

**ANNEX 24**

**RESOLUTION MSC.471(101)  
(adopted on 14 June 2019)**

**PERFORMANCE STANDARDS FOR FLOAT-FREE EMERGENCY  
POSITION-INDICATING RADIO BEACONS (EPIRBs)  
OPERATING ON 406 MHz**

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING ALSO regulations IV/7.1 and 14.1 of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended, concerning radiocommunications for the Global Maritime Distress and Safety System (GMDSS), which require, inter alia, that ships be provided with an emergency position-indicating radio beacon (EPIRB), which shall conform to appropriate performance standards not inferior to those adopted by the Organization,

RECOGNIZING the need to prepare performance standards for float-free EPIRBs operating on 406 MHz through the Cospas-Sarsat System of low-altitude earth orbiting, medium-altitude earth orbiting, and geostationary earth orbiting satellites to be used in the GMDSS, in order to ensure the operational reliability of such equipment and to avoid, as far as practicable, adverse interaction between such equipment and other communication and navigation equipment on board ships,

RECOGNIZING ALSO that EPIRBs, as a component of the GMDSS and operating through the Cospas-Sarsat System in the frequency band 406-406.1 MHz, should be type-approved to ensure the integrity of the Cospas-Sarsat satellite system, avoid harmful interference to the spaceborne equipment, exclude unauthorized transmissions, and to provide reliable data to rescue coordination centres,

HAVING CONSIDERED the recommendation made by Sub-Committee on Navigation, Communications and Search and Rescue, at its sixth session,

1 ADOPTS the *Recommendation on performance standards for float-free Emergency Position-Indicating Radio Beacons (EPIRBs) operating on 406 MHz*, set out in the annex to the present resolution;

2 RECOMMENDS that Member States ensure that float-free EPIRBs operating on the frequency 406 MHz, which form part of the GMDSS:

- .1 if installed on or after 1 July 2022, conform to performance standards and type-approval standards not inferior to those specified in the annex to the present resolution;
- .2 if installed before 1 July 2022, conform to performance standards not inferior to those specified in the annex to resolution A.810(19), as amended by resolutions MSC.56(66) and MSC.120(74), and type-approval standards not inferior to those specified in resolution A.696(17);

3 INVITES the Cospas-Sarsat partners to ensure that any amendments to the specification for Cospas-Sarsat 406 MHz distress beacons that could impact on this performance standard are agreed with the Organization prior to their adoption;

4 AGREES that any proposed amendments to this resolution are agreed with the Cospas-Sarsat partners prior to their adoption;

5 ALSO AGREES to keep these Performance Standards under review and to adopt amendments thereto, as necessary.

ANNEX

**RECOMMENDATION ON PERFORMANCE STANDARDS FOR  
FLOAT-FREE-EMERGENCY POSITION-INDICATING RADIO  
BEACONS (EPIRBs) OPERATING ON 406 MHz**

**Part A – GENERAL**

**1 INTRODUCTION**

The emergency position-indicating radio beacon (EPIRB) should, in addition to meeting the requirements of the Radio Regulations, the relevant ITU-R Recommendations and the general requirements set out in resolution A.694(17), comply with the following performance standards.

**2 GENERAL**

2.1 The EPIRB should be capable of transmitting a distress alert, including encoded position information from a receiver using a recognised global navigation satellite system (GNSS) with global coverage, to satellites equipped with a search and rescue 406 MHz processor or repeater.

2.2 The EPIRB should be of an automatic float-free type. The equipment, mounting and releasing arrangements should be reliable, and should operate satisfactorily under the most extreme conditions likely to be met with at sea.

2.3 The EPIRB should:

- .1 be fitted with adequate means to prevent inadvertent activation;
- .2 be so designed that the electrical portions are watertight at a depth of 10 m for at least 5 min. Consideration should be given to a temperature variation of 45°C during transitions from the mounted position to immersion. The harmful effects of a marine environment, condensation and water leakage should not affect the performance of the beacon;
- .3 be automatically activated after floating free;
- .4 be capable of manual activation and deactivation;
- .5 be provided with means to indicate that signals are being emitted;
- .6 be capable of floating upright in calm water and have positive stability and sufficient buoyancy in all sea conditions;
- .7 be capable of being dropped into the water without damage from a height of 20 m;
- .8 be capable of being tested, without using the satellite system, to determine that the EPIRB is capable of operating properly;
- .9 be of highly visible yellow/orange colour and be fitted with retroreflecting material;

- .10 be equipped with a buoyant lanyard suitable for use as a tether (to a liferaft, lifeboat or person in the water but not to the ship), which should be so arranged as to prevent its being trapped in the ship's structure when floating free;
- .11 be provided with a low duty cycle light (0.75 cd), active during darkness, visible to the human eye and detectable by all types of night vision devices, to indicate its position to nearby survivors and to rescue units;
- .12 not be unduly affected by seawater or oil or both;
- .13 be resistant to deterioration in prolonged exposure to sunlight;
- .14 be provided with a 121.5 MHz beacon primarily for homing by aircraft;
- .15 be provided with a GNSS receiver for position fixes and an associated indication that GNSS signal reception is satisfactory or unsatisfactory; and
- .16 be provided with an Automatic Identification System (AIS) locating signal in accordance with the Recommendation ITU-R M.1371, Technical characteristics for an automatic identification system using time division multiple access in the VHF maritime mobile frequency band.

2.4 The battery should have sufficient capacity to operate the EPIRB for a period of at least 48 h.

2.5 The EPIRB should be so designed as to operate under any of the following environmental conditions:

- .1 ambient temperatures of -20°C to +55°C;
- .2 icing;
- .3 relative wind speeds up to 100 knots; and
- .4 after stowage, at temperatures between -30°C and +70°C.

2.6 The installed EPIRB should:

- .1 have local manual activation; remote activation may also be provided from the navigating bridge, while the device is installed in the float-free mounting;
- .2 be capable, while mounted on board, of operating properly over the ranges of shock and vibration and other environmental conditions normally encountered above deck on seagoing ships; and
- .3 be designed to release itself and float free before reaching a depth of 4 m at a list or trim of any angle.

### **3 DISTRESS FUNCTION**

3.1 When the EPIRB is manually operated a distress alert should be initiated only by means of a dedicated distress alert activator.

3.2 The dedicated activator should:

- .1 be clearly identified; and
- .2 be protected against inadvertent operation.

3.3 Manual distress alert initiation should require at least two independent actions.

3.4 The EPIRB should not be automatically activated after being manually removed from the release mechanism.

#### **4 GNSS RECEIVER POSITION REPORTING**

When the EPIRB is activated:

- .1 the GNSS position fix shall be updated at intervals of no more than five minutes; and
- .2 when an updated fix is transmitted in the AIS message for the first time, the error between the transmitted and the actual position shall not exceed 30 m assuming a drift rate of 3 kn.

#### **5 LABELLING**

5.1 Labelling for operation controls and indicators should, as far as possible, be understood through graphical images and symbols without the need for text.

5.2 In addition to the items specified in resolution A.694(17) on general requirements, the following should be clearly indicated on the exterior of the equipment:

- .1 brief operating instructions;
- .2 expiry date for the primary battery used; and
- .3 the identity codes programmed into the transmitters.

### **Part B – RADIO-FREQUENCY SIGNALS**

1 The technical characteristics of the transmitted signal and the message format should be in accordance with the requirements of Cospas-Sarsat System documents C/S T.001 or C/S T.018.

2 Provisions should be included for storing the fixed portion of the distress message in the EPIRB using non-volatile memory.

3 A unique beacon identification code should be made part of all 406 MHz messages. For EPIRBs compliant with C/S T.001 this identification code should include a three-digit maritime identification digits (MID) code to denote the country in which the beacon is registered, followed by either:

- .1 the trailing 6 digits of the ship station identity in accordance with appendix 43 of ITU Radio Regulations Recommendation ITU-R M.585, Assignment and use of identities in the maritime mobile service; or

- .2 a unique serial number; or
- .3 a radio call sign.

Preference is given to the method in sub-paragraph .1 above.

For EPIRBs compliant with C/S T.018 this identification code should include a three-digit maritime identification digits (MID) code to denote the country in which the beacon is registered, followed by a unique serial number and either the maritime mobile service identity or a radio call sign.

4 The 121.5 MHz homing signal should:

- .1 have a 121.5 MHz transmitting duty cycle not less than 50% (1.125 seconds on, 1.125 seconds off) and if more than 50%, the on time should be increased beyond 1.125 seconds and the off time reduced accordingly; and
- .2 with the exception of the sweep direction, meet the technical characteristics of appendix 15 of the Radio Regulations. The sweep may be either upward or downward.

5 The AIS locating signal should:

- .1 transmit in accordance with recommendation ITU-R Rec M.1371;
- .2 start after the first 406 MHz satellite message and ensure the AIS signal does not conflict with a scheduled 406 MHz satellite signal;
- .3 when the AIS signal coincides with a scheduled 121.5 MHz homing signal, then the 121.5 MHz homing signal may be interrupted for the transmission of the AIS signal, provided the minimum 50% duty cycle is maintained;
- .4 broadcast the Cospas-Sarsat beacon 15 HEX-ID in the AIS message 14, alternating with the text "EPIRB ACTIVE" on AIS1 and AIS2; and
- .5 indicate in the transmitted AIS locating signal when the included position fix is more than five minutes old.

### **Part C –TYPE APPROVAL OF EPIRBs OPERATING IN THE Cospas-Sarsat SYSTEM**

1 EPIRBs forming an integral component of the GMDSS and operating through the Cospas-Sarsat satellite system in the frequency band 406 - 406.1 MHz should be type approved to ensure the integrity of the Cospas-Sarsat satellite system, avoid harmful interference to the spaceborne equipment, exclude unauthorized transmissions, and to provide reliable data to rescue coordination centres.

2 National administrations should:

- .1 ensure, as part of national type approval procedures, that any new type of EPIRB to be deployed on board ships is tested to confirm that it is in accordance with the performance standards for EPIRBs; confirmation that the EPIRB meets part B of this performance standard can be achieved by either:

- .1 performing, or having performed, under national procedures, all appropriate tests; and/or
  - .2 accepting type approval test results obtained through the Cospas-Sarsat type approval procedure for first generation beacons (Cospas-Sarsat document C/S T.007) or the Cospas-Sarsat type approval procedure for second generation beacons (Cospas-Sarsat document C/S T.021) and confirmed by the delivery of a Cospas-Sarsat Type Approval Certificate; and
- .2 encourage national type approval authorities to develop test procedures compatible, to the extent possible, with Cospas-Sarsat System document C/S T.007 or C/S T.021 as appropriate and, if necessary, in consultation with the Cospas-Sarsat Secretariat.

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