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RESOLUTION A.821(19)
adopted on 23 November 1995

PERFORMANCE STANDARDS FOR GYRO-COMPASSES FOR HIGH-SPEED CRAFT

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,

RECALLING ALSO resolution MSC.36(63), by which the Maritime Safety Committee, on 20 May 1994, adopted the International Code of Safety for High-Speed Craft (HSC Code),

RECALLING FURTHER resolution 1 of the Conference of Contracting Governments to the International Convention for the Safety of Life at Sea (SOLAS), 1974, by which the Conference, on 24 May 1994, adopted amendments to the 1974 SOLAS Convention, including a new chapter X on safety measures for high speed craft, which makes the provisions of the HSC Code mandatory under that Convention for all such craft constructed on or after 1 January 1996,

BEARING IN MIND section 13.13 of the HSC Code, which requires that all navigational equipment to which chapter 13 applies should conform to performance standards not inferior to those adopted by the Organization,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its sixty-fourth session,

1. ADOPTS the Recommendation on Performance Standards for Gyro-Compasses for High-Speed Craft set out in the Annex to the present resolution;

2. RECOMMENDS Governments to ensure that gyro-compasses required to be carried on high speed craft conform to performance standards not inferior to those set out in the Annex to the present resolution;

3. REQUESTS the Maritime Safety Committee to keep these Performance Standards under review and to adopt amendments thereto, as necessary.

ANNEX

RECOMMENDATION ON PERFORMANCE STANDARDS FOR GYRO-COMPASSES FOR HIGH-SPEED CRAFT

1 INTRODUCTION

1.1 The gyro-compass should determine the direction of the head of the high-speed craft (HSC) in relation to geographic (true) north.

1.2 In addition to the general requirements contained in resolution A.694(17), the gyro-compass equipment installed in craft operating under the following conditions:

.1 speed exceeding 30 knots and up to 70 knots;

.2 maximum rate of turn 20°/s; and

.3 normal range of operation between 70°N and 70°S should, as required by chapter 13 of the HSC Code, comply with the minimum performance requirements specified in these standards.

1.3 The gyro-compass, within a speed range of up to 30 knots, should comply with the requirements of resolution A.424(XI), and within a speed range of 30 knots to 70 knots should comply with the requirements of this resolution.

1.4 A qualitative description of the effects of gyro-compass errors due to high speed, accelerations, course changes, sea state, etc., and a qualitative description of corresponding errors in other navigational aids, should be provided to the user.

2 DEFINITIONS

For the purpose of these performance standards, the following definitions apply:

2.1 *Gyro-compass* means both the gyro-compass as heading sensor and the associated heading transmission system.

2.2 *True heading* means the horizontal angle between the vertical plane passing through the true meridian and the vertical plane passing through the craft's fore and aft datum line. It is measured from true north (000°) clockwise through 360°.

2.3 The compass is said to be *settled* if any three readings taken at intervals of 30 min, when the compass is on a level and stationary base, are within a band of 0.7°.

2.4 *Settle point heading* means the mean value of ten readings taken at 20-minute intervals after the gyro-compass has settled as defined in 2.3.

2.5 *Settle point error* means the difference between settle point heading and true heading.

2.6 Other errors to which the gyro-compass is subject are defined as the difference between the observed value and the settle point heading.

3 METHOD OF PRESENTATION

Gyro-compass equipment should include the provision of a compass card or analogue repeater for steering purposes and equipment for the purpose of taking visual bearing. It should be graduated at equal intervals of one degree or a decimal fraction thereof. A numerical indication should be provided at every 10° starting from 000° clockwise through 360°. Additionally, a digital display may be provided. When a digital display is provided, the course should be displayed as three digits plus, optionally, a fourth digit indicating tenths of a degree. When a gyro-compass with digital display is used it should incorporate a turning indicator.

4 ACCURACY

4.1 Performance under static conditions - (Settling of equipment)

4.1.1 When run-up in accordance with the manufacturer's instructions, the gyro-compass should settle within 6 h in latitudes of up to 70°.

4.1.2 The settle point error as defined in 2.5 at any heading and at any latitude up to 70° should not exceed ± 0.75° x secant latitude where heading indications of the gyro-compass should be taken as the mean of 10 readings at 20-minute intervals, and the root mean square value of the differences between individual heading indications and the mean should be less than ± 0.25° x secant latitude.

4.1.3 The repeatability of settle point error from one run-up to another should be within 0.25° x secant latitude.

4.2 Performance under operational (dynamic) conditions

4.2.1 When run-up in accordance with the manufacturer's instructions, the gyro-compass should settle within 6 h in latitudes of up to 70° when rolling and pitching with simple harmonic motion of any period between 6 s and 15 s, a maximum angle of 5°, and a maximum horizontal acceleration of 0.22 m/s^2.

4.2.2 The repeatability of the settle point error of the master gyro-compass should be within ± 1° x secant latitude, including variations in magnetic fields and changes in temperature as required by resolution A.694(17), etc., likely to be experienced in the craft in which it is installed.

4.2.3 In latitudes of up to 70° N or S in craft operating within a latitude band of 10°:

.1 the residual steady state error, after correction for speed and course influences at a speed of 70 knots, should not exceed ± 0.25° x secant latitude;

.2 the maximum error due to a rapid alteration of speed of 70 knots should be kept to a minimum, and should not exceed ± 2°;

.3 the error due to a rapid alteration of course of 180° at a maximum rate of turn of 20°/s in any azimuth direction at a speed of 70 knots should not exceed ± 3°; and

.4 the transient and steady state errors due to the craft rolling, pitching and yawing, with simple harmonic motion of any period between 6 s and 15 s, maximum angle of 20°, 10° and 5° respectively, and maximum horizontal acceleration not exceeding 1 m/s^2, and at any course, especially at 45°, 90° and 315° should not exceed ± 1° x secant latitude.

4.2.4 When subject to the environmental conditions referred to in resolution A.694(17)*, the error should not exceed ± 1°.

4.2.5 The maximum divergence in reading between the master compass and the steering and visual bearing equipment under all operational conditions should not exceed ± 0.5°.

4.2.6 The follow up rate of the transmission system should be at least 20° per s.

5 POWER SUPPLY

The gyro-compass should be provided with an uninterruptable power supply.

6 CONSTRUCTION AND INSTALLATION

6.1 The master gyro-compass should be installed in a craft with the fore and aft datum lines parallel to the craft's fore and aft datum line to within ± 0.5°. The lubber line should be in the same vertical plane as the centre of the card of the compass and should be aligned accurately.

6.2 Means should be provided for correcting the errors induced by speed and latitude. An approved accurate speed source should be used for automatic speed corrections.

6.3 A status signal should be provided to indicate that the gyro-compass is ready for use.

6.4 An alarm signal should be provided to indicate that the gyro-compass has suffered an external power supply failure or an internal system functional failure which would invalidate the heading information.

6.5 The system should be designed to enable heading information to be provided to other navigational aids such as radar, ARPA, radio direction-finder and automatic pilot. The accuracy of the other navigational aids must not be degraded, and should continue to comply with the standards specified for such aids.

7 INTERFACE

The gyro-compass equipment should provide an output of heading information with an accuracy as defined in 4 when interfaced by other equipment.

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*Methods of testing are contained in Publications IEC 945 and ISO 8728.