



Underwater Sonar Location Device Approval Installation and Maintenance

1 Applicability

- 1.1 The Air Navigation Order 1972, as amended, Schedule 5, Paragraph 4 (7) Scale T, requires that certain categories of aeroplanes shall be provided with an underwater sonar location device of a type to be approved by the CAA to assist in the underwater location of aircraft wreckage.
- 1.2 This Specification will form the basis of an acceptable means of compliance with the Order. Alternative Specifications submitted for approval should provide for at least equivalent performance standards over the range of environmental conditions stated in this Specification. Equipment complying with FAA Advisory Circular AC No. 21-10 will be acceptable.
- 1.3 The Applicant for equipment approval shall provide a Declaration of Design and Performance to show compliance with this or other Approved Specifications in accordance with the requirements of British Civil Airworthiness Requirements Section A, Chapter A3-3.

2 Equipment Approval

2.1 Acceptable Performance Standards

- a) **Operating Frequency** 37.5 kHz \pm 1 kHz.
- b) **Operating Depth** From the surface down to 6096m (20,000 ft).
- c) **Pulse Length** Not less than 9 ms.
- d) **Pulse Repetition Rate** Not less than 0.9 pulse/s.
- e) **Operating Life** Not less than 30 days.
- f) **Acoustic Output** On initial operation the acoustic output shall not be less than 150 N/m² (1,500 dyne/cm²) peak pressure at 1 metre. At the end of 30 days continuous operation it shall not be less than 100 N/m² (1,000 dyne/cm²) peak pressure at 1 metre.
- g) **Operating Temperature** -7°C to +8°C.
- h) **Actuation** The beacon shall be actuated by fresh water and salt water at all depths from the surface to 6096m (20,000 ft), within 4 hours after immersion, and shall then operate to the standards of (a) to (g) above, inclusive.
- i) **Radiation pattern** The free space output should be radiated over at least 8% of a spherical pattern. If more than one beacon is needed to achieve this pattern,

The latest version of this document is available in electronic format at www.caa.co.uk, where you may also register for e-mail notification of amendments.

Printed copy is available from: TSO, PO Box 29, Norwich NR3 1GN www.tso.co.uk/bookshop
 Telephone: 0870 600 5522 e-mail: book.orders@tso.co.uk Fax orders: 0870 600 5533

beacon approval will include the limitation that the required number of beacons shall be installed in certain relative positions.

- 2.2 **Environmental Tests** The beacon shall comply with the Acceptable Performance Standards of paragraph 2.1 after it has been subjected to the following environmental tests in the order given. During these tests there shall be no continuous actuation of the beacon transmission.
- 2.2.1 **Storage Temperature:** - $54^{\circ}\text{C} \pm 3^{\circ}\text{C}$ for 48 hours
+ $71^{\circ}\text{C} \pm 3^{\circ}\text{C}$ for 48 hours.
- 2.2.2 **Inadvertent Operation** The beacon shall be cold soaked at $-10^{\circ}\text{C} \pm 3^{\circ}\text{C}$ for six hours and then immediately placed in a chamber which is maintained at $35^{\circ}\text{C} \pm 3^{\circ}\text{C}$ and 95% $\pm 5\%$ relative humidity for 18 hours. This complete cycle shall be repeated 15 times. The beacon shall be tested in the position most critical to inadvertent actuation.
- 2.2.3 **Vibration** The beacon shall be tested over the frequency range of 5 to 2000 Hz, 0.51 mm (0.020 in.) maximum displacement and 3 'g' maximum acceleration for one hour in each of the three major axes, or in accordance with an approved specification. Where necessary tests shall be carried out to show that the beacon will function satisfactorily after being subjected to the vibration spectrum of a direct mounted aeroplane location in which it may be installed.
- 2.2.4 **Impact** The beacon shall be subjected to a half sine wave impact shock applied in the most critical direction and having a peak acceleration of 1000 'g'. The time duration at the base of the half sine wave should be at least 5 ms. The impact force may be applied by placing the beacon on a flat surface, and then accelerating the flat surface.
- 2.2.5 **Static Crush** A 22.25 kN (5,000 lbf) force shall be applied to the beacon for 5 minutes in the most critical direction. The force may be applied by placing the beacon in the most critical direction between two flat surfaces and then bringing the surfaces together until the 22.25 kN (5,000 lbf) force is developed.

3 Installation and Maintenance

- 3.1 The beacon shall be installed on or adjacent to the crash protected flight data recorder, and it is strongly recommended that its attachments should be such that they will not become separated when subjected to the impact force specified in 2.2.4.
- 3.2 The procedures necessary for periodic inspections, testing and maintenance shall be specified in the Aeroplane Maintenance Schedule.