DC IPT

Technical Specification for CAP SERVICE, ROYAL MARINES,

Female Musicians

Defence Clothing

Integrated Project Team

PROPERTY OF :-
DEFENCE CLOTHING
INTEGRATED PROJECT TEAM
DE&S Caversfield
Skimmingdish Lane
Bicester
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Defence Equipment & Support

MINISTRY OF DEFENCE

PREFACE

TABLE 1 – PRODUCT LIST

Item Name	CAP SERVICE, ROYAL MARINES, Female Musicians
Development File No	D/DCT/P2188/3 & P3225 (RT)
Product Support File No.	D/DCT/452/054 (QAA)
NATO Stock Numbers	**Pattern Number**
8410-99-869-1869 to 1880	27910

Any colour shown in this document is for representation and must not be used for colour matching.

IPR STATEMENT

Technical documents in this specification refer to the edition current at the date of tender or contract unless otherwise stated.

TABLE 2 – ISSUE RECORD

Issue No	Comments	Issue Date
5	Reformatted to DE&S template. Updated related specs & docs. Clause 4.2 amended. Scarlet banding material changed from Pattern no. 8849B to 8851B.	07 November 2008
4	Reformatted, Specs & Docs updated. Band material (Navy) Changed. Minor changes to Table 7	18 August 2003
3		19 July 2001
2		31 October 2000

PART 1

1. THE PRODUCT

a. Use of the Product. A peaked cap for wear by RM female musicians. The size schedule provides for eleven sizes and outsize measure.

FIGURE 1.

Patt 27910

TABLE 3 – RELATED SPECIFICATIONS AND DOCUMENTS.

Specification/Document	Detail
BS EN ISO 105 Part E04 Part X12	Textiles. Tests for colour fastness. Colour Fastness to Perspiration. Colour Fastness to Rubbing.
BS EN ISO 845	Cellular plastics and rubbers – Determination of apparent (bulk) density.
BS EN ISO 1133	Plastic Determination of melt mass-flow rate (MFR) and melt volume flow rate (MVR) of thermoplastics.
BS EN ISO 1183-3	Plastic. Method for determining the density of non-cellular plastics Gas pyknometer method.
BS EN ISO 1923	Cellular plastics and rubbers – Determination of linear dimensions.
BS EN 12590	Textiles. Industrial sewing threads wholly or partly made from synthetics.
BS EN ISO 139	Textiles. Standard Atmosphere for conditioning and testing.
BS 2780	Glossary of leather terms.
BS 3870 Part 1& 2	Stitches and seams.
BS 5139	Method of specifying general purpose polypropylene and propylene copolymer materials for moulding and extrusion.
UK/SC/3907	Buttons, anodised aluminium gold and silver.
UK/SC/4164	Cloth, coated, PVC on cotton, white.
UK/SC/4776	Cloth, buckram, jute.
UK/SC/5516	Cloths, Wool, Uniform Dress.
UK/SC/5628	Cloth, velvet, cotton and silk, WR.
UK/SC/5696	Leather, sheep, head leather.
UK/SC/6153	Cloths, Woollen & Cloths Wool Worsted

2. PATTERNS.

a. Master Patterns. The DC IPT at Caversfield holds a Master Pattern for this product. Potential contractors may view the pattern on site by arrangement with the DC IPT Commercial Department.

b. Standard Patterns. A Standard Pattern may be obtained from the DC IPT Technical Information Office and may be used to provide the criteria for all materials, components and manufacturing features not fully defined in this specification.

PART 2

3. PRODUCT DESIGN

a. Product Description. The design female peaked cap, appearance of the cap is to be as shown in Figure 1 page 4 and comply with the measurements in Table 7.

TABLE 4 – PRODUCT COMPONENTS.

4.1 Crown and bevel	• Cloth, coated, PVC on cotton, white, No. 2. Pattern No. 8180B, to Specification UK/SC/4164. Or an alternative approved by the DC IPT. • It is imperative that this cloth is free from all foreign impurities that will discolour the fabric.
4.2 Band and piping	• Cloths, woollen, Doeskin Faced Scarlet. Pattern no. 8851B to UK/SC/6153 • Cloth, Wool, Navy. Pattern No. 8849U to UK/SC/5516
4.3 Crown, bevel and band lining	• Cloth, twill, viscose, plain weave polyester or plain weave, viscose conforming to Table 9
4.4 Interlining crown bevel and piping	• Flexible polyurethane foam having cells of uniform size and conforming to the requirements of Table 10.
4.5 Additional crown lining	• Clear PVC sheeting 0.1mm thick.
4.6 Head Leather	• Leather, sheep, basil at least 1.0mm and no more than 1.3mm thick, to UK/SC/5696. The term basil is defined in BS 2780. • Or an alternative approved by the DC IPT.
4.7 Band stiffener (In order of preference)	• Buckram, jute, laminated 2 ply, to comply with the buckling and flexibility tests specified in Specification UK/SC/4776. • Or glued hessian, plain weave, 1000g/m^2. • Or high density polyethylene sheet, 0.1 ± 0.01mm thickness either solid or perforated. • Or air expanded plastic, 1.2mm thickness. • Or polypropylene sheet, 0.1± 0.01mm thickness, either solid or perforated.

TABLE 4 – PRODUCT COMPONENTS continued.

4.8 Peak	• Flexible, PVC, black/beige laminate, with black side polished and beige side flock sprayed, approximately 1.0mm thick, laminated to flexible vulcanised fibre or flexible fibreboard. • Or two-part laminate, fabric, impregnated with polyurethane with black patent finish approximately 1.0mm thick, laminated to polypropylene/polyethylene, surface finish leather grain, colour to be bottle green, approximately 1.5mm thick. • Total thickness of peaks to be no less than 2.5mm and no more than 2.8mm, to comply with the requirements of Table 12.
4.9 Lining for peak (except two part laminate)	• Skiver green or imitation skiver green, embossed cotton backed plastic. The term skiver is defined in BS 2780. The peak lining fabric is to have a rating of 4 for colour fastness to wet rubbing when tested to BS EN ISO 105, Part X 12 to conform to Table 9.
4.10 Binding for peak	• PVC black, 0.6mm thick.
4.11 Crown wire	• Steel, stainless, flat section with connecting tube not less than 0.3mm and not more than 0.5mm wide. All metal to be rustproof. • Or an alternative approved by the DC IPT
4.12 Head leather binding and forehead cushion	• Cloth, velveteen, black, to comply with the colour fastness requirements of UK/SC/5628, Table 7.
4.13 Front support	• Polypropylene sheet designated BS 5139:1991, pp-H, E, N or C, 006 according to BS 5139, thickness approximately 2mm. It is to have density in the range 0.960 to 0.967g/m^3 measured according to BS EN ISO 1183-3, and a maximum melt flow rate of 1.0g/600S measured according to BS EN ISO 1133
4.14 Chinstrap	• PVC, black, 10mm wide, at least 1.0mm but not more than 1.3mm thick. See Table 7 for length.
4.15 Buttons	• Button, anodised aluminium, RM, (14mm) 22 ligne, Pattern No. 28077A to comply with Specification UK/SC/3907 NATO Stock No. 8455-99-869-2206.

TABLE 4 – PRODUCT COMPONENTS continued.

4.16 Sewing threads for all purposes	• Thread, polyester and cotton, continuous filament, polyester core, cotton sheath, to BS EN 12590. a. Metric Ticket No. 25(26), Peak to stiffener. b. Metric Ticket No. 36 (35), Bevel, band, sewing in crown, back and front finishing, lining and all hand sewing. c. Metric Ticket No. 75 For all other sewing

TABLE 5 – PRODUCT CONSTRUCTION

5.1 Crown	• The crown, pear shaped, formed by two pieces of main material, is to be fused to flexible polyurethane foam, to comply with the requirements of Table 11. The crown is then to be sewn together with a 0.7mm seam, using seam type 4.03.03 of BS 3870. • The perimeter of the crown is to have a piped edge joined in line with the back seam of the bevel quarters. • A cap wire with a connecting tube is to be fitted on the inside of the cap above the piping of the crown.
5.2 Bevel	• The bevel, fused to flexible polyurethane foam as in 5.1 above is to be cut one piece with the seam to the back of the cap. The seam is to be formed using seam type 4.03.03 of BS 3870.
5.3 Band	• The band is to be constructed in two parts. The top part (in scarlet) is to measure 4.5cm in depth at the centre front tapering to 2.cm at the centre back and the lower part (in navy) is to measure 0.7cm.
5.4 Band Stiffener	• The stiffener is to be cut sufficiently long to allow a 2cm overlap where it is joined slightly off set from the centre back to reduce the thickness. • The stiffener is to be stitched through the outer material, through the seam joining the two piece band, and stitched to of the band / bevel seam.
5.5 Peak	• The peak, black side uppermost, chamfer edged on the brow line and lined on the underside. • The outer edge of the peak is to be bound with black PVC 6mm deep. • When fitted, the peak is to be correctly balanced and central to the front of the cap.

TABLE 5 – PRODUCT CONSTRUCTION continued.

5.5 Peak continued	• The peak may be fitted to the band stiffener by sewing the inner edge of the peak to either the inner or the outer edge of the stiffener. The seam allowance from the seam to the inner peak edge is to be not less than 3mm and not more than 5mm. • When fitting the peak to the outer edge of the stiffener, the bottom edge of the stiffener is to be bound with velveteen. • When fitting the peak to the inner edge of the stiffener, a strip of velveteen, depth 2.5cm is to be sewn to the head leather prior to attaching the head leather to the cap, extending for the length of the peak. • The peak is to be securely sewn to the stiffener with approximately 4 stitches per 2cm.
5.6 Head leather	• Each cap is to have a brachered head leather as shown on the Standard Pattern. • The depth of the head leather is to be no less than 3.5cm and no more than 4cm. • The ends of the head leather are to overlap not less than 1cm and not more than 4cm at the centre back of the cap and be tacked together at the top and bottom edge. • Black velveteen, finished depth 2.5cm, is to be sewn to the head leather prior to attachment to the cap, extending the length of the peak.
5.7 Front support	• The front support is to be securely attached to the stiffener, and effectively support the front of the cap and is to comply with the measurements in Table 7 and not protrude above the crown bevel seam.
5.8 Lining	• The crown/bevel lining is to be shaped with a dart running from the back of the cap to the centre of the crown, in line with the seam and be securely sewn to the inside of the cap. • The lining is to be securely attached at the bottom edge of the stiffener by hand or machine stitching or securely glued with a suitable adhesive. • The additional lining, cut from polyethylene film/PVC sheeting, approximately 10cm square is to be securely sewn centrally to the crown lining using seam type 5.04.01 of BS 3870.

TABLE 5 – PRODUCT CONSTRUCTION continued.

5.9 Chinstrap and button position	• A button is to be securely sewn on each side of the cap to accommodate the chinstrap, positioned 1.0cm from the bottom edge of the band and 1.5cm behind the junction of the peak/band point.
5.10 Seams and stitching to BS 3870	• Machine stitching is to be stitch type 301, with at least eight but not more than ten stitches per 2cm. • The top stitching for seam type 4.03.03 is to be 0.2cm from the former seam. • The piping is to be formed using seam type 1.12.01. • The brachering on the head leather is to be stitch type 304 with at least six stitches per 2cm. • The binding on the peak is to be formed using seam type 3.01.01.
5.11 General	• Sewing threads may be treated with stain free lubricant. • All seams are to be free from pucker. • The cap is to be free from all ends of sewing thread, be blocked, steamed and shaped to retain appearance, and delivered in a clean condition. • The surface of the peak is to be free from cracking and other defects. • The felling on the head leather is to have at least six stitches per 2cm. • The peak is to be sewn to the stiffener with approximately four stitches per 2cm.

TABLE 6 – SCHEDULE OF NATO STOCK NUMBERS AND ACTUAL BODY MEASUREMENTS.

NATO Stock Numbers 8410-99-869-	**Size and internal circumference**
1869	50
1870	51
1871	52
1872	53
1873	54
1874	55
1875	56
1876	57
1877	58
1878	59
1879	60
1880	Outsize Measure

TABLE 7 – MEASUREMENTS AND TOLERANCES.

- All measurements are in centimetres.
- Outsize measure caps are to be made to the wearer's measurements to be supplied to the contractor and this table is then to be used as a guide.

Size		**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**	**Tol (mm)**	
													+	**-**
Crown (excl. piping)	Length of seam	21	21.5	22	22.5	23	23.5	24	24.5	25	25.5	26	2	2
	Width at widest point following shape	20.5	21	21.5	22	22.5	23	23.5	24	24.5	25	25.5	2	2
Band	Depth at front	5.2											2	2
	Depth at back	2.7											2	2
Bevel	Depth at front	5.5											2	2
	Depth at sides (in line with buttons)	5											2	2
	Depth at back	4											2	2
Peak	Depth at centre front	4.5											1	1
	Length from point to point	26.5											5	5
Band stiffener	Depth at front	6											2	2
	Depth at back	4											2	2
Front support	Length	7.5											2	2
	Width at base	3											2	2
	Width at top	3											2	2

TABLE 7 – MEASUREMENTS AND TOLERANCES continued.

Size		**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**	Tol (mm)	
													+	**-**
Peak (prior to insertion with the peak laid flat)	**Centre**	6											1	1
	*** Length**	20											2	2
Chin Strap Length Fully Extended		49											10	10

* Measurements to be taken in a straight line from point to point.

4. LABELLING REQUIREMENTS. Information and format is to be as follows:

- For stock sizes: NATO StockNumber, size and contract number.
- For special measure: NATO Stock Number, size of wearer and the contract number.
- Position: Clearly marked on a label attached at the centre of the crown lining.

  Or clearly printed on a pressure sensitive self-adhesive label, to be adhered to the centre of the crown lining.
- The identification label is to be covered by the additional crown lining, including pressure sensitive self-adhesive labels.

Figure 2. Identification and marking label.

Stock Sizes	Special Measure
8410-99-869-1875 Size: 56 0/000/0000	8410-99-869-1880 Size: 0/000/0000

- The size number is to be 1.2cm high and the remainder of the characters 0.6cm high.

TABLE 9 – TEST REQUIREMENTS.

The peak lining and bevel linings are to conform to the requirements of the following Table:

BS EN ISO 105		
Part E04		Part X12
Perspiration		Rubbing wet
Staining	Colour Change	Colour Change
4-5	5	4

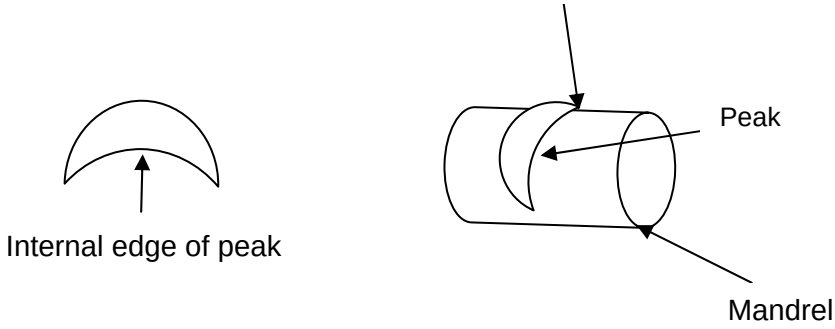
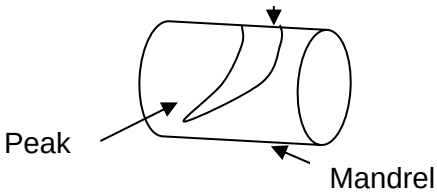
TABLE 10 – METHOD OF TEST. Flexible polyurethane foam.

PROPERTY	REQUIREMENT	METHOD OF TEST
Apparent density kg/m^3	25 - 30	BS EN ISO 845
Thickness mm	3 - 5	BS EN ISO 1923

TABLE 11 – METHOD OF TEST TO DETERMINE FABRIC/FOAM LAMINATE BOND STRENGTH.

• The minimum bond strength of the laminated fabric is to be 1.25N/25mm when determined by the following method:	
11.1 Specimen preparation	• Specimens which have been conditioned for 24 hours in the standard testing atmosphere defined in BS EN ISO 139 are to be cut 200mm x 25mm with at least two specimen being cut with the 200mm dimension in the warp and weft direction respectively.
11.2 Procedure	• The conditioned samples are to be delaminated by hand for 100mm. The tails are to be clamped in the jaws of a CRE tensile testing machine. The specimen is then to be peeled apart at a jaw separation rate of 100mm/min for a 50mm length of the specimen.
11.3 Calculation and expression of results	• The maximum value of peel bond strength is to be recorded for each specimen that peels for 50mm without the foam breaking. The value at break is to be recorded and reported for specimens in which the foam breaks during delamination. • The mean value of two results for specimens which delaminate for 50mm without the foam breaking is to be calculated in the warp and weft direction respectively.

TABLE 12 – TEST FOR THE DELAMINATION OF PEAKS.

12.1 Test procedure	• Four cap peaks (detached from caps) are to be taken from batches of up to 500 and conditioned for 24 hours in the standard atmosphere defined in BS EN 20139. • Two peaks are to be placed in an environmental chamber at 70 ± 2°C and 95 - 100% relative humidity for 6 hours ± 15 minutes. After removal, the peaks are to be examined for delamination of the black PVC and the (green) skiver, delamination of either peak is to render the batch rejected. Any degree of distortion is to be such that it will not affect the subsequent fitting of the peak to a cap; severe distortion of either peak is to render the batch rejected. • Two peaks are to be placed in a freezer at – 20 ± 2°C for 2½ hours ± 5 minutes. Immediately after removal, each peak is to be subjected to the following two tests using a mandrel of diameter 150 ± 1mm.
12.2 Edge test	Edge of peak to mandrel  • Use the minimum of force required to bend the internal edge of the peak around the mandrel, ensuring free contact with the circumference of the mandrel. Repeat with the other side up. Examine both sides of the peak for fractures or cracks; any such damage on either peak is to render the batch rejected.
12.3 Flat test	Flat edge to mandrel  • Use the minimum force required to bend the face of the peak around the mandrel, ensuring free contact with the circumference of the mandrel. Repeat with the other side up. Examine both sides of the peak for fractures or cracks; any such damage on either peak is to render the batch rejected.