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Specification No. 5

United Kingdom Civil Aviation Authority

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Inflatable Life Jackets

1 General

NOTE: Material differences between the previous version of this Specification, contained in Paper No. 136 Issue 2, and this Issue 2 of Specification No.5 are indicated with a marginal line.

1.1 This Specification defines three basic types of lifejacket to provide compliance with the Air Navigation Order. Lifejackets are to be classified for use by adults, children and infants, and shall comply in configuration and performance with the appropriate parts of this Specification.

1.2 Lifejackets designed and manufactured to alternative Specifications will be acceptable for approval by the CAA, subject to the lifejackets being at least to an equivalent standard.

NOTE: Infants' flotation cots are dealt with in CAA Airworthiness Division Specification No.9.

1.3 The lifejacket and its equipment shall be so designed and constructed as to remain serviceable for the period between scheduled inspections. The choice of materials used shall be such that, when stowed in accordance with the relevant instructions$_1$ neither the lifejacket nor its attached equipment shall be liable to become unserviceable through material deterioration or chafing, or from any other cause. Due consideration shall be taken of the possible temperature variations during stowage which may range between -140°C and +70°C for limited periods.

1.4 The equipment and fittings attached to the lifejacket shall not when in use in an emergency be capable of damaging the lifejacket itself, nor a liferaft, nor an inflatable slide, nor of causing injury to the wearer.

1.5 The wearing of the lifejacket inflated or deflated shall not prevent the wearer from assisting others nor from boarding a liferaft or slide raft from the water. The lifejacket shall be so designed to allow others to assist in the retrieving of the wearer from the water.

1.6 Any child or infant lifejacket shall have sufficient strength to allow the wearer to be properly lowered into or lifted from the water.

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2 Buoyancy and Flotation Attitude

2.1 The minimum total buoyancy applicable to the particular type of user of the lifejacket shall be as follows:-

USER	NOMINAL WEIGHT	MIN. TOTAL BUOYANCY IN FRESH WATER AT 20°C
ADULT	41 kg (90 lb.) and over	16 kg (35 lb.)
CHILD	Over 16 kg (35 lb.) and up to 41 kg (90 lb.)	11.5 kg (25 lb.)
INFANT	Up to 16 kg (35 lb.)	9 kg (20 lb.)

NOTE: If may be possible to achieve the above three categories with a single design of lifejacket.

2.1.1 The total buoyancy of the lifejacket shall be determined by using the method of the volume displacement of fresh water by the lifejacket when totally submerged.

2.2 The inflated lifejacket shall support the wearer in the water in a stable attitude which shall be taken to be when the trunk of the body is inclined backwards from the vertical at an angle of between 30° and 60°. In such an attitude the lifejacket shall provide support to the wearer's head such that the mouth is held clear of the water even if the wearer is unconscious.

2.3 Starting with the support attitude referred to in 2.2, the lifejacket shall allow the wearer to manoeuvre in the water.

2.4 When donned and inflated correctly, the lifejacket shall be capable of righting an unconscious wearer to the flotation attitude referred to in 2.2, within 5 seconds and retaining the wearer in this attitude.

2.5 The lifejacket shall not unduly restrict the wearer' a field of vision and should permit the wearer an adequate movement of the head.

3 Inflation System

3.1 General

3.1.1 The lifejacket shall have two separate means of inflation, the primary means being a mechanically-initiated stored gas system and the secondary means a standby oral inflation system capable of repeated use. The required buoyancy shall be obtainable by either method.

3.1.2 A manually-operated means of releasing the pressure in the lifejacket is required and shall be of a type capable of repeated use. Protection shall be provided against inadvertent deflation.

3.1.3 After inflation by either method, it shall be possible to deflate the lifejacket and then to re-inflate it by using the standby method. The standby inflation method shall be readily accessible, simple and obvious in operation and it shall be impossible for any valve which may be used to be inadvertently left open. It shall be possible to "top up" the lifejacket orally whilst in use and without loss of inflation pressure.

3.1.4 If the lifejacket is of the reversible type, the requirements of this Specification also apply with the lifejacket worn in the reverse sense.

3.2 **Stored Gas System**

3.1.1 Location of the actuating means of this type of system shall be such that it can be operated by either hand, in or out of the water. The method of releasing the stored gas into the lifejacket shall be obvious; however, suitable marking shall be provided to advise the user.

3.1.2 The amount of stored gas provided shall be capable of inflating the lifejacket to achieve the correct buoyancy as specified in 21 within 10 seconds of release into the lifejacket.

3.1.3 Adequate protection shall be provided to guard against any inadvertent initiation of an inflation, e.g. by vibration when stowed, when its wearer is climbing through an emergency exit or when it is dropped from a height of l.5 m (5 ft.).

3.2 **Oral Inflation System**

The oral inflation device provided shall be fitted with a non-return valve and be positioned such that it can readily be used in and out of the water. After use, the device shall return to a position such that it will not produce facial injuries during a jump into the water as specified in 7.1.3. The non-return valve shall open initially at a maximum air pressure of 25 kN/m^2 (10 ins. water) applied at the mouthpiece.

4 Donning and Adjustment

4.1 The correct method of donning the lifejacket shall be reasonably self-evident to untrained passengers. The lifejacket shall be made to fit securely throughout its range of adjustment in all likely conditions of use and size of wearer. So far as possible, any adjustment necessary to make the lifejacket fit securely shall be made automatically when being donned. The wearer shall be able to make any re-adjustment without undue risk of the lifejacket slipping off. The lifejacket should be capable of being removed from the valise or container and donned by an adult passenger, seated in an aircraft, within 15 seconds unassisted, with a safety belt fastened.

4.2 It shall be practicable for a trained crew member to place upon another adult, child or infant, the appropriate lifejacket within 30 seconds unassisted.

4.3 It shall be practicable for an adult to place a lifejacket on an incapacitated adult in or out of the water, at least to an extent to allow the latter to be provided with sufficient flotation such as to hold the wearer's head clear of the water.

4.4 Subsequent to proper donning, inadvertent release or loosening of the lifejacket such that its flotation characteristics are unacceptably altered, shall be prevented.

4.5 The shape of the lifejacket shall not restrict breathing, nor unnecessarily channel water or spray into the wearer's face, when in the water.

5 Attached Equipment

5.1 Any equipment attached to the lifejacket shall be of such design and location that it will not interfere with the donning, wearing, operation and performance of the lifejacket in any way, nor reduce its life.

5.2 Each lifejacket shall be fitted with a light source, having an output nominally equivalent to at least 1.0 Lumen, for a continuous period of 12 hours even when immersed in water. Any bulb-protecting lens, when clean, shall allow a light distribution consistent with maximum conspicuity at a minimum light transmission factor of 90%. The location of the light source shall be such that maximum practical conspicuity is achieved with the appropriate lifejacket worn in the normal manner by an adult, child or infant when in the water. For increased conspicuity and enhancement of the effectiveness of directed light sources, e.g. searchlights, it is recommended that patches of retro-reflective material be affixed to the surfaces of the lifejacket.

5.3 Where a whistle is required it shall be a one-piece type and attached to the lifejacket by a cord of sufficient length to facilitate use. In the event of the whistle being immersed, it shall be capable of being effectively operated within 5 seconds of its removal from the water.

5.4 Any other attached equipment shall be demonstrated to the CAA as having no adverse effects on the operation, life and performance of the lifejacket.

6 Spray Hoods

6.1 Where a spray hood is provided, the following design considerations shall be taken into account.

6.2 The wearer shall be able to deploy the hood easily when wearing the lifejacket (inflated or deflated) in or out of the water.

6.3 The spray hood shall be permanently attached to the lifejacket in such a fashion that it can be easily re-stowed when not in use, without reducing the performance of the basic lifejacket. The hood will not be considered suitable if it can in any way retain water.

6.4 The angles of vision shall not be unduly restricted, and the ability to swim and manoeuvre shall not be impaired by life jackets fitted with a hood.

6.5 The lifejacket's light source shall not be masked by the presence of the spray hood.

6.6 The materials used in the hood's construction shall be compatible with those of the lifejacket and shall in no way be able to cause damage to the buoyancy chambers or fabric of the lifejacket or liferaft.

7 Practical Tests

7.1 A lifejacket of the type for which approval is sought shall be tested in both calm and disturbed water (e.g. a swimming pool and in choppy sea or simulated choppy sea conditions). The Manufacturer's evaluation of the lifejacket, shall be agreed with the CAA and shall at least include the following tests or demonstrations.

7.1.1 **Flotation Test** The clearance of a wearer's face above the water shall be checked for a conscious person and the corresponding clearance shall be assessed, assuming the person to be unconscious as required in 2.2 and 2.4.

7.1.2 **Swimming Test** The practicability of self-propulsion in the lifejacket shall be proved. A swimming test shall be made with the lifejacket deflated and a test to show the practicability of self-propulsion with the lifejacket inflated shall also be made as referred to in 2.3.

7.1.3 **3m (10 ft.) Jump Test** Jumps shall be made from a height of 3m (10 feet) in the attention position into the water to demonstrate that there is no danger of injury to the wearer and no significant displacement of or damage to the lifejacket. This test shall be made with the lifejacket both inflated and deflated when worn by subjects of varying stature.

7.1.4 **Strength Pressure Test** The lifejacket shall have proof and ultimate factors of not less than 3 and 5 respectively on the pressure at which it is designed to be inflated by the primary means, at a stabilised ambient temperature of +45°C, and in no case shall the proof and ultimate pressures be less than 14 kN/m^2 (2 lbf/in^2) and 23 kN/m^2 (3.3 lbf/in^2) respectively.

7.1.5 **Buoyancy** The lifejacket shall retain buoyancy after use of the primary inflation system to such an extent that after a period of 12 hours the requirements of 2.2 and 2.4 can be met.

8 Materials and Processes

8.1 All materials used shall be to a specification which controls the suitability of the material for its intended application including storage.

8.2 Leather shall not be used.

8.3 The choice of materials and protective treatment shall be such that during the period between inspections, corrosion or deterioration will not render the lifejacket unserviceable.

8.4 The lifejacket, packed ready for stowage, shall not support combustion, nor shall it be likely to be rendered unserviceable by inadvertent contact with a lighted match or cigarette. The valise or container material shall meet the requirements of CAA Specification No.8, Issue 2 dated 24th September 1973 - Flame Resistance Testing for Aircraft Interior Materials.

8.5 The magnetic effect of the lifejacket shall not exceed one degree deflection of an aircraft compass placed at a distance of 300 mm (1 ft.).

9 Colour, Operational Markings and Packaging

9.1 If crew lifejackets are different from passenger lifejackets then, both lifejackets and valises shall be marked accordingly.

9.2 The predominant colour of the lifejacket shall be an approved International Rescue colour, as specified in British Standards Institution Specification No. BS.381C or acceptable equivalent. Instructions for donning and operation shall be readable to the wearer of the lifejacket taking into account the reversible lifejacket.

9.3 The lifejacket's donning and operating instructions shall be bold and readable in low levels of illumination and shall be kept to a minimum with the purpose of achieving speed of correct operation and minimum confusion.

9.4 The valise or container in which the lifejacket is to be kept whilst on board the aircraft shall be approved as part of the lifejacket's general assembly.

9.5 The valise or container shall clearly be marked to the effect that a lifejacket is contained therein. The method of opening the package shall be rapid and obvious, (without the use, of excessive physical force).

10 Marking

10.1 Each detachable part of the lifejacket shall where practicable be marked with:

a) The manufacturer's approved inspection stamp;

b) The part number;

c) Date of manufacture or batch record.

NOTE: Where marking is not practicable alternative means should be agreed with the CAA.

10.2 The lifejacket assembly shall be marked with:

a) The lifejacket model designation;

b) The manufacturer's name and address;

c) Date of manufacture;

d) Serial Number;

e) Date at which next service and overhaul are due;

f) Lifejacket classification, i.e. adult, child or infant, or combination thereof.

10.3 The charged inflation cylinder shall be marked with its total weight and the weight of charge.

10.4 The markings prescribed in 10.1, 10.2 and 10.3 shall be made such that they remain legible.