

## Chapter 3

# LIFE JACKETS, Mk. 3

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**TABLE I**  
**Stores Reference Number**

Item	Stores Ref.
Aircrew life jacket, Mk. 3 (one size only) consisting of:—	22C/1349
Waistcoat .....	22C/1350
Stole, complete with oral inflation valve .....	22C/1182
Operating head, Type M .....	6D/1624
CO <sub>2</sub> cylinder—34 grammes, light alloy .....	6D/1623E
Fluorescine sea marker .....	22C/1185
Lifeline and toggle .....	22C/1187
Whistle .....	22C/1186
Ground/air emergency code .....	27H/2733
Heliograph 2 in. × 2 in. .....	27H/2107
Life-jacket lamp .....	5A/3739

**Note . . .**

The CO<sub>2</sub> cylinder is to be replaced at wastage rates by the Mk. 4 cylinder (Stores Ref.

6D/1865). The Mk. 4 cylinder differs from the Mk. 2 in the design of the neck and is sealed, after charging, with a disc bushing assembly (Stores Ref. 6D/1835). An adapter (Stores Ref. 6D/1883) is required to charge the Mk. 4 cylinder on the standard charging rig and is part of the rig. The procedure for adapting the rig and charging the cylinder are in Chap. 10.

**Introduction**

1. The aircrew life jacket, Mk. 3 (fig. 1) consists of a waistcoat containing a stole which can be inflated with carbon dioxide (CO<sub>2</sub>) from a small cylinder. The stole cover is normally folded and held in position by snap fasteners which are burst open when the stole is inflated.

2. The stole cover is attached to the waistcoat at a point fairly high up the body of the waistcoat. This leaves the ends of the stole cover free so that the waist straps of the parachute harness can pass under



Fig. 1. Life jacket, Mk. 3

them. The shoulder straps of the parachute harness are fitted underneath the projecting lobes of the stole cover. The life jacket

can therefore be inflated while the parachute harness is still worn.



Fig. 2. Life jacket inflated

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3. The stole can be "topped up" or deflated by an oral inflation valve. The life jacket may be worn over a pressure-breathing waistcoat, and has a hole on the right-hand side to allow for the oxygen connection to the waistcoat.

4. The life jacket is provided with a fluorescein sea marker, lifeline and toggle, whistle, ground/air emergency code, heliograph, and a life jacket lamp. Straps are fitted at the base of the jacket for the attachment of the dinghy pack and dinghy lanyard. In certain areas, shark repellent may be provided.

5. When the stole is inflated, the lobe tips must be brought close to the body to give the correct angle of flotation. Pull cords are fitted on the bottom of each lobe for this purpose (*fig. 2*). The survivor can be lifted out of the water by two webbing loops, retained in the stole cover when the stole is folded, but easily located when the stole is inflated.

6. The CO<sub>2</sub> cylinder cannot be discharged accidentally. The wearer can use either hand to work the operating head; the

strength of pull required is about 15 lb.

#### DESCRIPTION

##### Waistcoat and stole

7. The waistcoat (*fig. 3*), which incorporates the stole cover, is made of fabric dyed yellow, and the stole (*fig. 4*) is made of rubberproofed fabric. The life jacket buttons at the front and can be adjusted for size by a webbing waistband with non-slip buckles. The dinghy pack is attached by two quick-release fittings, secured to adjustable straps, one on each side in front of the life jacket. The dinghy lanyard is connected to a third quick-release fitting attached to a webbing loop on the right-hand side of the life jacket.

8. For R.A.F. personnel, the female portion of the quick-release fitting is fitted on all three waistcoat attachments; for R.N. personnel, the female portion is fitted to the waistcoat for the dinghy pack attachments, and the male portion for the dinghy lanyard attachment.

(Continued on next page of text)



9. A D-ring on the right-hand edge of the stole cover forms an anchorage point for the oxygen mask tube.

10. The stole can be inserted and removed through an opening at the back of the stole cover. The oral inflation tube, which is attached to the stole, passes through a hole on the right-hand side of the cover. The housing for the CO<sub>2</sub> cylinder, on the left-hand side of the cover, is an open-ended pocket secured to a stiffened flap and closed

by a sliding fastener. The cylinder is held in position by two short lengths of cotton webbing, which are securely tied around the gas outlet union.

11. Snap fasteners are used to assemble the component parts of the life jacket (for example, to hold the ends of the stole in place, and to position the lifting straps before the cover is folded), and to hold the folded cover in position.

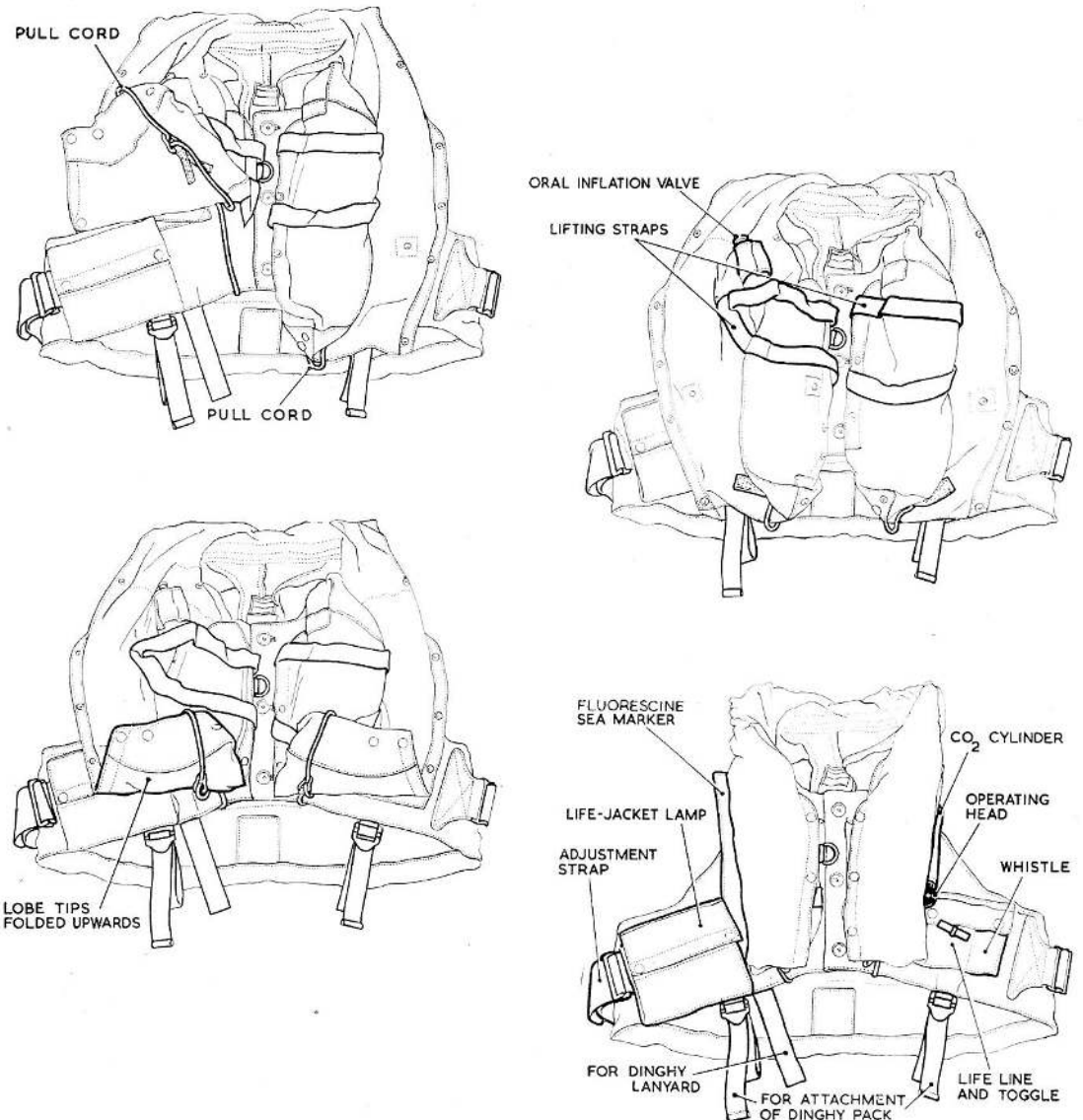


Fig. 3. Folding the life jacket

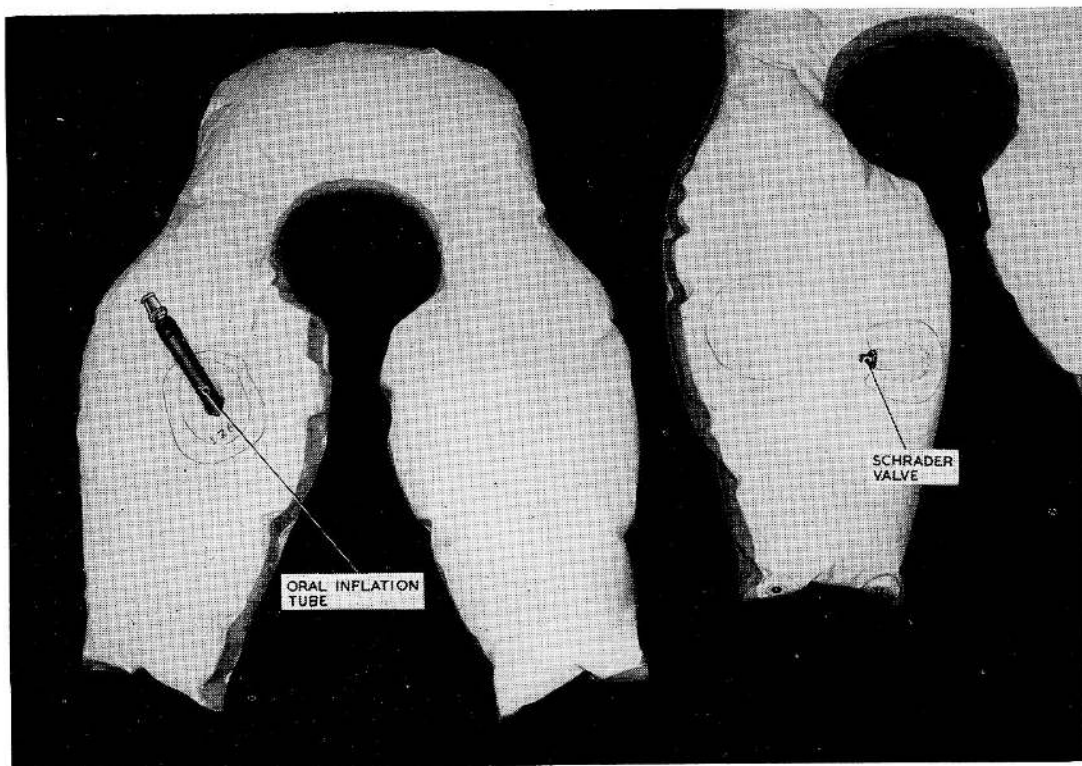


Fig. 4. Stole

12. The lifeline, heliograph, and ground/air emergency code are stowed in a pocket on the left-hand side of the life jacket, with the whistle in a separate pocket beside them. The lamp is stowed in a pocket on the right-hand side.

13. The fluorescine sea marker is supplied in a rubber pack, which is fitted inside a rip-off pocket on a flap on the right-hand side of the stole cover. Tapes at the top of the rubber pack are sewn to the pocket so that when the pocket is pulled open the pack is also pulled open and an inner pack containing the chemical is released (fig. 5.) The inner pack is attached to the life jacket by a cord.

14. Shark repellent (if provided) is fitted on the left-hand side of the stole cover, in a pocket similar to that containing the sea marker.

#### Inflation mechanism

15. The inflation mechanism consists of a CO<sub>2</sub> cylinder, an operating head, Type M, and the connection to the stole. The

operating head and cylinder are described in Chap. 11. The connection on the stole is a Schrader valve mounted in a rubber housing cemented to the stole.

#### Oral inflation valves

16. Three types of valves have been used in the production of stoles; they are not interchangeable and are as follows:—

Stores Ref.	Details
22C/1356	This is a metal valve used in earlier production and although still in use has been superseded by a nylon valve.
22C/1429	Nylon valve, Mk. 1. This was introduced to replace the metal valve but has since been superseded by a larger model to provide easier inflation.
22C/1429	Nylon valve, Mk. 2. This is now the standard valve for stoles and replaces both the previous types in current and future production.

*Metal valve*

17. The oral inflation valve (*fig. 6*) is connected to the stole by a rubber tube. The valve consists of a mouthpiece and body, inside which is a spindle carrying a rubber sealing ring. The base of the mouthpiece fits inside the body and bears on a spring. A screwed portion of the spindle engages a threaded shoulder in the mouthpiece, and the sealing ring seats on a shoulder in the body. The mouthpiece is covered by a rubber sleeve (Stores Ref. 22C/1320).

18. The wearer should unscrew the mouthpiece and top up the stole as necessary, pushing down the mouthpiece to open the valve. The valve is closed by the spring during inhalation. To deflate the stole, the mouthpiece should be pushed down and the valve held open. To lock the valve so that air cannot escape, the mouthpiece should be screwed down tightly.

*Nylon valve, Mk. 1*

19. The valve (*fig. 7*) consists of two hollow cylindrical mouldings, one is the mouthpiece and the other is the body into which the mouthpiece is fitted; the measurement across the flange is 0.8 in. Internally, there is a coil spring over the mouthpiece which rests between a shoulder about two-thirds of the way down the mouthpiece and another shoulder near the lower end of the body. This spring holds a rubber sealing washer on the end of the mouthpiece against an orifice in the end of the body; a shoulder recessed in the end of the body provides a seating for the sealing washer. Nylon is used because it is hygienic in that it does not collect dirt or dust particles, it will not freeze to the lips in very cold weather and it is a strong material.

20. When not being used, the mouthpiece is locked in the "up" position by rotating it until a tongue-shaped cam engages over a shoulder in the body; this prevents inadvertent depression of the mouthpiece with consequent loss of air in the stole. To inflate the stole, rotate the mouthpiece until the tongue-shaped cam engages with a similar cam in the body and depress the mouthpiece with the lips as inflation is commenced; the action of depressing the mouthpiece "lifts" the sealing washer off its seating, exposes the orifice at the end of the body, and allows air to pass through

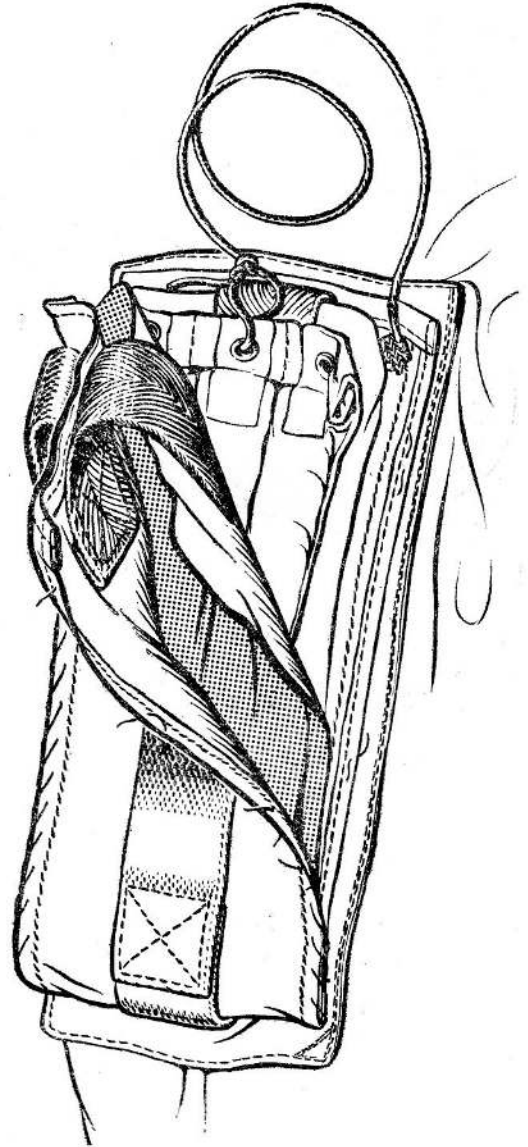


Fig. 5. Fluorescine sea marker

the valve to the stole. The mouthpiece **MUST** be depressed before inflation can take place.

*Nylon valve, Mk. 2*

21. This valve is identical with the Mk. 1 valve, but is larger, the measurement across the flange is 1.1 in. and there is a larger orifice for the passage of air into the stole; these alterations in dimensions make inflation easier.

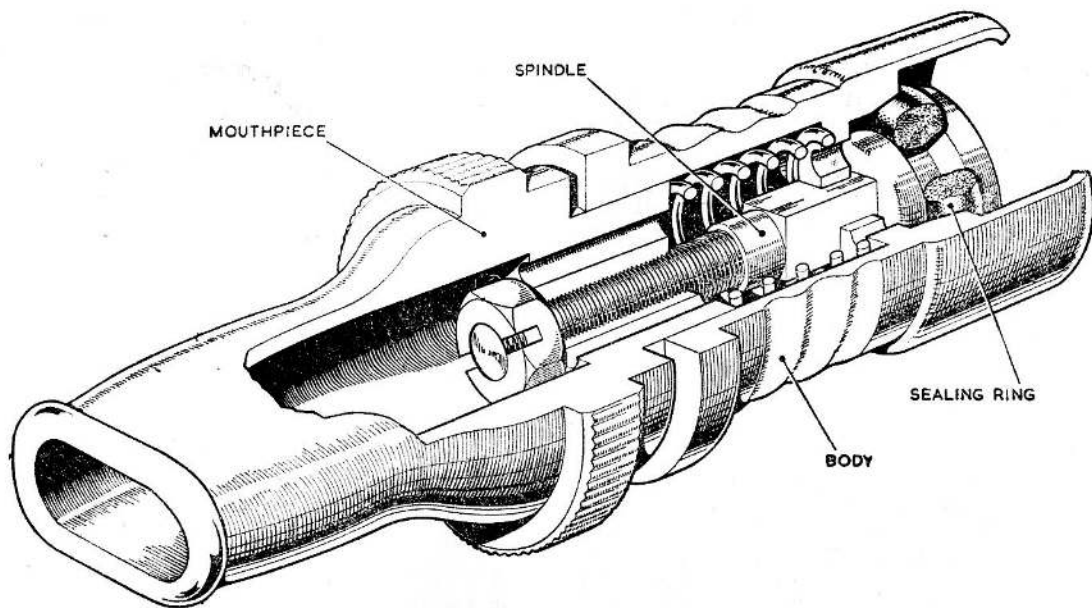
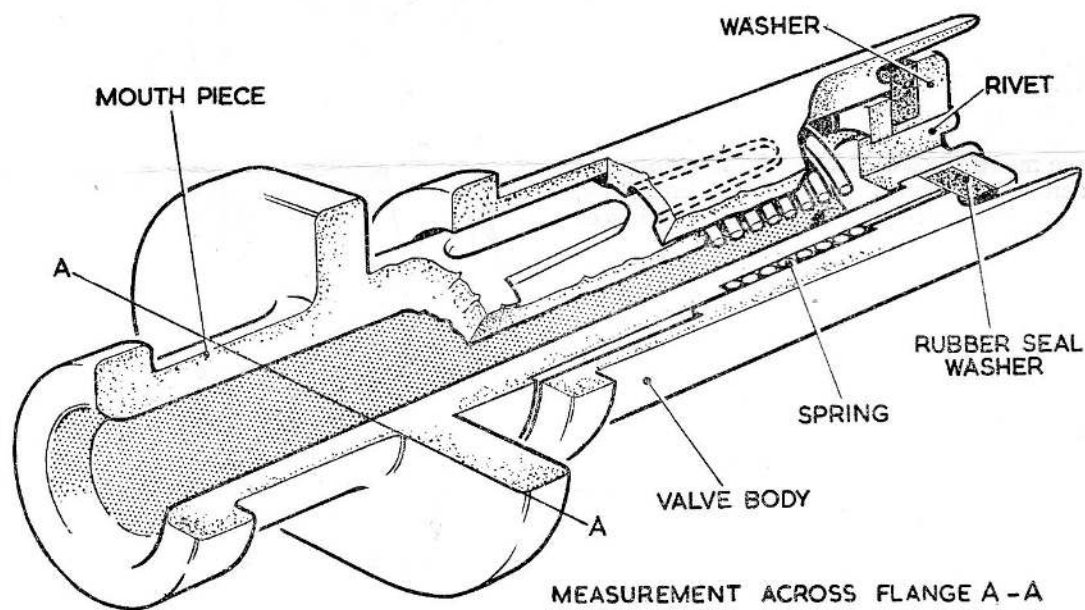


Fig. 6. Metal oral inflation valve



MEASUREMENT ACROSS FLANGE A-A  
 MK 1 VALVE 0.8 IN.  
 MK 2 VALVE 1.1 IN.

Fig. 7. Nylon oral inflation valve

**Life-jacket lamp**

22. The life-jacket lamp (*fig. 8*) consists of a battery, a skull cap on which the bulb is mounted, and a cable, all stowed inside a watertight plastic case. The battery consists of plates of silver chloride and magnesium which operate when in contact with fresh or salt water.

23. A 3-volt, 2-watt filament bulb protected by a plastic screw-on cover is mounted on a housing attached to the skull cap. The skull cap and the cable are stowed in a compartment on the side of the battery case. The joint between the flanges of the housing and the case is sealed by a spring clip to which is attached a

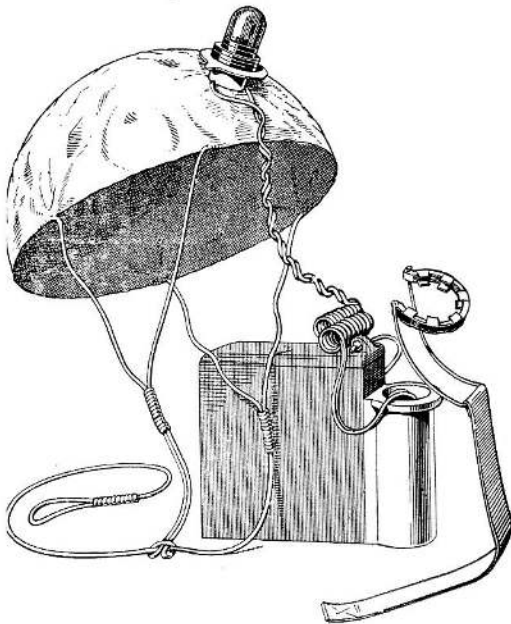


Fig. 8. Lamp and skull cap

pull-off linen tag. The lamp is attached to the life jacket by a nylon lanyard. Further information on the lamp is given in A.P. 4343E, Vol. 1, Sect. 16.

24. When the spring clip is pulled off and the bulb housing and skull cap pulled out, water enters the battery through holes in the side compartment, and activates the plates. The battery has a minimum endurance of 16 hours at full brilliance; it can be used only once.

*Instructions for use*

25. (1) Open the pocket on the life jacket so that the skull cap and cable can be withdrawn. If it is more convenient, the lamp can be taken out of the pocket.

(2) Pull off the spring clip.

**Note . . .**

*Do not remove the spring clip until the lamp is required for immediate use, otherwise water may seep through to the battery.*

(3) Pull out the bulb housing and put on the skull cap. The cap is a loose fit and may be worn on a bare head, or over a helmet or the hood of an immersion suit. The Y-shaped securing lines on each side of the cap should pass over the ears, as on a water-polo cap, and the drawstring pulled tight under the chin.

(4) If the wearer is in the water, the battery may be left in the life-jacket pocket. If the wearer is in a dinghy, the battery should be placed over the side in the water. The weight will be taken by the lanyard and not by the electric cable.

**Before flight**

26. The parachute harness shoulder straps should be passed underneath the CO<sub>2</sub> cylinder and operating head on the wearer's left shoulder and underneath the fluorescine pack on the right shoulder. The waist straps of the parachute harness should be passed under the free ends of the stole cover. The safety harness straps can be passed over the life jacket.

**In an emergency**

27. The life jacket can be inflated during a parachute descent. After immersion in the sea, the lobes of the stole should be adjusted by the pull cords at the bottom of each lobe. This will pull the lobes closer to the body and provide the correct angle of flotation.

28. If either side of the stole container does not burst open on inflation, the snap fasteners holding it in position should be pulled free.

**ASSEMBLING**

29. All stitching must be done before the stole is inserted. Knots tied in the ends of the nylon cords securing the lamp, whistle, and lanyard must be stitched or sealed to prevent their coming undone.

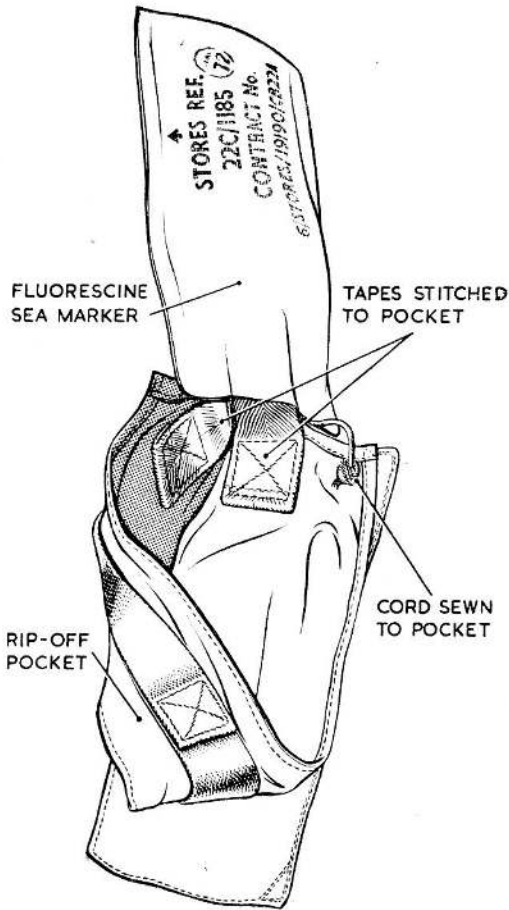


Fig. 9. Attachment of sea marker to pocket

#### Emergency code and lifeline

30. Place the ground/air emergency code in the pocket containing the lifeline and toggle and fasten it in place with a few stitches. Ensure that the lifeline is securely attached to the life jacket, and sew the toggle end of the line lightly to the top of the pocket with a few stitches of scarlet locking thread (Stores Ref. 15A/181), leaving the toggle protruding.

#### Whistle

31. Attach the whistle to the nylon cord, making sure that the cord cannot slip. Ensure that the other end of the cord is securely attached to the life jacket.

#### Life-jacket lamp

32. Attach the end of the nylon lanyard firmly to the lamp, and place the lamp in the pocket.

#### Quick-release fittings

33. Attach the appropriate quick-release fittings to the adjustable straps (for the dinghy pack) and to the webbing loop (for the dinghy lanyard).

#### Fluorescine sea marker

34. Stitch the cord on the fluorescine sea marker firmly to the life jacket (fig. 9) Stitch one of the tapes at the top of the marker to the life jacket and the other to the top of the rip-off pocket, using 50/3 cord linen or a suitable equivalent linen thread. There should be 8-12 stitches per inch, and the ends of the thread must be securely fastened off. Sew down the free sides of the pocket with scarlet locking thread (5 stitches to the inch).

#### Stole

35. Inflate the stole slightly and insert it in the outer cover through the opening at the back of the cover, making sure that the stole lies flat and is not twisted. Fasten the snap fasteners at the bottom of each lobe. Bring the oral inflation tube through at the front of the cover and pass it under its retaining loop. Deflate the stole. Make sure that the mouthpiece of the oral inflation valve is screwed down firmly. Bring the Schraeder connection through the hole in the back left-hand side of the cover.

#### Inflation mechanism

36. The operating head should be set and fitted to the CO<sub>2</sub> cylinder in accordance with the instructions given in Chap. 11, para. 7 and 8. Place the cylinder in its stowage, connect the gas outlet of the head to the Schraeder valve attached to the stole, following the instructions given in Chap. 11, para. 9, and tie the tapes at the bottom of the cylinder stowage round the neck of the gas outlet union. Close the sliding fastener on the cylinder stowage.

#### Folding

37. With the stole cover open, smooth and fold outwards the upper surface; fold the

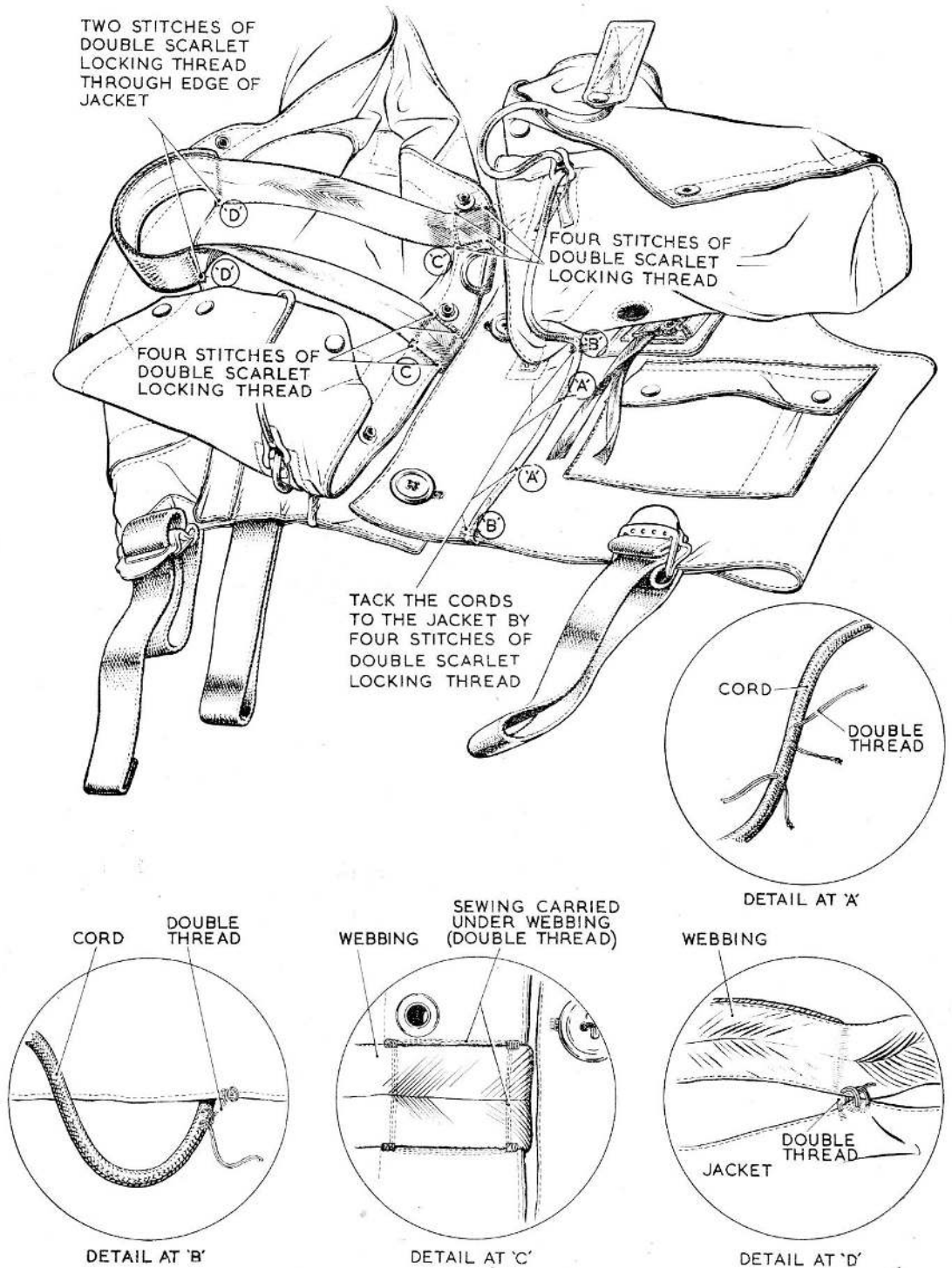


Fig. 10. Tacking the lobe adjustment cords and lifting straps

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lobe tip upwards and fasten it in position with the snap fasteners, and then fold the outer half of the lobe inwards and fasten it in position. This sequence is illustrated in fig. 3. Fold back the head rest and clip it in place.

## SERVICING

### After immersion in salt water

**38.** The operating head, CO<sub>2</sub> cylinder, life jacket lamp and battery, sea marker, whistle, heliograph and ground air emergency code are to be removed. The sea marker is to be discarded and, with the exception of the lamp and battery, the remaining items, together with the life jacket, are to be thoroughly rinsed in successive changes of clean, cold water and allowed to dry naturally away from all sources of artificial heat and sunlight. The lamp and battery are to be labelled with the details of the immersion and returned to the electrical bay. The CO<sub>2</sub> cylinder is to be serviced and then returned to the appropriate Maintenance Unit clearly marked 'This cylinder has been immersed in salt water'. After having been immersed in salt water the life jacket is to be used for wet drills only.

### Removing the inflation mechanism

**39.** If the cylinder is to be unscrewed from the operating head, whether for check weighing or because it has been discharged, the locking screw on the head must first be released. If this is not done, the threads on the cylinder will be damaged.

**40.** When the operating head is removed from the stole, take care not to damage the Schrader valve. The operating head and the valve should be held firmly while the coupling nut is unscrewed: use two spanners. It is very easy to pull the Schrader valve out of its mounting.

### Testing the stole

**41.** During periodic servicing, the life jacket should be inflated through the oral inflation valve to check that the snap fasteners open correctly and that the valve operates satisfactorily.

**42.** The stole should be inflated through the ◀oral▶ valve with air to a pressure equal to 30 cm. (about 11.75 in.) of water. The air supply should then be cut off and the stole left for ◀10▶ minutes. The pressure must not drop more than 2 cm. (about 0.8

in.) of water. A defective stole must be renewed.

### Oral inflation valve

**43.** If air leaks through the valve and the valve is metal or a nylon, Mk. 1, the stole is to be renewed. If, however, a Mk. 2 nylon valve is fitted, and air leaks through this valve, only the valve need be renewed.

**44.** To renew a Mk. 2 nylon valve, proceed as follows:—

(1) Carefully remove the tube from the body of the valve by rolling the tube towards the stole. The end of the tube should be eased off the valve body with the thumbs, bent back towards the stole and then rolled off; alternatively the tube may be pushed off, but no attempts must be made to pull the valve out of the tube.

(2) Having removed the old valve, roll the tubing back and clean the inner surface to remove any foreign matter.

(3) Wet the outside of the new valve with clean water, insert the valve and unroll the tube.

(4) Test the stole as described in para. 41.

### Note . . .

*When a new valve is fitted, ensure that the flat sides of the flange of the mouthpiece are parallel with the flanged base of the inflation tube when the mouthpiece is in the "open" position.*

(5) Place the stole on one side for the solution to cure. After the solution has set, test the stole as described in para. 42.

### Waistcoat

**45.** The waistcoat should be examined for signs of wear, tears, broken stitches, loose buttons, faulty sliding fasteners, and damaged or corroded snap fasteners, buckles or straps. Slight damage to the fabric may be repaired, providing there is no loss of strength.

**46.** If the life jacket has been used, the pull cord should be stitched in position on the waistcoat. Tacking stitches  $\frac{3}{4}$ —1 in. long of scarlet locking thread should be used. The lifting straps should also be

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stitched in place to prevent their working out of the folded stole cover (*fig. 10*).

#### CO<sub>2</sub> cylinder life

47. Pending the issue of further information, the cylinder used with this life jacket is to be subjected to a hydraulic test once every FOUR YEARS. Provided the cylinder remains undamaged, or has not been immersed in sea water, it may be used for four years from the date of the last test; the date of the last test is stamped on the cylinder.

#### R.A.F. cylinders

48. To ensure that cylinders are re-tested at the expiry of this "life", Units, other than Maintenance Units, are to keep a record of the date on which the last test was applied to each cylinder "in use" as part of a life jacket or held as a spare. When cylinders become due for re-testing, they are to be categorized as "repairable at depot" and returned empty to No. 14 Maintenance Unit, where arrangements will be made for re-test or repair, or both.

49. Cylinders issued by Maintenance Units should have the following minimum useful "life":—

- |   |                         |
|---|-------------------------|
| (1) Cylinders issued to   |                         |
| (a) Commands abroad   | } ◀ Two years or more ▶ |
| (b) No. 41 Group and other Units when demands are marked "For use abroad" |                         |
| (2) Cylinders issued for all other requirements                           | } ◀ One year or more ▶  |

#### Other limitations

50. Until further notice, the following limitations are imposed:—

- (1) *Stole*. Three replacement valves.
- ◀ (2) *Oral inflation valve*. Four immersions in salt water. ▶
- (3) *Life jacket*. Sixteen immersions in salt water.
- (4) *CO<sub>2</sub> cylinder*. Twelve months' use for drills in fresh water.

51. When these limits are reached the items are to be renewed. CO<sub>2</sub> cylinders withdrawn in accordance with these instructions are to be returned to the appropriate Maintenance Unit marked "Used in fresh water drills for twelve months."



## Appendix 1

### SERVICING SCHEDULES

Note.- The following information will be issued in A.P.1182E,  
Vol.5, in due course.

#### GENERAL NOTES

1. The following personnel are responsible for servicing the life jacket:-

Daily servicing - Flying personnel

Two-monthly servicing - Safety Equipment and Electrical personnel

2. The two-monthly servicing should be conducted on all equipment before issue.

3. Certified records of all servicing are to be maintained by the Safety Equipment Section in accordance with normal practice.

#### DAILY SERVICING

- (1) Examine the cover of the life jacket generally for signs of damage or wear, and check the security and serviceability of straps, buckles, snap fasteners, and buttons.
- (2) Check the mouthpiece of the oral inflation valve for serviceability. Ensure that the valve is finally screwed firmly down.
- (3) Check all ancillary equipment for completeness.
- (4) Check that the break thread and seal on the inflation mechanism are intact, that the CO<sub>2</sub> cylinder is screwed home and that the locking screw is tight.

#### TWO-MONTHLY SERVICING

##### LIFE JACKET

- (1) Disconnect the Schrader valve on the stole from the inflation mechanism and remove the stole from the cover.
- (2) Examine the mouthpiece of the oral inflation valve for damage and corrosion.

- (3) Pressure-test the stole. To do this, inflate the stole with air to a pressure equal to 30 cm. (about 11.75 in.) of water and maintain the pressure for 5 minutes. Then cut off the air supply and leave the stole for a further 5 minutes. The pressure must not drop more than 2 cm. (about 0.8 in.) of water. A defective stole must be renewed.
- (4) Remove the CO<sub>2</sub> cylinder (first releasing the locking screw) and weigh it. The correct weight of CO<sub>2</sub> is 34 grammes +  $\frac{1}{2}$  grammes; the empty weight of the cylinder (in grammes) is marked on the base of the cylinder.
- (5) Pull off the red cap on the operating head. Examine the head for serviceability, corrosion, and damage. Work the lever and by feeling inside the cylinder holder with a fingertip, ensure that the piercing pin has full travel. Reassemble the cap, and renew the break thread and lead seal.
- (6) Re-fit the CO<sub>2</sub> cylinder and tighten the locking screw.
- (7) Examine the stole cover for signs of wear, tears, broken stitches, loose buttons, faulty fasteners, defective buckles and straps. (Slight damage to the fabric may be repaired; damaged stitching should be made good.)
- (8) Check all the remaining items of ancillary equipment for completeness, serviceability, and security of attachment.
- (9) Reassemble the life jacket. With the stole container open, smooth and fold outwards the upper surface; fold the lobe tip upwards and fasten it in position with the snap fasteners, and then fold the outer half of the lobe inwards and fasten it in position.

- Notes.-
- (1) All stitching must be done before the stole is inserted.
  - (2) Knots tied in the ends of the nylon cords securing the lamp, whistle, and lanyard, must be stitched or sealed to prevent their coming undone.

#### LIFE-JACKET LAMP

- (1) Examine the lamp for signs of external damage.
- (2) Without disturbing the spring clip, remove the screw-on bulb cover and the bulb. Check that the bulb is serviceable.
- (3) Using a high resistance voltmeter (about 1,000 ohms/volt), check that no voltage is being developed in the cell.
- (4) Put back the bulb and bulb cover, making sure that the cover is tight.

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