

## Appendix 1

## FLYING CLOTHING

## Introduction

1. The following is the range of flying clothing available for the use of aircrew in Canberra P.R.9 aircraft; it is also scaled in A.P.830, Vol. 3, Sect. C, to which reference should be made, as necessary.

Ref. No.	Description
22C/-	
1475 to 1478	Drawers, cotton, short, aircrew
1162 to 1164	Vests, string, aircrew
9421244 to 9421250 and 9424959	Socks, woollen, knitted, plain
9421251 to 9421258	Socks, woollen, knitted, ribbed
1597 to 1606 or 1657 to 1666	Shirts, cotton, aircrew or Shirts, aircrew, N.P.
1527 to 1542	Boots, flying, 1952 pattern
1121 to 1126	Gloves, cape, leather, N.P.
1904 to 1911	Suits, flying, Mk. 2
2024	Garters, leg restraint, Q.R. (for attachment to flying suit Mk. 2)
1725 to 1728	Helmets, flying, Type G
2110 to 2124	Helmets, protective, Mk. 1A, c/w visor attachment
1650 to 1651	Screens, anti-glare, Medium/ large
1877	Jackets, life-saving, Mk. 4A
1801 to 1814	Suits, flying dress, Mk. 2, blouse
1815 to 1828	Suits, flying dress, Mk. 2, trousers
1713 to 1718	Jerkins, pressure, Mk. 1
1856 to 1861	Suits, air-ventilated, Mk. 2A
1841 to 1844	Suits, anti-G, Mk. 5A
2093 to 2105	Helmets, partial pressure, Type E

## Ref. No.

## Description

6D/-	
2170	Connector, anti-G suit, special
2262	Hose assembly, AVS, Mk. 3
2307	Mask, oxygen, Type P2A
2309	Mask, oxygen, Type Q2A
2073	Hose assembly, oxygen mask, Mk. 1 (c/w personal component of P.E.C.)
2228	Hose assembly, pressure jerkin, Mk. 6

2. A brief description of the items of clothing, including the chief technical reasons for their use, is given in the appropriate chapter of Sect. 1; more detailed information, including servicing and modifications, is contained in A.P.1182E, Vol. 1, 2 and 4.

3. The range of items available includes those required for both high and low altitude flying, as well as those items (such as boots, vests etc.) which are used in both types of sorties. For the purposes of this appendix, the functional items of clothing are grouped together as assemblies giving adequate protection up to the heights indicated.

4. It should be noted that the anti-G suit used in Type B and C assemblies is required as a garment to assist pressure breathing, in the event of loss of cabin pressure at high altitude, and has no anti-G function whatever in this aircraft. It is inflated with oxygen from the main supply and not, as is normal, with air. The suit is provided with a bayonet end fitting on its supply hose which, during dressing, should be connected to the Y-fitting on the pressure jerkin hose assembly (between the personal component of the P.E.C. and the jerkin valve).

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## FLYING CLOTHING ASSEMBLIES

### Type A assembly (with Mk. 21 oxygen regulator)

5. This is a LOW ALTITUDE clothing assembly and provides protection in the following conditions:-

- (1) It provides full protection up to an altitude of 45000 ft.
- (2) Upon loss of cabin pressure for any reason, the aircraft must be brought down to 36000 ft. within two minutes. From 45000 ft. this can only be achieved if the emergency situation is appreciated and the maximum possible descent rate (vide A.P.4326J-P.N.) is set within the first thirty seconds after losing cabin pressure.

#### Note . . .

*Reference should, however, be made to the Type A1 assembly which includes a Mk. 20 oxygen regulator.*

6. The assembly consists of the following items:-

Type P or Q mask (according to size of face)

Flying helmet, Type G

Protective helmet, Mk. 1A

Hose assembly, oxygen mask, Mk. 1

Jacket, life-saving, Mk. 4A

Suit, air-ventilated, Mk. 2A c/w hose assembly, AVS, Mk. 3. (Optional wear. Suit hose to be cut to length required to give a neat 'run' with the rest of the A.E.A. when sitting in the ejection seat).

### Type A1 assembly (with Mk. 20 oxygen regulator)

7. This is a LOW ALTITUDE clothing assembly identical with that listed in para. 6, but the maximum altitude at which full protection is given is reduced because of the conditions set out in para. 8.

8. The Mk. 20 and 21 oxygen regulators have different 'laws' suited to the high altitude clothing assemblies for which they are designed. At high altitudes the Mk. 20 regulator gives a greater breathing pressure which can become intolerable with an oxygen mask, although it is

quite acceptable with the proper equipment. As a result, the altitude limitation of the Type A clothing assembly is reduced to 39500 ft. when the aircraft has a Mk. 20 regulator (para. 5 (1) refers). The descent time and other conditions (para. 5 (2) refers) are unchanged, but for 45000 ft., read 39500 ft.

### Type B assembly (with Mk. 21 oxygen regulator)

9. This is a HIGH ALTITUDE clothing assembly and provides protection in the following conditions:-

- (1) It provides full protection up to an altitude of 50000 ft.
- (2) Upon loss of cabin pressure for any reason, the aircraft must be brought down to 40000 ft. (36000 ft. if the canopy has been lost) within two minutes. From 45000 ft. or above, this can only be achieved if the emergency situation is appreciated and the maximum possible descent rate (vide A.P.4326J-P.N.) is set within the first thirty seconds after losing cabin pressure.

#### Note . . .

*Reference should, however, be made to the Type C assembly which includes a Mk. 20 oxygen regulator.*

10. The assembly consists of the following items:-

Type P or Q mask (according to size of face)

Flying helmet, Type G

Protective helmet, Mk. 1A

Pressure jerkin, Mk. 1, c/w hose assembly, pressure jerkin, Mk. 6

Anti-G suit Mk. 5A, c/w connector 6D/2170; suit hose to be cut to required length.

#### Note . . .

*It is essential that the fit of jerkin and anti-G suit is approved by a qualified F.P.M.O. after thorough indoctrination and checking of the subject in a decompression chamber.*

Suit, air-ventilated, Mk. 2A, c/w hose assembly,

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AVS, Mk. 3. (Optional wear. Suit hose to be cut to length required to give a neat 'run' with the rest of the A.E.A. when sitting in the ejection seat).

11. The limitations in para.9 take into account:—

- (1) The suction which would develop in the cabin from loss of its canopy.
- (2) The altitude which can be lost, in the time for which protection is given by the clothing assembly, without exceeding aircraft limitations.

These altitude limitations are, therefore, lower than those which may be given in other references for the equipment, since these other references are of a general nature and do not necessarily take into account matters, such as those in sub-para. (1) and (2), peculiar to their use in a particular aircraft.

#### Type C assembly (with Mk. 20 oxygen regulator)

12. This is a HIGH ALTITUDE clothing assembly identical with that listed in para. 10. The clothing assembly protection limitations, etc. imposed by para. 9 also impose an artificial restriction on the capabilities of the aircraft. To remove this, it is intended to introduce an assembly giving still better altitude protection as soon as it can be arranged. For this assembly the oxygen regulator will be a Mk. 20 and the personal equipment will be as follows:—

Helmet, partial pressure, Type E

Pressure jerkin, Mk. 1, c/w hose assembly, pressure jerkin, Mk. 6

Anti-G suit Mk. 5A, c/w connector 6D/2170; suit hose to be cut to required length.

Note . . .

*It is essential that the fit of these items is approved by a qualified F.P.M.O., after indoctrination and checking of the subject in a decompression chamber.*

Air-ventilated suit, Mk. 2A, c/w hose assembly, AVS, Mk. 3. (Optional wear. Suit hose to be cut to length required to give a neat 'run' with the

rest of the A.E.A. when sitting in the ejection seat).

13. This clothing assembly will give adequate protection, provided a descent is made to reach 36000 ft. within four minutes after losing cabin pressure, and will impose no restrictions on the altitude capabilities of the aircraft. At the ceiling of the aircraft, this will again require that the emergency situation is fully appreciated and maximum permissible rate of descent is set up within the first 30 seconds after losing cabin pressure; reference should, however, be made to para. 14 and 15 if the aircraft is fitted with a Mk. 21 oxygen regulator instead of a Mk. 20.

#### Type D assemblies (non-standard)

14. It is important that flights should not be permitted with high altitude clothing assemblies Type B and C when the wrong oxygen regulator is fitted in the aircraft. Even with the counter pressure provided by the jerkin and anti-G trousers, the Mk. 20 regulator can produce a breathing pressure which is not tolerable with the Type P or Q masks; with P.R.9 aircraft this factor (although serious) is not the overriding one, since the main reason why flights with non-standard clothing assemblies and their related oxygen regulators should not be permitted is the height from which a descent to 36000 ft. can be made within 1½ min. plus ½ min. preparation time.

15. Similarly, the Mk. 21 oxygen regulator imposes serious penalties on the protection provided by the Type C clothing assembly, because the regulator gives a reduced oxygen supply. Once again, the overriding factor is the total 'get-down' time which must not exceed two minutes. Thus, if the clothing assembly Type B is used in an aircraft fitted with a Mk. 20 oxygen regulator, or the clothing assembly Type C is used in an aircraft fitted with a Mk. 21 oxygen regulator, the maximum altitude for which full protection is available is 45000 ft. in each instance.

16. The following summary sets out the limitations:—

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Clothing assembly		Canberra P.R.9 fitted with Mk. 21 Regulator		
Assembly	Description	Alt. Limit	Descend to	Within
<u>A</u> and <u>A1</u>	Mask alone	<u>A</u> 45000 ft.*	36000 ft.	2 min.*
<u>B</u> and D	Mask, jerkin and anti-G suit	<u>B</u> 50000 ft.*	40000 ft.	2 min.*
<u>C</u> and D	P.P. helmet, jerkin and anti-G suit	D 45000 ft.	36000 ft.	2 min.*

Clothing assembly		Canberra P.R.9 fitted with Mk. 20 Regulator		
Assembly	Description	Alt. Limit	Descend to	Within
<u>A</u> and <u>A1</u>	Mask alone	<u>A1</u> 39500 ft.	36000 ft.	2 min.*
<u>B</u> and D	Mask, jerkin and anti-G suit	D 45000 ft.	36000 ft.	2 min.*
<u>C</u> and D	P.P. helmet, jerkin and anti-G suit	<u>C</u> Ceiling of aircraft	36000 ft.	4 min.*

Note . . . .

- (1) *Items in column 5 marked with an asterisk; descent to be at maximum permissible aircraft limits within 30 sec. of losing cabin pressure.*
- (2) *Items in column 3 marked with an asterisk; for full protection, including loss of canopy; these heights should be reduced to 41000 ft. and 45000 ft. respectively. In the event of the canopy being lost, the descent should continue to at least 36000 ft. (para. 5 and 9 refer).*
- (3) *Underlined letters indicate the normal high and low altitude clothing assemblies appropriate to the regulator concerned.*

DRESSING

17. The recommended order of dressing for high altitude clothing assemblies is as follows:-

Note . . . .

*A flying clothing worker, or other suitably qualified tradesmen, should be in attendance during dressing to render assistance where necessary.*

- (1) Vest, pants and socks.
- (2) Air-ventilated suit (AVS) is required.

Note . . . .

*This garment is donned with the slit at the back. It has two pairs of tapes with colour coded ends; the top pair is marked RED and should be tied behind the neck, the lower pair is marked BLUE and should be brought round the waist and tied in front. In warm weather an air supply should be connected immediately to the suit and maintained in action until take-off. This is important, since in warm climates or warm climatic conditions the more critical*

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*risks of heat exhaustion may well occur during this period, rather than after becoming airborne.*

- (3) Shirt.
- (4) Trousers of flying dress.
- (5) Anti-G suit.
- (6) Boots.
- (7) Jacket of flying dress (if required).
- (8) Flying suit (with fitted garters).

Pass the AVS and anti-G hoses through the slits provided on the right side of these garments.

- (9) Pressure jerkin. Before closing the slide fastener, pass the AVS and anti-G hoses through the slit provided on the right leg.

**Note . . .**

*A better run of the hoses may be achieved by ignoring the slit and passing them through the leg opening itself. It is therefore recommended that each individual should determine the most suitable configuration by sitting in the seat in the aircraft with the P.E.C. components connected and,*

*bearing in mind that the hoses are supplied longer than is normally required, route them to provide the most convenient 'run' so that they can be cut to the required length.*

- (10) Connect the anti-G suit to the Y-piece on the jerkin hose assembly (leaving the AVS connected to the air supply).
- (11) Don the partial-pressure helmet, or fabric helmet and oxygen mask, according to the clothing assembly used.
- (12) Fit the partial-pressure helmet (or mask) hose assembly into the jerkin hose assembly and connect the Mic/Tel plug to the socket attached to the jerkin hose assembly.
- (13) Conduct a functional test of the clothing assembly, using the test rig cabinet in the crew room (or flying clothing cloak-room). Instructions for conducting these tests, or checks, are contained on the test rig cabinet.
- (14) Don the protective helmet.
- (15) Put on the gloves and proceed to the aircraft. Just before entering the aircraft, disconnect the AVS from the air supply and connect the hose to the personal component of the P.E.C. on the jerkin hose assembly.

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