

July 2005

## **Firms engaged in testing of navigational equipment and systems**

### **General comments**

Firms engaged in the testing of navigational equipment and systems are not required to be approved as service suppliers under IACS Unified Requirement Z17. However, it is recommended that the classification society/recognised organisation concerned be guided by the following when seeking or approving assistance for the surveyor during initial, annual, periodical or renewal surveys of navigational systems and equipment covered by IMO Records of Equipment for the SOLAS Safety Certificates (Forms P, C and E), i.e. navigational equipment required by SOLAS Reg. V/19. The forms are attached for information.

Firms should be approved for the 'functional level' and not for the 'manufacturer level'. Approval of firms by classification societies does not include the ability to service the equipment down to the 'manufacturer level'.

If a firm is not able to cover all groups of navigational equipment the groups of equipment for which the firm is approved should be listed on any certificate issued.

### **Process**

#### *Item 1: Extent of engagement:*

Performing inspection and testing of navigational equipment and systems on board ships for compliance with SOLAS requirements.

The service supplier engagements are divided into 5 groups of services as listed under item 5. Preferably, the service supplier should seek approval for all of these groups in order to be approved as service supplier for navigational equipment and systems. Approval of service suppliers according to a limited number of groups may be considered on a case by case basis.

#### *Item 2: Reference documents:*

The service supplier should have access to SOLAS Ch. V and all IMO Performance Standards relevant for each group of services as well as all IEC cross product standards (IEC 60945 and IEC 61162 series). The IMO Performance Standards are listed under item 5.

Where different flag states have their own interpretations or requirements regarding particular equipment or systems, these need to be part of the instructions / procedures, and arrangements for updating the validity of such interpretations / requirements should be in place.

#### *Item 3: Personnel:*

The service supplier should provide evidence that the person carrying out the inspection has education from a technical school (a minimum two years' programme of engineering or physical science) or from a nautical institution with relevant seagoing experience as a certified ship's officer. Personnel should be trained in testing navigational equipment and systems, preferably by the manufacturer of the equipment. Personnel should also have passed training concerning initial, annual, periodical and renewal surveys and have proficiency in the English language commensurate with the work.

Personnel testing colour calibration on ECDIS should, in addition, have a documented Ishihara colour vision deficiency test or equivalent and have colour vision not worse than would be required for seagoing service as an officer.

*Item 4: Procedures and instructions:*

The supplier should have documented procedures and instructions for carrying out the testing and examination of navigational equipment and systems. Such procedures and instructions should ensure that the level of performance tests is in compliance with the relevant technical standards.

The procedures should cover all types of equipment within the relevant group for which approval is sought. Dedicated checklists with appropriate pass criteria for each test / inspection should be available.

*Item 5: Equipment / publications*

The service supplier should, as a minimum, have the applicable publications for the different groups of services.

The supplier should have the major and auxiliary equipment (e.g. multi meter, earth fault finder, NMEA logger, AIS test set, sound generator, sound level meter, etc.) required for correctly performing the testing. A record of the test equipment used should be kept. The record should contain information on manufacturer and type of equipment, and a log of maintenance and calibrations.

	Systems	Publications (As of 2004)
Group 1.	Heading information systems incl. bearing devices  Rate-of-turn indicators	IMO A.382(X) - Magnetic compass IMO A.424(XI) - Gyro compass IMO A.821(19) - Gyro compass for HSC IMO MSC.86(70), Annex 2 - TMHD (fitted before 1 July 2002) IMO MSC.116(73) – THD  IMO A.526(13) - R.O.T.I.
Group 2.	Speed and distance measuring equipment (SDME)  Echo sounding equipment	IMO A.478(XII) - SDME (fitted before 1 January 1997) IMO A.824(19) - SDME (fitted before 1 July 2002) IMO MSC.96(72) - SDME  IMO A.224(VII) - Echo sounder (fitted before 1 January 2001) IMO MSC.74(69), Annex 4 - Echo sounder
Group 3.	Positioning systems	IMO A.815(19) - World-wide Radionavigation System IMO A.529(13) - Accuracy Standards for Navigation IMO A.818(19) - Loran-C / Chayka IMO A.819(19) - GPS (fitted before 1 July 2003) IMO MSC.112(73) - GPS IMO MSC.53(66) - GLONASS (fitted before 1 July 2003) IMO MSC.113(73) - GLONASS IMO MSC.74(69), Annex 1 - GPS / GLONASS (fitted before 1 July 2003) IMO MSC.115(73) - GPS / GLONASS IMO MSC.114(73) - DGPS / DGLONASS

	Radar systems incl. plotting aids	IMO A.222(VII) - Radar (fitted before 1 September 1984) IMO A.477(XII) - Radar (fitted before 1 July 1999) IMO MSC 64(67), Annex 4 - Radar IMO A.278(VIII) - Symbols for Radar IMO A.422(XI) - ARPA (fitted before 1 January 1997) IMO A.823(19) - ARPA IMO A.820(19) - Radar HSC
	ECDIS, charts and nautical publications	Updated list of available charts and ENC ( <a href="http://catalogue.ukho.gov.uk/home.asp">http://catalogue.ukho.gov.uk/home.asp</a> ; <a href="http://www.hidrografico.pt/website/ic_enc/viewer.htm">http://www.hidrografico.pt/website/ic_enc/viewer.htm</a> ) Relevant IMO SLS.14 Circulars related Nautical charts and publications. IMO A.817(19) - ECDIS IMO MSC.64(67), Annex 5 - ECDIS back-up IMO MSC.86(70), Annex 4 - ECDIS RCDS mode
	AIS	IMO MSC.74(69), Annex 3 - AIS IMO SN Circ.217 - Presentation of AIS
Group 4.	Alarm systems	IMO MSC.128(75) - BNWAS IACS BDEAP (SC181)
	Indicators	(IMO requirements for rudder, propeller, thrust, pitch and operational mode indicators requirements not yet available)
	Sound reception systems	IMO MSC.86(70), Annex 1
Group 5.	Heading / Track control systems (HCS / TCS)	IMO A.342(IX) - HCS (fitted before 1 January 1999) IMO MSC.64(67), Annex 3 - HCS IMO A.822(19) - HCS for HSC IMO MSC.74(69), Annex 2 – TCS
	Integrated Bridge Systems (IBS)	IMO MSC.64(67), Annex 1 – IBS
	Integrated Navigational System (INS)	IMO MSC.86(70), Annex 3 - INS

*Item 6: Reporting:*

The service supplier should confirm by means of a documented report that the equipment has been tested satisfactorily.

*Item 7: Review and Verification:*

The surveyor should be on board to the extent necessary to control the process.

The surveyor should confirm that no further testing is needed or specify additional testing.

The surveyor should verify the report of the service supplier.

*Att: 1 IACS Record; Record of approved cargo ship safety equipment.*

*2 IMO Record; Record of Equipment; Details of navigational systems and equipment.*

## IACS Record

## RECORD OF APPROVED CARGO SHIP SAFETY EQUIPMENT

To meet the provisions of the  
INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AND  
AMENDMENTS THERETO

This form must be kept on board and be available for inspection by a nominated surveyor or recognized organization at all times.

No.						
<b>2.</b>	<b>SAFETY OF NAVIGATION</b>	Maker	Type / Serial No.	Type approved by or Type Approval No.		
<b>2.1</b>	<b>Shipborne Navigational Equipment (SOLAS Reg. V/12) or (SOLAS Amendments 2000 Reg. V/17,18,19,20,26)</b>					
2.1.1	Standard Magnetic Compass*, #) (ships >= 150 GT)					
2.1.2	Steering Magnetic Compass (not required, if heading information is provided by standard magnetic compass readable by helmsman at main steering position)	N.A.	N.A.	N.A.	yes <input type="checkbox"/>	no <input type="checkbox"/>
2.1.3	Reflector to the steering position	N.A.	N.A.	N.A.	<input type="checkbox"/>	<input type="checkbox"/>
2.1.4	Means of communication between standard magnetic compass and normal navigational control position***) (only required acc. to SOLAS V/12).	N.A.	N.A.	N.A.	<input type="checkbox"/>	<input type="checkbox"/>
2.1.5	Means for taking bearings through 360****) ( corresponds to 2.1.11, 2.1.13 )	N.A.	N.A.	N.A.	<input type="checkbox"/>	<input type="checkbox"/>
2.1.6	Magnetic compass table or curve of residual deviations***) ( corresponds to 2.1.14 )	N.A.	N.A.	N.A.	<input type="checkbox"/>	<input type="checkbox"/>
2.1.7	Spare magnetic compass if no steering compass or gyro compass is installed*), #), -(ships >= 150 GT)	N.A.	N.A.	N.A.	<input type="checkbox"/>	<input type="checkbox"/>
2.1.8	Gyro compass*), **), -(ships >= 500 GT) ( For ships constructed before 1 September 1984 also applicable if >= 1600 GT and engaged on international voyages )					
2.1.9	Heading information at emergency steering position by telephone or other means (2.1.10 fulfils this requirement)- (ships >= 500 GT****) -(irrespective of size)****), *, #)	N.A.	N.A.	N.A.	yes <input type="checkbox"/>	no <input type="checkbox"/>
2.1.10	Gyro compass heading repeater at the emergency steering position, -(ships >= 500 GT)****), *) -(also required for ships constructed on or after 1 February 1992 )	N.A.	N.A.	N.A.	<input type="checkbox"/>	<input type="checkbox"/>
2.1.11	Gyro compass bearing repeater*), **) -(ships >=500 GT)****), -(ships >=1600 GT)***) ( For ships constructed before 1 September 1984 also applicable if >= 1600 GT and engaged in international voyages )	N.A.	N.A.	N.A.	<input type="checkbox"/>	<input type="checkbox"/>
2.1.12	Heading control system *), ****) / (formerly auto-pilot) -(ships >= 10,000 GT) or Track control system *), ****) / (formerly auto-pilot) -(ships >= 10,000 GT)					

IACS Recommendation 89 Attachment 1

No.						
2.	SAFETY OF NAVIGATION	Maker	Type / Serial No.	Type approved by or Type Approval No.		
2.1.13	Pelorus or compass bearing device ( azimuth circle / azimuth mirror / shadow pins ) <sup>1), *, ****)</sup> , ( For ships constructed before 1 July 2002 also applicable if >= 150 GT, or for smaller ships, if so decided by flag state administration)	N.A.	N.A.	N.A.	yes	no
					<input type="checkbox"/>	<input type="checkbox"/>
2.1.14	Means of correcting heading and bearings****), ( For ships constructed before 1 July 2002 also applicable if >= 150 GT )	N.A.	N.A.	N.A.	<input type="checkbox"/>	<input type="checkbox"/>
2.1.15	Transmitting heading device (THD) *, ****), #) (Magnetic / Gyro / GNSS principle) <sup>1)</sup> -(ships >= 300 GT)					
2.1.16	ECDIS (alternative to 1.6.2)					
2.1.17	Back up arrangements for ECDIS ( Appropriate folio of paper nautical charts or second independent ECDIS )					
2.1.18	Receiver for a global navigation satellite system (GPS, GLONASS / terrestrial navigation system ) <sup>1), *, #)</sup>					
2.1.19	9 GHz radar *) -(ships >=300 GT) ***) , #) ( For ships constructed before 1 September 1984 also applicable if >= 1600 GT size and above )					
2.1.20	Additional radar ( 3 GHz / 9 GHz ) <sup>1), *)</sup> -(ships >= 10,000 GT) ****) -(ships >= 3,000 GT) ****),					
2.1.21	Radar plotting facilities (only to be filled out if no entries for item 2.1.22)	N.A.	N.A.	N.A.	yes	no
					<input type="checkbox"/>	<input type="checkbox"/>
2.1.22	Automatic radar plotting aid (ARPA)* -(ships >= 10,000 GT)***), -(ships >= 15,000 GT / tanker >= 10,000 GT constructed before 1 September 1984)					
2.1.23	Automatic tracking aid (ATA)****), *) -(ships >= 500 GT)					
2.1.24	Second automatic tracking aid (ATA) *) -(ships >= 3,000 GT) ****) -(ships >= 10,000 GT if radar equipment installed on or after 1 January 1999, IMO Res. A477 (XII) as amended by Res. MSC 64 (67), Annex 4, Sec. 7.3)					
2.1.25	Electronic plotting aid (EPA)****), *) -(ships >=300 GT and <= 500 GT), #)					
2.1.26	Automatic identification system -(AIS) (ships >=300 GT), #) ( refer to SOLAS Amendments 2000 Reg. V / 19.2.4 )					
2.1.27	Voyage data recorder(VDR) ****) -(ships >= 3,000 GT)					

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No.				
2.	SAFETY OF NAVIGATION	Maker	Type / Serial No.	Type approved by or Type Approval No.
2.1.28	Speed and distance measuring device through the water -(ships >=500 GT)*** ( if not fitted with ARPA acc. to 2.1.22 only device to indicate speed and distance required when engaged on international voyages ) -(ships >=300 GT)****, *)			
2.1.29	Speed and distance measuring device over the ground in the forward and athwartship direction****, *) , #) (ships >= 50,000 GT)			
2.1.30	Echo-sounding device -(ships>=1600 GT when constructed before 25 May 1980) -(ships >=500 GT when constructed on or after 25 May 1980) -(ships >=300 GT)****, *) , #)			
2.1.31	Rudder angle indicator -(ships >= 500 GT)****, *) , ***) -(ships >= 1600 GT)***)			
2.1.32	Propeller revolution indicator -(ships >= 500 GT)****, *) , ***) -(ships >= 1600 GT)***)			
2.1.33	Propeller pitch and operational mode indicator -(ships >= 500 GT)****, *) , ***) -(ships >= 1600 GT)***)			
2.1.34	Force and direction indicator for lateral thrust propellers -(ships >= 500 GT)****, *) , ***) -(ships >= 1600 GT)***)			
2.1.35	Rate of turn indicator -(ships >= 100,000 GT)****) -(ships >= 50,000 GT)****, *)			
2.1.36	Sound reception system (SRS) for ships with bridge totally enclosed****, #)			
2.1.37	Integrated Navigation System (INS) INS (A) - minimum function / INS (B) - with information / INS (C) - with automatic control <sup>1)</sup>			
2.1.38	Integrated bridge system (IBS) Passage execution / Communications / Machinery control / Loading, discharging and cargo control / Safety and security <sup>1)</sup>			
		Yes	No	N/A
2.1.39	Where a heading control system, track control system (formerly Auto-Pilot) is fitted, clear instructions are provided at the control console on change-over from automatic to manual steering and vice-versa.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.1.40	Heading control system/track control system <sup>1)</sup> (formerly Auto-Pilot) are provided with emergency source of power	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2.1.41	Heading control system is fitted with a heading monitor and an off-course audible alarm signal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.1.42	Track control system is fitted with a position monitor and appropriate alarms including a back-up navigator alarm.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

IACS Recommendation 89 Attachment 1

No.				
2.	<b>SAFETY OF NAVIGATION</b>	Maker	Type / Serial No.	Type approved by or Type Approval No.
2.1.43	Simple operating instructions with a block diagram showing the change-over procedure from the remote steering gear control system and the steering gear power units are permanently displayed on the navigating bridge and in the steering gear compartment			<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

\*) Alternative means of meeting this requirement are permitted under regulation V/19.2.9.3. In case of other means they shall be specified.

\*\*\*) Ships less than 1600 GT shall be fitted with as far as possible.

\*\*\*\*) Applicable for ships constructed on or after 1 September 1984

#####) Applicable for ships constructed on or after 1 July 2002

#) The Administration shall determine to what extent the provision of navigational equipment shall not apply to the following categories of ships:

- .1 ships below 150 GT on all voyages;
- .2 ships below 500 GT not engaged on international voyages;
- .3 fishing vessels; and
- .4 ships operating solely in waters landward of the baselines which are established in accordance with international law.

## IMO Record

### Record of Equipment for the Cargo Ship Safety Equipment Certificate (Form E)

#### 3 Details of navigational systems and equipment

Item	Actual provision
1.1 Standard magnetic compass*	.....
1.2 Spare magnetic compass*	.....
1.3 Gyro compass*	.....
1.4 Gyro compass heading repeater*	.....
1.5 Gyro compass bearing repeater*	.....
1.6 Heading or track control system*	.....
1.7 Pelorus or compass bearing device*	.....
1.8 Means of correcting heading and bearings	.....
1.9 Transmitting heading device (THD)*	.....
2.1 Nautical charts/Electronic chart display and information system (ECDIS)**	.....
2.2 Back-up arrangements for ECDIS	.....
2.3 Nautical publications	.....
2.4 Back-up arrangements for electronic nautical publications	.....
3.1 Receiver for a global navigation satellite system/terrestrial radionavigation system*, **	.....
3.2 9 GHz radar*	.....
3.3 Second radar (3 GHz/ 9 GHz**)*	.....
3.4 Automatic radar plotting aid (ARPA)*	.....
3.5 Automatic tracking aid*	.....
3.6 Second automatic tracking aid*	.....
3.7 Electronic plotting aid*	.....
4 Automatic identification system (AIS)	.....
5 Voyage data recorder (VDR)	.....
6.1 Speed and distance measuring device (through the water)*	.....
6.2 Speed and distance measuring device (over the ground in the forward and athwartship direction)*	.....
7 Echo sounding device*	.....
8.1 Rudder, propeller, thrust, pitch and operational mode indicator*	.....
8.2 Rate of turn indicator*	.....
9 Sound reception system*	.....



IACS Recommendation 89 Attachment 2

10	Telephone to emergency steering position*	.....
11	Daylight signalling lamp*	.....
12	Radar reflector*	.....
13	International Code of Signals	.....

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\* Alternative means of meeting this requirement are permitted under regulation V/19. In case of other means they shall be specified.  
\*\* Delete as appropriate.