

Chapter 10

ANTI-G SUITS, Mk. 4A and 5A

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Introduction

1. When 'g' forces are applied to the human body the blood is drained away from the upper system to the abdomen and legs and this, by reducing the flow to the brain, induces 'blackout'. The average pilot will experience this after a 5 'g' load has been applied for about 5 sec. The values are approximate and vary from person to person and in one person from day to day as the physical condition changes under the influence of fatigue, strain, hunger and similar factors. Repeated exposure to blackout without adequate time in between for complete recovery of normal resistance lowers the threshold and the condition returns at lower values of 'g'. Blackout is followed by mental confusion for some seconds after recovery and repeated blackouts result in mental fatigue and physical lassitude for some hours. These conditions introduce an avoidable hazard into flying.

2. Anti-g suits are designed to prevent the pooling of the blood in the abdomen and lower limbs by applying pressure over them whenever 'g' forces above a stated value are applied to the body. They have the effect of raising the resistance to blackout by about 2 'g'.

DESCRIPTION

3. There are two marks of anti-g suit, the Mk. 4A and 5A. They are similar in almost

every respect, the main difference being in the location of the inlet hose which is on the left-hand side of the waist band on the Mk. 4A suit and the right-hand side on the Mk. 5A. The Mk. 4A inlet hose is complete with a connector and the Mk. 5A hose is without. Other differences are confined to such details as the sizes, locations and types of reinforcing used on various parts of the suits.

4. A suit (*fig. 1*) consists of a trouser-like garment cut away at the crotch and knees containing a bladder (*fig. 2*) which extends across the abdomen and down the legs. Sliding fasteners enable the suit to be fastened on the wearer; adjustment straps and buckles at the waist and laces on the legs, which are gusseted, provide for the required adjustments. Metal strips retained in pockets on the waist band maintain the shape at the waist. Hooks and bars secured by tapes at the top and bottom of the waist band provide a safeguard against failure of the sliding fastener while the suit is being worn. These also facilitate donning of the suit by enabling the waist band to be fastened round the wearer while the sliding fastener and laces are being adjusted. The items are not visible in the illustration.

5. The material used in the manufacture of the suits and bladder covers is an open weave nylon; in the construction of the

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bladder, flexible rubber sheeting is used. The bladder is retained inside its cover in the legs of the suit but is free across the abdomen except that it is connected to the waist band by elastic supports. This arrangement permits the bladder to inflate without becoming distorted.

6. Anchor tabs of rubberised fabric attached to the bladder at intervals are sewn to the suit to prevent the bladder from becoming creased or displaced as the suit is put on. Strips of rubber sponge inside the bladder form airways and a 2 in. wide reed inside the abdominal part of the bladder prevents it from becoming over-inflated. When the anchor tabs are sewn to the suit, short lengths of tape are stitched into the seams so that, whenever the bladder is removed, the sewing can be cut against the tape instead of the material of the suit.

7. A short length of rubber tubing is cemented to the bladder to act as a housing for the inflation tube which is a rubberised fabric hose reinforced with coiled wire. It is supported by an anchorage strap where it passes through the suit. The bladder is reinforced locally with patches of rubberised fabric.

Sizes

8. Suits are available as follows :—

Mk. 4A		
<i>Size</i>	<i>Range (for guidance) only</i>	<i>Ref. No.</i>
Small	5 ft. 4 in. to 5 ft. 7 in.	22C/1509
Medium	5 ft. 8 in. to 5 ft. 11 in.	22C/1510
Large	6 ft. 0 in. to 6 ft. 4 in.	22C/1511
Extra large	over 6 ft. 4 in.	22C/1512
Mk. 5A		
Small	as for Mk. 4A	22C/1841
Medium	as for Mk. 4A	22C/1842
Large	as for Mk. 4A	22C/1843
Extra large	as for Mk. 4A	22C/1844

The range is given only for guidance. Every care should be taken when selecting a suit to ensure the best possible fit so that the maximum benefit will be obtained when it is worn.

Fitting a suit

9. The suit is intended to be worn over all normal clothing and is unsuitable for use under any clothing not provided with a passage for the inlet tube. It must be worn under an immersion suit.



Fig. 1. Internal view of anti-g suit Mk. A

10. Refer to fig. 4 to 9. The wearer should put on the anti-g suit over all clothing that he expects to wear with it, fasten the sliding fasteners and tighten the back strap. The lacing on the legs should be drawn reasonably tight and the ends temporarily but securely tied. If possible the suit should be inflated to a pressure not exceeding 7 lb/in² while the wearer is sitting and the final adjustment of the lacing made. When this is complete the laces can be permanently tied and any spare length either tucked away neatly or cut off. If cut, the ends should be dipped in rubber solution to prevent them from fraying. Once the adjustment is made it will not need to be altered unless a very different set of clothing is to be worn under the suit and then only if the bulk is appreciably greater or smaller.

Preparing a Mk. 5A suit for service

11. The inlet hose should first be cut to a length appropriate to the wearer's personal dimensions and the position of the personal equipment connector on the seat with an allowance of 1 in. for fitting the connector.

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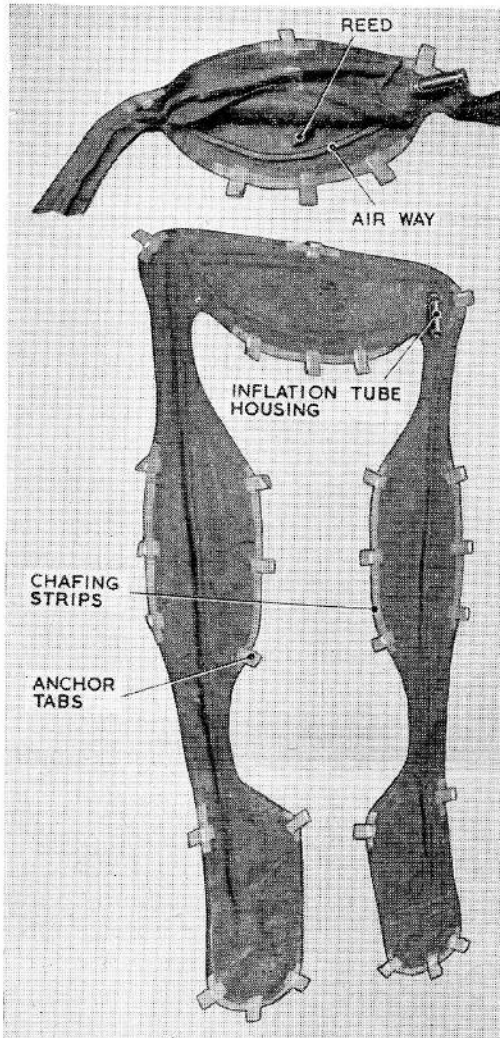


Fig. 2. Bladder

The length should be such that the hose is neither unduly slack nor under tension when the man portion of the personal equipment connector is fitted to the seat portion.

12. The connector should be fitted to the hose, using the wire reinforcing as a screw thread, so that the end of the hose seats on the flange at the bottom of the connector. It may be necessary to slightly stretch the mouth of the hose by inserting the little finger and opening it out. If lubricant is required, water, silicone grease (*Ref. No. 34B/237*) or Aquadag 4042/DTD 500J may be used. The lubricant should be very sparingly smeared on the hose, every care being taken to ensure that none passes into the mouth of the hose whence it could be carried by the airstream into the hose or bladder and cause an obstruction.

Servicing the suits

13. Servicing is to be in accordance with the instructions given in Vol. 4 at the intervals stated therein.

◀ Washing a suit

14. The following method of washing anti-g suits has been found satisfactory and is authorised:—

- (1) Blank off the connector.
- (2) Immerse the suit in a dilute solution of Compound Emulsion Detergent (*Ref. No. 33C/387*) or mild, pure soap, e.g., Lux.
- (3) Knead or brush the material lightly until all loose dirt and stains are removed. This treatment must be

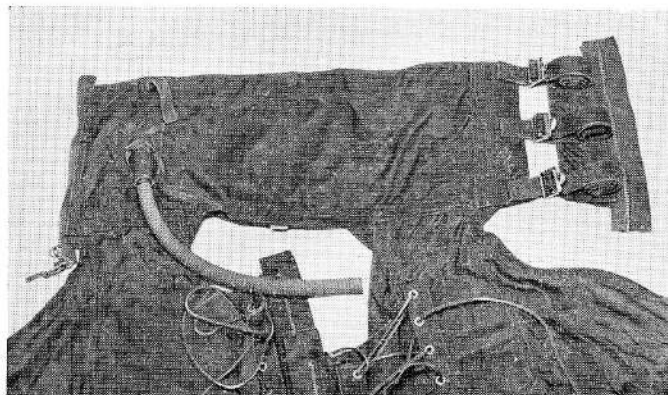


Fig. 3. Waist band Mk. 5A suit

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effected in such a manner that damage to fittings and rubber components is prevented.

(4) Rinse in several changes of clean, fresh water ensuring that all traces of dirt and the washing medium are removed.

(5) Allow to dry away from all sources of artificial heat and direct sunlight.▶

Folding a suit for storage

15. Lay the suit flat with the sliding fasteners open, fit a protective cap to the quick-release plug and cover the inflation tube with corrugated cardboard or similar material. Then fold the suit as shown in fig. 10.



Fig. 4. Before putting on



Fig. 5. Securing the waist



Fig. 6. Securing the legs

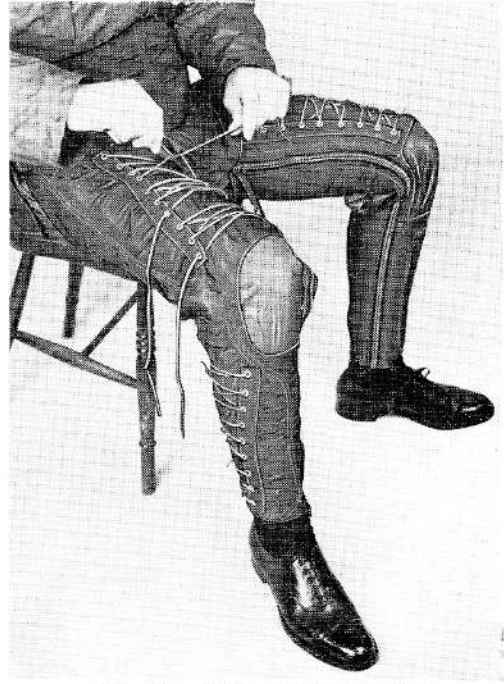


Fig. 7. Adjusting the lacing



Fig. 8. Ready for connection to air supply



Fig. 9. Trial inflation

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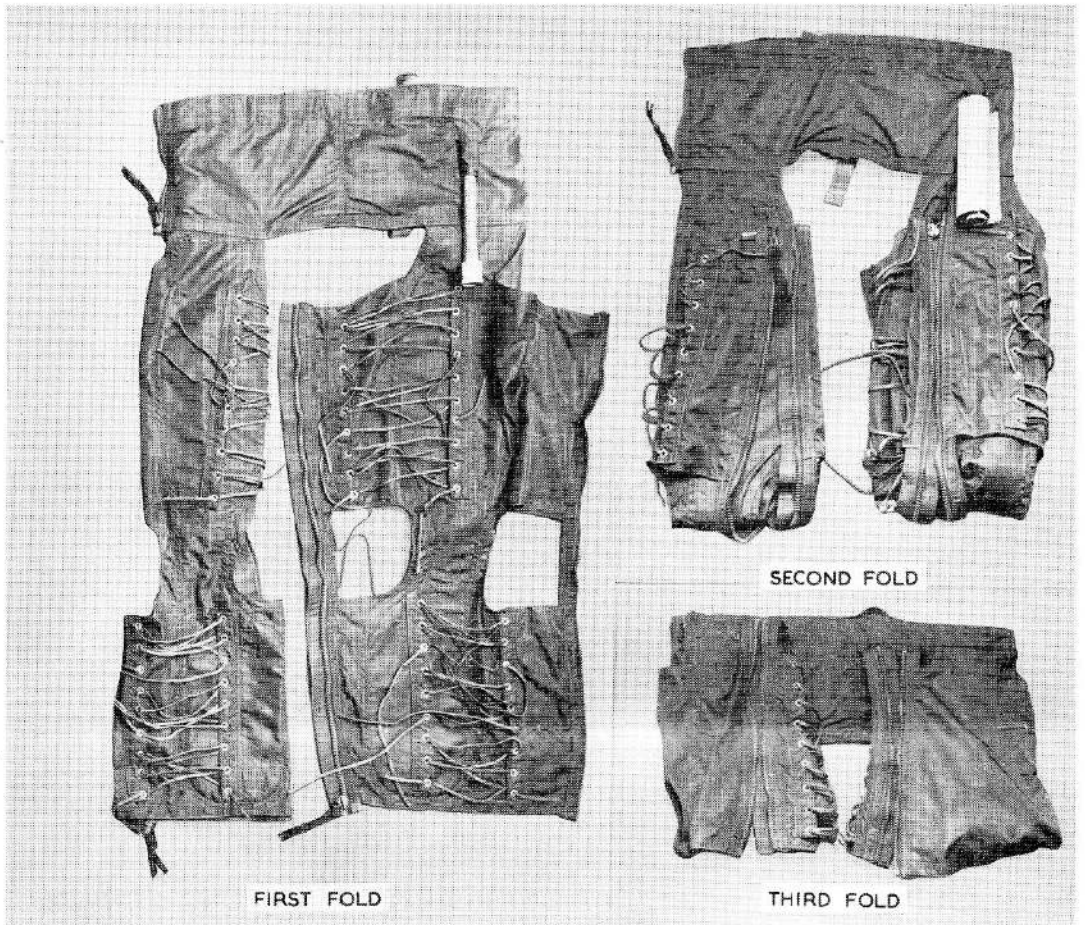


Fig. 10. Folding a suit for storage

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