Chapter 5

HELMETS AND HEADGEAR

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LIST OF ILLUSTRATIONS

Introduction

1. Helmets are divided into two categories for the purposes of description :—

(1) *General purpose helmets.* These offer limited protection in an emergency, exclude most of the outside noise so that communication between members of the crew and between the aircraft and the ground is possible, and provide an anchorage for other essential items of flying equipment, such as an oxygen mask. They are made of leather or fabric, such as Aertex, and certain types may be worn as a head cover under a protective helmet.

(2) *Protective helmets.* These are hard and rigid, and offer protection against head injuries likely to be caused by buffeting or a crash landing; they also increase the chance of a safe ejection if the canopy release mechanism fails. This type of helmet is usually worn over one of the general purpose helmets.

2. A helmet must fit closely, but not too tightly; a tight fitting helmet causes headaches. If a general purpose helmet is too loose, it will be uncomfortable under a protective helmet and, what is more important, it will be impossible to fit an oxygen mask correctly.

HELMETS, TYPES C AND C*, WIRED

3. The Type C wired helmet (*fig.* 1) is a general purpose helmet, made of leather and fitted with a Type 2091 connector. It is provided for use in aircraft fitted with static seats, and is available in the following sizes :—

	Size	Stores Ref. No.
1	$6\frac{1}{2}$ to $6\frac{3}{4}$	22C/877
2	$6\frac{7}{8}$ to 7	22C/878
3	$7\frac{1}{8}$ to $7\frac{3}{8}$	22C/879
4	$7\frac{1}{2}$ to $7\frac{3}{4}$	22C/880

4. The Type C* wired helmet is similar to the Type C, but has a Type 2808 connector. It is provided for use in aircraft fitted with ejection seats, and is available in the following sizes :—

	Size	Stores Ref. No.
1	$6\frac{1}{2}$ to $6\frac{3}{4}$	22C/1095
2	$6\frac{7}{8}$ to 7	22C/1096
3	$7\frac{1}{8}$ to $7\frac{3}{8}$	22C/1097
4	$7\frac{1}{2}$ to $7\frac{3}{4}$	22C/1098

5. A further variant of the Type C* wired helmet, fitted with a tropicalised Type 3511 connector, is available in the following sizes :—

Fig. 1. Type C wired helmet

	Size	Stores Ref. No.
1	6½ to 6¾	22C/1145
2	6⅞ to 7	22C/1146
3	7⅛ to 7⅜	22C/1147
4	7½ to 7¾	22C/1148

HELMETS, TYPES E AND E*, WIRED

6. The Type E wired helmet (*fig.* 2) is a lightweight version of the Type C helmet, made of open weave fabric and fitted with a Type 2091 connector. It is available in the following sizes :—

	Size	Stores Ref. No.
1	6½ to 6¾	22C/973
2	6⅞ to 7	22C/974
3	7⅛ to 7⅜	22C/975
4	7½ to 7¾	22C/976

7. The Type E* wired helmet is similar to the Type E, but has a Type 2808 connector. It is provided for use in aircraft fitted with ejection seats, and is available in the following sizes :—

	Size	Stores Ref. No.
1	6½ to 6¾	22C/1099
2	6⅞ to 7	22C/1100
3	7⅛ to 7⅜	22C/1101
4	7½ to 7¾	22C/1102

8. A further variant of the Type E* wired helmet, fitted with a tropicalised Type 3511 connector, is available in the following sizes :—

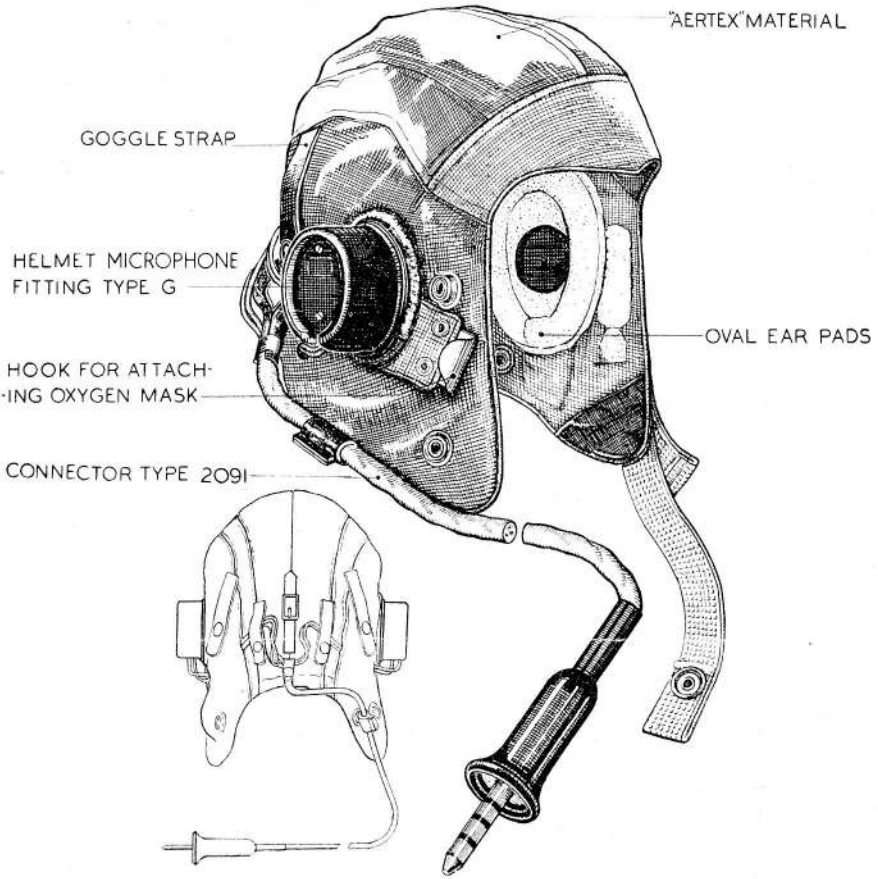

Fig. 2. Type E wired helmet

	Size	Stores Ref. No.
1	$6\frac{1}{2}$ to $6\frac{3}{4}$	22C/1149
2	$6\frac{7}{8}$ to 7	22C/1150
3	$7\frac{1}{8}$ to $7\frac{3}{8}$	22C/1151
4	$7\frac{1}{2}$ to $7\frac{3}{4}$	22C/1152

NECK PROTECTORS

9. Neck protectors (Stores Ref. 22C/1088), for use in tropical countries, may be attached to the helmets by press studs.

HELMET, TYPE F

10. The Type F helmet (*fig.* 3) is made of open weave fabric and may be worn as a general purpose helmet, or as a head cover under a protective helmet as shown in fig. 8. It is available in the following sizes :—

	Size	Stores Ref. No.
1	$6\frac{1}{2}$ to $6\frac{3}{4}$	22C/1385
2	$6\frac{7}{8}$ to 7	22C/1386
3	$7\frac{1}{8}$ to $7\frac{3}{8}$	22C/1387
4	$7\frac{1}{2}$ to $7\frac{3}{4}$	22C/1388

11. It is similar to the Types C and E helmets in general outline, but has an elastic strap across the back which can be adjusted to improve the fit round the neck;

Fig. 3. Type F helmet

the earpads are attached by press studs to the inside of the helmet. Apertures at the back and side enable back or side entry connectors to be used, and a flap at the back covers the leads ; this flap is held in position by the elastic strap.

12. Internally, all metal fittings which come into contact with the head or face are covered with fabric to prevent low temperature burns.

13. The earpads are made in two parts. One is made of moulded rubber and is sufficiently rigid to locate the pad once it is in position; it also carries the earpiece for the receiving part of the communication apparatus, together with a connector and plug to the aircraft side of the communication system, and a plug to which the microphone lead is connected. The other part is a soft leather pad filled with glass fibre wadding. The pad and the connector are secured to the canvas backing of the moulded rubber by hand stitching, and the microphone plug is secured by a press stud.

Note . . .

If the Type F helmet is used in aircraft fitted with static seats, a longer connector than that shown will be required. An extension to the existing lead can be made locally for this purpose.

Assembling the components

14. The helmet may be supplied ready for use but for the purposes of these instructions it has been assumed that the components (*fig.* 4) have been supplied separately or that the helmet has been dismantled for detailed examination.

15. To assemble the earpads and earpieces (*fig.* 5), proceed as follows :—

Right-hand ear pad

(1) Stitch the soft leather pad to the canvas backing of the rubber moulding; ensure that the stitches do not pass through the rubber.

(2) Pass the leads to the earpiece through the holes in the rubber moulding. If one lead is longer than the other, fit the longer lead through the upper hole. Avoid twisting the leads.

(3) Dip the split tapered rubber bushes in french chalk and fit them over the leads, tapered end towards the holes in the rubber moulding. Slide the bushes down the leads until the tapered ends protrude through the holes ; do not pull the bushes tight in the holes at this stage.

(4) Remove the rubber vent plug from the earpiece ; a pin or similar sharp instrument may be used to assist this operation.

(5) Fit the leads into the earpiece and tighten the locking screws. Ensure that the leads are held firmly.

(6) Ease the leads back through the rubber moulding and press the earpiece into position in the moulding, taking care not to pinch the wall.

(7) Pull the leads gently through the tapered bushes to remove any slack, and pull the tapered bushes through the holes until they are tight.

Left-hand ear pad

(8) Fit the leather pad and earpiece as described in sub-para. (1) to (7) and clip the microphone plug to the press stud on the rubber moulding. Attach the connector to the rubber moulding by oversewing with about six turns of No. 18 linen thread ; the stitches are to be secured to the canvas backing and must not pass through the rubber.

16. To assemble the ear pads in the helmet (*fig.* 6), proceed as follows :—

(1) Fit the ear pads to their respective sides of the helmet by fastening the press studs.

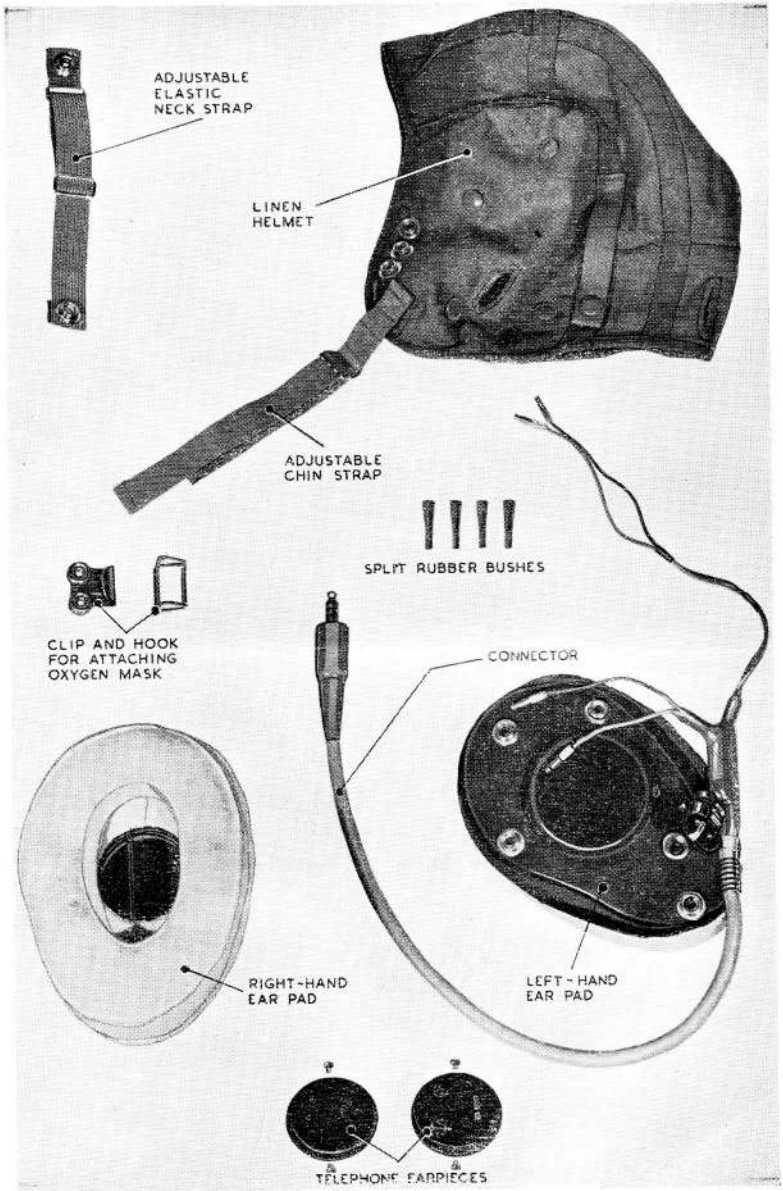

Fig. 4. Components of the Type F helmet

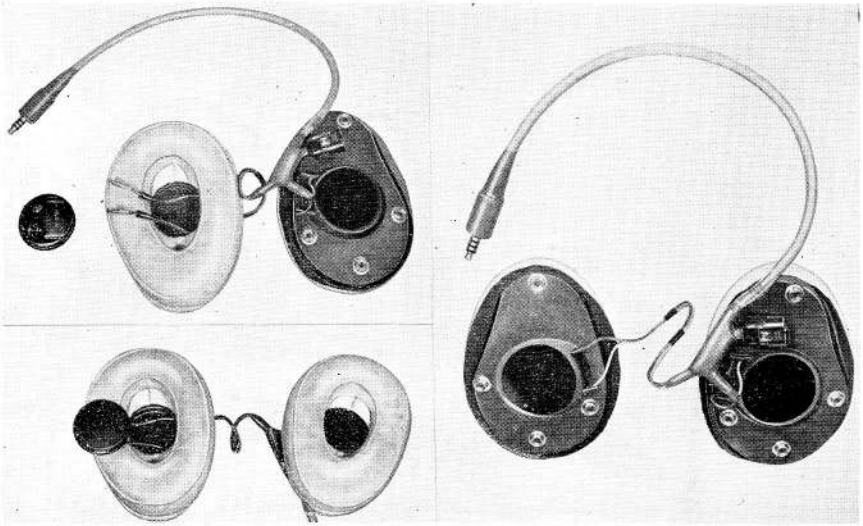

Fig. 5. Assembling the ear pads and earpieces

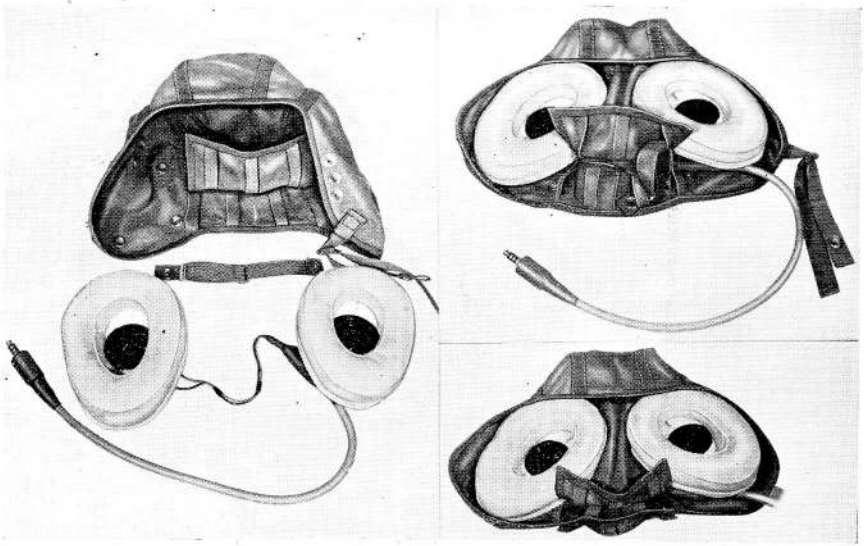

Fig. 6. Assembling the ear pads in the helmet

Fig. 7. Type F helmet worn with goggles

(2) Lay the leads at the back of the upturned flap, taking care not to twist them. Clip one end of the elastic strap to the press stud at one side of the flap, pass the other end through the loops on the helmet and flap alternately, keeping the leads close to the join between the flap and helmet, and clip the other end of the strap to the press stud at the other end of the flap.

(3) Make sure that the microphone plug protrudes through the aperture at the side of the helmet.

17. Fit the clip for the oxygen mask to the right-hand side of the helmet (*fig.* 3) as follows :—

(1) Try the helmet on the wearer and decide which is the better of the two positions ; the clip fits on two of the press studs.

(2) Attach the clip permanently to the selected position by fitting suitable rivets through the press studs.

Note . . .

A buckle hook may be supplied with the helmet. This hook should be fitted to the helmet in place of the existing hook.

Fitting the helmet

18. The helmet should fit closely all round the head, and several sizes should be tried on before finally deciding on the one to wear. Adjustments can be made to improve the fit, e.g., by altering the length of the elastic strap at the back and tightening the chin strap ; such adjustments will have the effect of drawing the helmet tighter round the face and neck, but will not improve the fit round the head to any appreciable degree. Selection of the correct size is important, because it ensures maximum comfort and efficiency, and because the correct fit and efficiency of other items of equipment, such as the oxygen mask, depend on a correctly fitting helmet.

19. When goggles are worn with this helmet (*fig.* 7), the headband should be passed through the loops just behind the ear pads (*fig.* 4).

Servicing

20. Dismantle the helmet and pass the earpieces, complete with the connector and microphone plug, to the appropriate specialist bay for servicing.

21. Examine the fabric helmet, elastic strap and ear pads for holes, tears and broken stitching. Ensure that the metal fittings are undamaged and that the elastic threads in the strap are not broken or deteriorated to such an extent that the elasticity, i.e., power of recovery after being stretched, is virtually lost. Broken stitching may be made good and small tears may be repaired. Any components which are extensively damaged, or components with damaged metal fittings, are to be renewed.

22. Examine the moulded rubber formers of the ear pads to ensure that the press studs are firmly fixed in them, and that the canvas covering is serviceable. Ensure that the soft leather pads are securely stitched to the formers after they have been serviced.

23. The fabric helmet may be washed with soap and water when it is dirty ; do not force the drying by placing the helmet near a heating apparatus, it should be allowed to dry naturally. Ear pads covered with smooth leather, NOT those covered with chamois leather, may be sponged with soap and water to clean them, they should be allowed to dry naturally.

24. Re-assemble the components after servicing, as described in para. 15 to 17.

Fig. 8. Protective helmet, Mk. IA, worn over a Type F helmet

PROTECTIVE HELMET, Mk. IA

25. This helmet (*fig.* 8) protects the head from injuries which may be caused by buffeting or a crash landing, and increases the chance of a safe ejection if the canopy release mechanism fails. It is available in the following sizes :—

Size	Fitting and Stores Reference		
	Narrow	Regular	Broad
1	22C/1515	22C/1516	22C/1517
1½	22C/1652	22C/1653	22C/1654
2	22C/1518	22C/1519	22C/1520
3	22C/1521	22C/1522	22C/1523
4	22C/1524	22C/1525	22C/1526

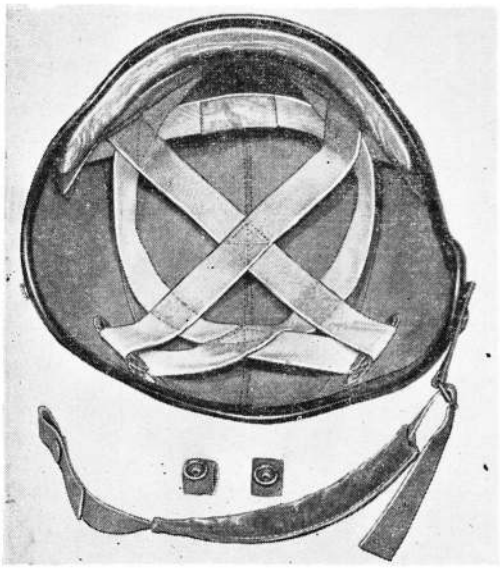

Fig. 9. Internal view of protective helmet, Mk. IA

26. The helmet is constructed from bonded laminations of nylon fabric and is shaped to fit over the Type F helmet, the two lobes coinciding with lobes formed by the ear pads of the fabric helmet.

27. Internally, it is lined with leather, is padded at the top, has a leather-covered pad to protect the forehead, and a webbing harness to support it on the crown of the head (*fig.* 9). An adjustable chin strap with a velveteen band holds the helmet in position, and small elastic loops to retain the headband of goggles can be secured to the outside with press studs, if required (*fig.* 10).

Note . . .

Provision will be made for the use of a visor with these helmets, and information will be included as soon as it is available.

Fig. 10. Components of protective helmet, Mk. IA

Assembling the components

28. Attach the chin strap to the left-hand side of the helmet, making sure that the velveteen band is fitted with the sewn edge outwards ; when fitted in this manner the velveteen band will not chafe the chin or neck. The press stud on the right-hand side of the helmet is weaker than that on the left-hand side ; in an emergency, the helmet will come away before the wearer is injured.

29. If goggles are worn with this helmet (*fig.* 11), the headband should be removed from the facepiece of the goggles, threaded

Fig. 11. Protective helmet, Mk. 1A, worn with goggles

through the small elastic loops after these loops have been fitted to the outside of the helmet, and then reassembled to the facepiece.

Fitting the helmet

30. It is essential that this helmet should fit properly from the outset, because no amount of wear will do anything to improve a badly-fitting helmet ; the sensation of pressure caused by a badly fitting helmet would become intolerable if the helmet were worn for long periods. The helmet should fit well down, so that it is supported by the internal harness and not by side pressure.

31. The wearer should try on several helmets, even if he has decided on one that is apparently the right size, because individual helmets of the same nominal size may vary slightly. The helmet should be worn for approximately 30 minutes before it is accepted as being a good fit ; if it feels tight in any direction, it should not be accepted. The shape of the helmet cannot be altered.

32. To don the helmet, place the thumbs inside the lobes and ease them apart, so that the helmet does not jam over the ear pads of the inner helmet or head cover. Keep the chin strap of the fabric helmet fastened. When the helmet has been donned, fasten the chin strap, but do not pull it too tight.

Servicing

33. Examine the internal harness, chin strap and any metal fittings, and ensure that they are serviceable ; make sure that the harness is secure.

34. Repairs to the helmet, other than the renewal of the chin strap, are not permitted, but damaged paint, i.e., where it has been scratched or worn off, may be covered with silver cellulose finish. If, however, it is suspected that damage to the paint is more than superficial (if, for example, the wearer has been involved in an accident causing a head injury), the helmet should be examined carefully to make sure that the laminations have not been broken or their structure weakened. Press very firmly with the thumbs around the suspected area, indicated by the damage to the paint. If there is any softness, the helmet MUST NOT be used, and is to be replaced by a serviceable item.

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Fig. 11. Protective helmet, Mk. 1A, worn with goggles

through the small elastic loops after these loops have been fitted to the outside of the helmet, and then reassembled to the facepiece.

Fitting the helmet

30. It is essential that this helmet should fit properly from the outset, because no amount of wear will do anything to improve a badly-fitting helmet; the sensation of pressure caused by a badly-fitting helmet would become intolerable if the helmet were worn for long periods. The helmet should fit well down, so that it is supported by the internal harness and not by side pressure.

31. The wearer should try on several helmets, even if he has decided on one that is apparently the right size, because individual helmets of the same nominal size may vary slightly. The helmet should be worn for approximately 30 minutes before it is accepted as being a good fit; if it feels tight in any direction, it should not be accepted. The shape of the helmet cannot be altered.

32. To don the helmet, place the thumbs inside the lobes and ease them apart, so that the helmet does not jam over the ear pads of the inner helmet or head cover. Keep the chin strap of the fabric helmet fastened. When the helmet has been donned, fasten the chin strap, but do not pull it too tight.

Servicing

33. Examine the internal harness, chin strap and any metal fittings, and ensure that they are serviceable; make sure that the harness is secure.

34. Repairs to the helmet, other than the renewal of the chin strap, are not permitted, but damaged paint, i.e., where it has been scratched or worn off, may be covered with silver cellulose finish. If, however, it is suspected that damage to the paint is more than superficial (if, for example, the wearer has been involved in an accident causing a head injury), the helmet should be examined carefully to make sure that the laminations have not been broken or their structure weakened. Press very firmly with the thumbs around the suspected area, indicated by the damage to the paint. If there is any softness, the helmet MUST NOT be used, and is to be replaced by a serviceable item.

HELMET, TYPE G

35. The Type G helmet is similar in design to the Type F except that it is more robust and the neck adjustment is permanently attached to the head harness and is non-elastic. The helmet may be worn in all conditions in which the Type F is suitable and will eventually replace it.

Description

36. The helmet consists of: –

Ref. No.	*Nomenclature*
22C/1395	Bushes, rubber, split
22C/1393	Capsule, ear, Mk. 1, L.H.
22C/1394	Capsule, ear, Mk. 1, R.H.
22C/1396	Clip, oxygen mask
10 HA/13158	Connector, Type 10041
10 HA/8679	Connector, Type 3518
10 AH/19	Earpieces, Type 53 (2 off)
22C/1729 to 22C/1732	Head covers, Type G, sizes 1 to 4

37. Helmets are available in four sizes which roughly coincide with common hat sizes as follows: –

Ref. No.	*Helmet size*	*Hat size*
22C/1725	1	6½ to 6¾
22C/1726	2	6¾ to 7
22C/1727	3	7⅛ to 7⅜
22C/1728	4	7½ to 7¾

In selecting a suitable size the following points should be checked: –

(1) The ear capsules are correctly located over the ears.

(2) The helmet is not uncomfortably tight.

(3) A pressure breathing mask can be correctly fitted.

Too small a helmet will cause intense discomfort after only a short time and will mark the skin. Too large a fit will permit the ear capsules to hang too low and foul the life jacket.

◀ **38.** The helmet is suitable for existing and projected oxygen masks. When a P.4 mask is to be used, ensure that the correct helmet connector is fitted to the helmet. The procedure for fitting the connector is :–

(1) Untie the lacing of the helmet and withdraw the lacing from the buttonhole at the rear.

(2) Unfasten the adjusting strap and remove the strap, buckle and locating hoops.

(3) Draw the telephone cable and jack through the buttonhole and release the ear buns from the press studs. Take the ear buns and wiring from the helmet.

(4) Release the telephone plug and carefully ease the telephones from the ear buns.

(5) Slacken the locking screws and withdraw the leads from each telephone. Retain the split rubber bushes for use on the new helmet connector.

(6) Assemble the telephone earpieces and the helmet connector to the ear buns and fit the ear buns and wiring to the helmet. ▶

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