testing of magnetic compasses.

13.2.4 Care shall be taken in siting a magnetic compass or magnetic sensing element so that magnetic interference is eliminated or minimized as far as is practicable.

13.2.5 Passenger craft certified to carry 100 passengers or less shall, in addition to the compass required by 13.2.1, be provided with a properly adjusted transmitting heading device, suitable for the speed and motion characteristics and area of operation of the craft, capable of transmitting a true heading reference to other equipment.

13.2.6 Passenger craft certified to carry more than 100 passengers and cargo craft shall, in addition to the compass required in 13.2.1, be provided with a gyro-compass which shall be suitable for the speed and motion characteristics and area of operation of the craft.

13.3 Speed and distance measurement

13.3.1 Craft shall be provided with a device capable of indicating speed and distance.

13.3.2 Speed- and distance-measuring devices on craft fitted with an automatic radar plotting aid (ARPA) or automatic tracking aid (ATA) shall be capable of measuring speed and distance through the water.

13.4 Echo-sounding device

Non-amphibious craft shall be provided with an echo-sounding device which will give an indication of depth of water to a sufficient degree of accuracy for use when the craft is in the displacement mode.

The echo-sounding device must be capable of effective operation at full operational speed.

13.5 Radar installations

The ARPA should be operated with caution and in such a way that the ARPA is given sufficient time to settle into a steady state. When navigating at high speed, in reduced visibility or in areas of high traffic density, the risk of collision should be regularly checked by all available means and data obtained from the ARPA should be treated with caution and not relied upon implicitly. An operator should be aware that it is possible to travel faster than is appropriate in relation to the refresh time. The bearing rate change should be monitored as documented in Rule 7 of the Collision Regulations.

13.5.1 Craft shall be provided with at least one azimuth-stabilized radar operating on 9 GHz.

13.5.2 Craft of 500 gross tonnage and upwards or craft certified to carry more than 450 passengers shall also be provided with a 3 GHz radar or where considered appropriate by the Administration, a second 9 GHz radar or other means to determine and display the range and bearing of other surface craft, obstructions, buoys, shorelines and navigational marks to assist in navigation and in collision avoidance, which are functionally independent of those referred to in 13.5.1.

13.5.3 At least one radar shall be provided with facilities for an ARPA or ATA suitable for the motion and speed of the craft.

13.5.4 Adequate communication facilities shall be provided between the radar observer and the person in immediate charge of the craft.

13.5.5 Each radar installation provided shall be suitable for the intended craft speed, motion characteristics and commonly encountered environmental conditions.

13.5.6 Each radar installation shall be mounted so as to be as free as practicable from vibration.

13.6 Electronic positioning systems

Craft shall be provided with a receiver for a global navigation satellite system or a terrestrial radio navigation system, or other means, suitable for use at all times throughout the intended voyage to establish and update the craft's position by automatic means.

13.7 Rate-of-turn indicator and rudder angle indicator

13.7.1 Craft of 500 gross tonnage or upwards shall be provided with a rate-of-turn indicator. A rate-of-turn indicator shall be provided in craft of less than 500 gross tonnage if the test according to annex 9 shows that the turn rate can exceed safety level 1.

13.7.2 Craft shall be provided with an indicator showing the rudder angle. In craft without a rudder, the indicator shall show the direction of steering thrust.

13.8 Nautical charts and nautical publications

13.8.1 Craft shall be provided with nautical charts and nautical publications to plan and display the ship's route for the intended voyage and to plot and monitor positions throughout the voyage; an electronic chart display and information system (ECDIS) may be accepted as meeting the chart carriage requirements of this paragraph.

13.8.2 High-speed craft shall be fitted with an ECDIS as follows:

.1 craft constructed on or after 1 July 2008;

.2 craft constructed before 1 July 2008, not later than 1 July 2010.

13.8.3 Back-up arrangements shall be provided to meet the functional requirements of 13.8.1, if this function is partly or fully fulfilled by electronic means.

13.9 Searchlight and daylight signalling lamp

13.9.1 Craft shall be provided with at least one adequate searchlight, which shall be controllable from the operating station.

13.9.2 One portable daylight signalling lamp shall be provided and maintained ready for use in the operating compartment at all times.

13.10 Night vision equipment

When operational conditions justify the provision of night vision equipment, such equipment shall be provided.

Night vision equipment has limitations, particularly weather-related problems. Ambient light conditions and background lights reduce effectiveness in pilotage situations. A dedicated observer must be appointed and the night vision monitor should be manned at all times the craft is in operation in conditions where night vision equipment is deemed to be required. (ie: an additional person to the navigating team).

The MCA will assess the need for carriage of this equipment on a case by case basis taking account of the Collisions Regulations, Rule 6 on Safe Speeds.

13.11 Steering arrangement and propulsion indicator(s)

13.11.1 The steering arrangement shall be so designed that the craft turns in the same direction as that of the wheel, tiller, joystick or control lever.

13.11.2 Craft shall be provided with means to show the mode of the propulsion system(s).

13.11.3 Craft with emergency steering positions shall be provided with arrangements for supplying visual compass readings to the emergency steering position.

13.12 Automatic steering aid (automatic pilot)

13.12.1 Craft shall be provided with an automatic steering aid (automatic pilot).

High Speed Craft employed on short routes in enclosed waters are not required to be fitted with an autopilot. This is because of the length and nature of the crossing together with the amount of traffic they may encounter means that an autopilot would not be used. Refer also to 13.1.2 of the Code. (MSC/Circ.1102)

13.12.2 Provision shall be made to change from the automatic to manual mode by a manual override.

It should be possible to automatically and immediately override the autopilot to establish human control of the craft's steering by any movement of the manual steering controls. Reference should be made to the Recommendation on Performance Standards for Automatic Pilots, adopted by the Organisation by resolution A.342(IX) (for vessels travelling less than 30 knots) and A.822(19) (for vessels travelling greater than 30 knots.)

13.13 Radar reflector

If practicable, craft of 150 gross tonnage or below shall be provided with a radar reflector, or other means, to assist detection by ships navigating by radar at both 9 GHz and 3 GHz.

13.14 Sound reception system

When the craft's bridge is totally enclosed and unless the Administration determines otherwise, craft shall be provided with a sound reception system, or other means, to enable the officer in charge of the navigational watch to hear sound signals and determine their direction.

13.15 Automatic identification system

13.15.1 Craft shall be provided with an automatic identification system (AIS).

AIS is a carriage requirement for all seagoing passenger ships on international voyages. Vessels on domestic seagoing voyages of 300 gross tonnage or less may be exempted from the requirement. Note that The Merchant Shipping (Vessel Traffic Monitoring and Reporting Requirements) Regulations 2004, S.I. 2004 No. 2110, as amended, and MSN1795(M) Revised Carriage Requirements for Automatic Identification Systems (AIS) will need to be followed where appropriate in this respect.

13.15.2 AIS shall:

.1 provide automatically to appropriately equipped shore stations, other vessels and aircraft information, including the craft's identity, type, position, course, speed, navigational status and other safety-related information;

.2 receive automatically such information from similarly fitted vessels;

.3 monitor and track vessels; and

.4 exchange data with shore based facilities.

13.15.3 The requirements of 13.15.2 shall not apply where international agreements, rules or standards provide for the protection of navigational information.

13.15.4 AIS shall be operated taking into account the guidelines adopted by the Organization.

Refer to IMO Resolution A.917(22) Guidelines for operational use of ship-borne AIS as amended by Resolution A.956.(23) and MSC.74(69). See also MSN 1795(M) Revised Carriage Requirements for AIS, MGN 321(M) AIS on Double Ended Passenger Ferries, and MGN 324 Radio: Operational Guidance on the Use of VHF Radio and Automatic Identification Systems (AIS) at Sea, or subsequent amendments.

Long-Range Identification and Tracking (LRIT)

According to SOLAS Chapter V Regulation 19-1 - Long-Range Identification and Tracking of Ships, vessels required to transmit long range identification and tracking of ships (LRIT) messages when on international voyages are:

.1 passenger carrying high speed craft

.2 cargo high-speed craft of 300 gross tonnage and upwards.

Ships shall be fitted with a system to automatically transmit the information specified in MIN 301(M) (Long-Range Identification and Tracking of Ships (LRIT)) as follows:

.1 ships constructed on or after 31 December 2008;

.2 ships constructed before 31 December 2008 and certified for operations:

.2.1 in sea areas A1 and A2, as defined in regulations IV/2.1.12 andIV/2.1.13; or

.2.2 in sea areas Al, A2 and A3, as defined in regulations IV/2.1.12, IV/2.1.13 and IV/2.1.14;

not later than the first survey of the radio installation after 31 December 2008;

.3 ships constructed before 31 December 2008 and certified for operations in sea areas Al, A2, A3 and A4, as defined in regulations IV/2.1.12, IV/2.1.13, IV/2.1.14 and IV/2.1.15, not later than the first survey of the radio installation after 1 July 2009. However, these ships shall comply with the provisions of subparagraph .2 above whilst they operate within sea areas A1, A2 and A3.

.4 Ships, irrespective of the date of construction, fitted with an automatic identification system (AIS), as defined in regulation 19.2.4, and operated exclusively within sea area A1, as defined in regulation IV/2.1.12, shall not be required to comply with the provisions of this regulation.

The information to be automatically transmitted and other details relating to LRIT is described in MSN1812(M) SOLAS Chapter V MCA's 2002 Publication Amendments to SOLAS Chapter V and MIN 343(M+F) Changes to MCA's 2002 SOLAS V Publication Arising Out Of Amendments to SOLAS Chapter V. Refer also to the Performance standards and functional requirements for the long-range identification and tracking of ships, IMO Resolution MSC.263(84).

Note that while many UK craft will be exempt under .4 above, this will not be so for all UK craft.

Note also that The Merchant Shipping (Vessel Traffic Monitoring and Reporting Requirements) Regulations 2004, S.I. 2004 No. 2110, as amended, will need to be followed where appropriate.

13.16 Voyage data recorder

13.16.1 To assist in casualty investigations, passenger craft irrespective of size and cargo craft of 3,000 gross tonnage and upwards shall be provided with a voyage data recorder (VDR).

13.16.2 The voyage data recorder system, including all sensors, shall be subjected to an annual performance test. The test shall be conducted by an approved testing or servicing facility to verify the accuracy, duration and recoverability of the recorded data. In addition, tests and inspections shall be conducted to determine the serviceability of all protective enclosures and devices fitted to aid location. A copy of the certificate of compliance issued by the testing facility, stating the date of compliance and the applicable performance standards, shall be retained on board the craft.

Refer to guidelines in IMO Resolution A.861(20) (Recommendation and Performance Standards for voyage data recorders) as amended by MSC.214(81). The VDR is required to record (amongst other items) the following data: date and time, ship's position, speed, heading, bridge audio, communications audio, radar data, echo sounder, main alarms, rudder order and response, hull openings status, watertight and fire door status, acceleration and hull stresses (if fitted), wind speed and direction (if fitted).

Under current EC legislation all RoRo passenger ships on seagoing routes are required to fit VDR. S-VDR is not acceptable for these vessels.

Passenger vessels on Domestic Voyages in sea areas other than those covered by EU Class A need not carry VDR, those of 300 gross tonnage or more will require exemption; it is proposed to make suitable regulatory changes to exempt these vessels.

All Seagoing Domestic Passenger Ro-Ro or High speed craft, of any size of EU Class A, and those operating in equivalent sea areas; are required to carry VDR.

All types of Seagoing Domestic Passenger Vessels of 300 Gross Tonnage and over of EU Class A, and those operating in equivalent sea areas; are required to carry VDR.

13.17 Approval of systems, equipment and performance standards

13.17.1 All equipment to which this chapter applies shall be of a type approved by the Administration. Such equipment shall conform to performance standards not inferior to those adopted by the Organization.

The performance requirements of European standards are in full agreement with the relevant Resolutions of the IMO, are identical to the relevant standards published by the International Electrotechnical Committee (IEC) or the International Organisation for Standardisation (ISO) and the British Standard in force at the time of publication for the equipment concerned. All equipment must also meet the general requirements specified in BS EN 60945 and, where appropriate, be provided with a digital interface conforming with BS EN 61162-1.

13.17.2 The Administration shall require that manufacturers have a quality control system audited by a competent authority to ensure continuous compliance with the type approval

conditions. Alternatively, the Administration may use final product verification procedures where compliance with the type approval certificate is verified by a competent authority before the product is installed on board craft.

13.17.3 Before giving approval to navigational systems or equipment embodying new features not covered by this chapter, the Administration shall ensure that such features support functions at least as effective as those required by this chapter.

13.17.4 When equipment, for which performance standards have been developed by the Organization, is carried on craft in addition to those items of equipment required by this chapter, such additional equipment shall be subject to approval and shall, as far as practicable, comply with performance standards not inferior to those adopted by the Organization.*

** Refer to the table below which presents the content of the Code footnote in a tabular format.*

 # In the table below indicates that this equipment falls under the Marine Equipment Directive.

Standard for Navigational equipment:

Equipment	IMO RESOLUTION	EUROPEAN STANDARD
Magnetic Compass (Steering) #	A.382(X)	BS EN ISO 613
Gyro Compass #	A.821(19)	BS EN ISO 8728
Marine Transmitting Magnetic Heading Devices (TMHDs) & including electromagnetic (Fluxgate) Compasses #	MSC.116(73), annex 2 now superceded by MSC.166(78)	
Navigational radar #	A.820(19)	BS EN 60936-2
Echo Sounder #	A.224(VII) as amended by MSC.74(69), Annex 1 of which amended by MSC.115(73)	BS EN ISO 9875
Speed and Distance Measuring Equipment #	A.824(19) as amended MSC.96(72) refer to A.694(17)	BS EN 61023
Automatic Radar Plotting Aid (ARPA) #	A.422(XI) amended by A.823(19) refer to A.477(XII)	BS EN 60872-1
Rate of Turn Indicator #	A.526(13) refer to A.281(VIII)	
Automatic Steering Aids / Track control systems (Automatic Pilots) #	A342(IX) and A.822(19)	
Loran-C and Chayka Receivers #	A.818(19)	BS EN 61075
Global Positioning System (GPS) Receiver Equipment #	A.819(19) as amended by MSC.112(73)	
GLONASS Receiver Equipment #	MSC.53(66) amended by MSC.113(73)	
DGPS and DGLONASS Maritime Radio Beacon Receiver Equipment	MSC.64(67) as amended by MSC.114(73). Refer to A.477(XII) for backup requ'ts (annex 5)	
Combined GPS/GLONASS Receiver Equipment #	MSC.74(69) annex 1 as amended by MSC.115(73)	

Auto tracking	MSC.64(67) Annex 4 Appendix 1	
Electronic Chart Display and Information System (ECDIS) #	A.817(19) as amended by MSC.232(82).	IEC 61174, IEC 60945, IEC 61162-1
Night Vision Equipment for HSC	MSC.94(72)	
Daylight Signalling Lamps	MSC.95(72)	
Automatic Identification System #	MSC 74(69) and Res.A.917(22) amended by A.956(23).	
Voyage Data Recorder #	A.861(20) and MSC 163(78) amended by MSC.214(81)	