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RESOLUTION A.424(XI)

adopted on 15 November 1979

PERFORMANCE STANDARDS FOR GYRO COMPASSES

THE ASSEMBLY,

RECALLING Article 16(i) of the Convention on the Inter-Governmental Maritime Consultative Organization concerning the functions of the Assembly,

BEARING IN MIND the provisions of Regulation 12 of Chapter V of the International Convention for the Safety of Life at Sea, 1974,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its thirty-ninth session,

1. ADOPTS the recommendation on performance standards for gyro compasses the text of which is contained in the Annex to the present resolution;

2. RECOMMENDS Administrations to ensure that gyro compasses conform to performance standards not inferior to those specified in the Annex to the present resolution.

ANNEX

RECOMMENDATION ON PERFORMANCE STANDARDS FOR GYRO-COMPASSES

1 INTRODUCTION

1.1 The gyro-compass required by Regulation 12 of Chapter V of the International Convention for the Safety of Life at Sea, 1974, should determine the direction of the ship's head in relation to geographic (true) north.

1.2 The equipment should comply with the following minimum performance requirements.

2 DEFINITIONS

For the purpose of this recommendation, the following definitions apply:

.1 The term "gyro-compass" comprises the complete equipment and includes all essential elements of the complete design.

.2 The "true heading" is the horizontal angle between the vertical plane passing through the true meridian and the vertical plane passing through the ship's fore and aft datum line. It is measured from true north (000°) clockwise through 360°.

.3 The compass is said to be "settled" if any three readings taken at intervals of thirty minutes, when the compass is on a level and stationary base, are within a band of 0.7°.

.4 The "settle point heading" is the mean value of ten readings taken at twenty minute intervals after the compass has settled as defined in paragraph 2.3.

.5 The "settle point error" is the difference between settle point heading and true heading.

.6 The other errors to which the gyro-compass is subject are taken to be the difference between the observed value and the settle point heading.

3 METHOD OF PRESENTATION

The compass card should be graduated in equal intervals of one degree or a fraction thereof. A numerical indication should be provided at least at every ten degrees, starting from 000° clockwise through 360°.

4 ILLUMINATION

Fully adequate illumination should be provided to enable reading of scales at all times. Facilities for dimming should be provided.

5 ACCURACY

5.1 Settling of equipment

5.1.1 When switched on in accordance with the manufacturer's instructions the compass should settle within six hours in latitudes of up to 60°.

5.1.2 The settle point error as defined in paragraph 2.5 at any heading and at any latitude up to 60° should not exceed ± 0.75 x secant latitude where

heading indications of the 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. The repeatability of settle point error from one run-up to another shall be within 0.25° x secant latitude.

5.2 Performance under operational conditions

5.2.1 When switched on in accordance with the manufacturer's instructions, the compass should settle within six hours in latitudes of up to 60° when rolling and pitching with simple harmonic motion of any period between six and fifteen seconds, a maximum angle of 5°, and a maximum horizontal acceleration of $0.22\ m/s^2$.

5.2.2 The repeatability of the settle point error of the master compass shall be within $\pm 1^{\circ}$ x secant latitude under the general conditions mentioned in paragraphs 6.1 and 8 and including variations in magnetic field likely to be experienced in the ship in which it is installed.

5.2.3 In latitudes of up to 60°:

.1 the residual steady state error, after correction for speed and course influences at a speed of twenty knots, shall not exceed $\pm$ 0.25 x secant latitude;

.2 the error due to a rapid alteration of speed of twenty knots should not exceed $\pm 2^{\circ}$;

.3 the error due to a rapid alteration of course of 180° at a speed of twenty knots should not exceed $\pm 3^{\circ}$;

.4 the transient and steady state errors due to the ship rolling, pitching and yawing, with simple harmonic motion of any period between six and fifteen seconds, maximum angle of 20°, 10° and 5° respectively, and maximum horizontal acceleration not exceeding $1\ m/s^2$, should not exceed 1° x secant latitude.

5.2.4 The maximum divergence in reading between the master compass and repeaters under all operational conditions should not exceed $\pm 0.5^{\circ}$.

Note: When the compass is used for purposes other than steering and bearing, a higher accuracy might be necessary.

To ensure that the maximum error referred to in sub-paragraph 5.2.3.4 is not exceeded in practice, it will be necessary to pay particular attention to the siting of the master compass.

6 POWER SUPPLY

6.1 The equipment should be capable of operating continuously in accordance with the requirements of this recommendation in the presence of such variations of the power supply as are normally expected in a ship.

6.2 Means should be incorporated for the protection of the equipment from excessive currents and voltages, transients and accidental reversal of power supply polarity.

6.3 If provision is made for operating the equipment from more than one source of electrical energy, arrangements for rapidly changing from one source of supply to the other should be incorporated.

7 INTERFERENCE

7.1 All steps should be taken to eliminate as far as practicable the causes of, and to suppress, electromagnetic interference between the gyro-compass and other equipment on board.

7.2 Mechanical noise from all units should be so limited as not to prejudice the hearing of sounds on which the safety of the ship might depend.

7.3 Each unit of the equipment should be marked with the minimum safe distances at which it may be mounted from a standard or a steering magnetic compass.

8 DURABILITY AND RESISTANCE TO EFFECTS OF CLIMATE

The equipment should be capable of continuous operation under the conditions of vibration, humidity and change of temperature likely to be experienced in the ship in which it is installed.

9 CONSTRUCTION AND INSTALLATION

9.1 The master compass and any repeaters used for taking visual bearings should be installed in a ship with their fore and aft datum lines parallel to the ship's fore and aft datum line to within $\pm$ 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 in the fore and aft direction.

9.2 Means should be provided for correcting the errors induced by speed and latitude.

9.3 An automatic alarm should be provided to indicate a major fault in the compass system.

9.4 The system should be designed to enable heading information to be provided to other navigational aids such as radar, radio direction-finder and automatic pilot.

9.5 Information should be provided to enable competent members of a ship's staff to operate and maintain the equipment efficiently.

9.6 The equipment should be provided with an indication of manufacture, type and/or number.

9.7 The equipment should be so constructed and installed that it is readily accessible for maintenance purposes.
