



TITLE:
**SPECIFICATION FOR
PERSONAL PROTECTIVE
EQUIPMENT - PROTECTIVE
CLOTHING**

Part 4: High visibility clothing

| | |
|----------------------|------------------------|
| Doc. No. | KP1/6C/13/TSP/01/025-4 |
| Issue No. | 1 |
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0.1 Circulation List

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| 1 | Manager, Standards |
| Electronic copy (pdf) on Kenya Power Server (currently: Network→stima-fprnt-001→techstd&specs) | |

0.2 Amendment Record

| Rev No. | Date (YYYY-MM-DD) | Description of Change | Prepared by (Name & Signature) | Approved by (Name & Signature) |
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FOREWORD

This specification has been prepared by the Standards Department in collaboration with Human Resource Services Department; Safety, Health & Environment (SHE) Department of The Kenya Power and Lighting Company Limited (KPLC/Kenya Power) and The Kenya Electrical Trade & Allied Workers Union (KETAWU). The specification lays down requirements for – High Visibility Clothing. It is intended for use by Kenya Power in purchasing these items.

The supplier shall submit information which confirms satisfactory service experience with products which fall within the scope of this specification

1. SCOPE

- 1.1. This document specifies the design and performance, methods of test, marking and user information for high visibility garments for use in Industrial Work (Electrical and Mechanical) by Kenya Power company employees. It also outlines the high visibility requirements for garments to be worn by employees for enhancing their visibility while working in or adjacent to moving traffic, heavy equipment, work zones or other endangering elements.
- 1.2. The specification covers performance requirements for the garments made from flexible materials, which are designed to protect the wearer's body, except the hands, from heat, flame, and chemical substances. This shall include:
 - a) High visibility jacket
 - b) High visibility vests
- 1.3. The specification stipulates the minimum requirements for the jackets in the company and it shall be the responsibility of the supplier to ensure adequacy of the design, good engineering practice, adherence to the specification and applicable standards and regulations as well as ensuring good workmanship in the manufacture of the items for The Kenya Power & Lighting Company.
- 1.4. The specification does not purport to include all the necessary provisions of a contract.

2.0. REFERENCES

The following standards contain provisions which, through reference in this text constitute provisions of this specification. Unless otherwise stated, the latest editions (including amendments) apply.

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- ISO 20471: High visibility clothing -- Test methods and requirements
- ISO 105: Textiles -- Tests for colour fastness -- Part B02: Colour fastness to artificial light: Xenon arc fading lamp test; -- Part E04: Colour fastness to perspiration
- BS EN 340: Protective clothing: General requirements
- BS EN 1413: Textiles. Determination of pH of aqueous extract
- BS EN 14362-1: Textiles. Methods for determination of certain aromatic amines derived from azo colorants. Detection of the use of certain azo colorants accessible with and without extracting the fibres
- BS EN 1150: Protective clothing. Visibility clothing for non-professional use. Test methods and requirements
- BS EN 13402-2: Size designation of clothes. Primary and secondary dimensions
- KS 836-2: Classification and terminology of stitches and seams — Part 2: Seam types.
- KS 836-1: Classification and terminology of stitches and seams Part 1: Types – Ready-made garments.
- KS ISO 13935-1: Textiles – Seam tensile properties of fabrics and made-up textile articles -- Part 1: Determination of maximum force to seam rupture using the strip method

3.0. TERMS AND DEFINITIONS

- 3.1. The definitions given in the reference standard shall apply.
- 3.2. Kenya Power Logo – As per sample available with Human Resource & Administration Division, Kenya Power.

4.0. REQUIREMENTS

4.1. OPERATING CONDITIONS

The high visibility jackets and vests shall be suitable for use in Electrical and Mechanical Work, outdoors in tropical climate with:

- a) Altitudes of up to 2200m above sea level,
- b) Humidity of up to 95%,
- c) Average ambient temperature of +30°C with a minimum of -1°C and a maximum of +40°C.

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4.2. HIGH VISIBILITY CLOTHINGS

4.2.1. General requirements

The high visibility clothing shall be manufactured incorporating separate and combined performance materials as per BS EN 1150 and ISO 20471 and shall comprise of:

a) Background (fluorescent) materials

The background (fluorescent) material shall be evenly distributed around the body and shall be applied so that the minimum width is not less than 50mm. Any gap for fastening shall not be greater than 50mm and the total area of such gaps shall not be greater than 100mm² in any one band. The material colour shall be fluorescent yellow with properties as per Table 1.

b) Retro-reflective materials

The retro-reflective material shall be evenly distributed to all aspects of the body covered by the background material. The retro-reflective material shall be applied in the band and the logo. The individual area of retro-reflective material shall not be less than 25cm² and the minimum width shall not be less than 25mm. The retro-reflective material shall use a glass bead technology or prismatic technology (or high gloss) in order to achieve a maximum 360^o visibility with 8910 Silver Trim colour such as Scotchlite reflective material.

The retro-reflective band shall be BS EN 1150 or ISO 20471 approved and certified by an accredited laboratory to ISO/IEC 17025 (Certificate to be attached during tender). Glass bead type retro-reflective band shall be certified for 30 washes at 60^oC. The reflective material shall have a minimum reflectivity of 500cd/lux. Retro-reflective material shall be visible from 300metres.

4.2.2. Requirements of background material and combined performance material

- 4.2.2.1. All the requirements BS EN 340 and clause 4.2 of this specification shall be adhered to in the design, manufacture and testing of the clothing.
- 4.2.2.2. The colour and luminance factor of new background material and combined performance material shall be within the region of Table 1 & 2 when tested in accordance with clause 7.2 of BS EN 1150.

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Table 1: Colour coordinates for background material and combined performance as per BS EN 1150

| Colour | Chromaticity coordinates | | Material minimum luminance factor | |
|--------------------|--------------------------|-------|-----------------------------------|----------------------|
| | X | Y | Background | Combined performance |
| Fluorescent yellow | 0.387 | 0.610 | 0.76 | 0.70 |
| | 0.356 | 0.494 | | |
| | 0.398 | 0.452 | | |
| | 0.460 | 0.540 | | |

Table 2: Colour fastness as per BS EN 1150

| Care process | Test method | Fastness grade of grey scale, min |
|------------------------------------|-----------------------------|---|
| Domestic and commercial laundering | EN ISO 105-106C, method C2S | Colour change: 4 to 5 Staining: 3 |
| Dry cleaning | EN ISO 105-D01 | Colour change: 4 |
| Hot pressing | EN ISO 105-X11 | Colour change: 4 to 5 Staining: 4 |
| After xenon test | EN 20105-B02 | Exposure shall continue until the blue scale control number 4 changes to step 4 of the grey scale |

4.2.3. Retro-reflective performance requirements

Retro-reflective and combined performance material shall comply with the requirements of Table 3.

Table 3: Minimum performance requirement for retro-reflective material

| Exposure | Test method | Results |
|---|--|---|
| Abrasion | EN 530 | 5,000 cycles |
| Flexing | ISO 7854 method A | 7,500 cycles |
| Folding at cold temperatures | ISO 4675 | (-20±1)°C |
| Temperatures variation | BS EN 1150 clause 7.4.3 | (-50±1)°C |
| Washing | ISO 6330 method 2A | Pass |
| Dry cleaning | EN ISO 3175 | |
| Convective Heat: RA≥ 100 | | 10 minutes @ 140 °C (285 °F) |
| Wet Reflectivity: RA≥ 100 | EN 471, Annex D | |
| Coefficient of retro-reflective material R', measured at observation angle 12'and entrance angle 5° | CIE 54 and BS EN 1150 clause 7.3 | >100 cd lx ⁻¹ m ² |
| Coefficient of combined performance material R', measured at observation angle 12'and entrance angle 5° | BS EN 1150 clause 7.5 | >30 cd lx ⁻¹ m ² |
| Coefficient of retro-reflection for retro-reflective material | Annex A of ISO 20471 and BS EN 1150 clause 7.5 | >15 cd lx ⁻¹ m ² |

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4.3. HIGH VISIBILITY JACKET

4.3.1. General

- 4.3.1.1. The high visibility jacket (Garments covering the torso and arms) shall be ISO 20471 - class 3 or BS EN 1150 class 3 compliant, water resistant, soft shell athletic jacket with a stretchable three (3) layer fabric construction.
- 4.3.1.2. The body material shall consist two fused portions namely:
- Upper portion above the top retro-reflective band and the sleeves made of a two (2)-tone high visibility fluorescent yellow material.
 - Lower portion made of a 100% polyester material with a soft outer shell and Pantone Blue 288PC in colour,
- 4.3.1.3. The jacket lining material properties shall consist of a breathable, waterproof and windproof TPU (thermoplastic polyurethane) membrane with a warm and comfortable brushed fleece.

4.3.2. Specific design requirements

- 4.3.2.1. The high visibility jacket shall meet, as a minimum, the requirements for Class 3 garments set out in Table 1 of ISO 20471.
- 4.3.2.2. The high visibility jacket shall consist of background material, background contrasting material and retro-reflective materials;
- Background material**
The background material fabric shall have all the qualities described in clauses 4.2.2.1 and 4.2.2.2. The fabric shall be a high contrast FR 150D oxford polyester or equivalent with internal polyurethane coating.
 - Background contrasting material**
The fabric for background contrasting material shall be a Blue Pantone 288PC in colour, 100% polyester with internal polyurethane coating.
 - Retro-reflective material**
The retro-reflective material shall conform to qualities described in clause 4.2.3. The fabric shall be 50mm, 8910 Silver Trim colour.

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- 4.3.2.3. The background (fluorescent) material shall encircle all relevant parts (torso and arms) with a minimum width of 50mm. Allowable gaps for fastening systems and seams shall remain the same.
- 4.3.2.4. The sleeve shall be surrounded by two retro-reflective bands with at least 50 mm from each other, with the lower band at least 50 mm from the end of the sleeve.
- 4.3.2.5. The total visible areas for the fluorescent material shall be roughly equal on the front and back of a garment and shall be fluorescent yellow.
- 4.3.2.6. The reflective bands shall be inset at least 50mm from the bottom edge of the jacket, sleeve and no reflective band shall have a gap in it more than 50mm wide (for fastenings etc.) and the total gaps in a single band shall not exceed 100mm for the torso and sleeves.
- 4.3.2.7. The minimum total visible areas of fluorescent and reflective material - Class 3 shall be 0.8m² and 0.2m² (about 12¾ and 3¾ sheets of A4 paper).
- 4.3.2.8. The jacket shall have a stand-up collar of approximately 100mm in height and be well shaped and symmetrical. There shall be a 26mm² nylon coil zipper measuring approximately 215mm long sewn approximately 60mm from the top of the collar that shall hide the drop in three (3)-piece waterproof hood.
- 4.3.2.9. The jacket shall have a Val cover over the zipper. The side panels of the hood shall measure approximately 280mm in height x 200mm in width. The middle piece of the three (3) piece hood shall measure approximately 115mm wide and be sewn single needle raised.
- 4.3.2.10. The hood shall be shaped to allow peripheral vision. The hood shall be finished with elastic shock cords with tension loaded barrel locks for proper adjustment.
- 4.3.2.11. Additional features of the jacket shall be:
 - a) Zip closure with tunnel collar
 - b) Zippered side waist pockets
 - c) Zippered cell phone pocket at the chest
 - d) Draw string hem with barrel lock
 - e) Quick adjust rubber tab fastener with hook & loop cuffs.

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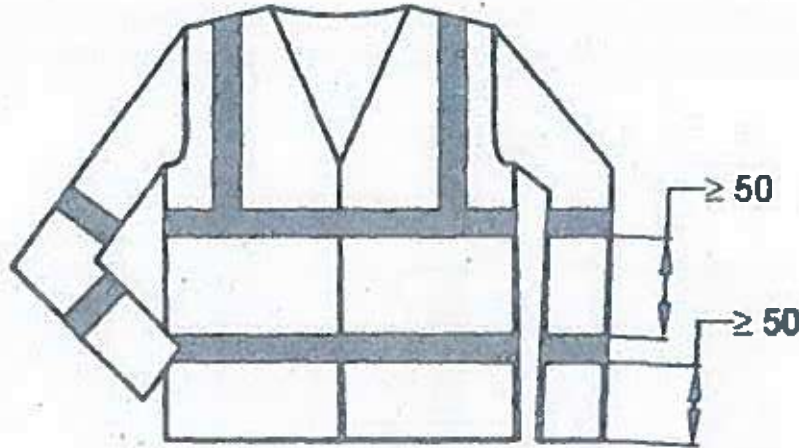
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All dimensions in millimetres.

Fig. 1: Features of high visibility jackets

4.4. HIGH VISIBILITY VESTS

4.4.1. Design and Construction

- 4.4.1.1. The high visibility vests shall be designed, manufactured, stitched and constructed as per BS EN 1150 class 3 compliant, ISO 20471 - class 3 and fully conform to provisions of clauses 4.2.1 to 4.2.3.
- 4.4.1.2. The vest shall have front fastness construction for greater wearer comfort and manoeuvrability. Lower rise at the waist will be followed by the horizontal strip of reflection. Collar and throat tab shaped providing optimum compatibility.
- 4.4.1.3. It shall have a new shoulder shape and decreased side sleeve to allow full rotation mobility in shoulder and arm. There will be presence of side supporting fabric avoiding joints at side.
- 4.4.1.4. The arm cut shall be at reasonable distance such that the wearer shall find no obstacles in wearing or working with the vest. Polyamide zip fasteners with metallic stoppers on both ends shall be provided for closing and opening of the vest.
- 4.4.1.5. There shall be no joints at the side of the vest. The shoulder shall be over locked for extra fitting and strength. This will help to provide locking of any loose edges and that there shall be no migrations of colours on the reflective vests or the reflective tapes.

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- 4.4.1.6. 100% polyester three (3) ply thread shall be used for stitching and be matched wherever the colour combination is required. The vest shall provide for 360° visibility.

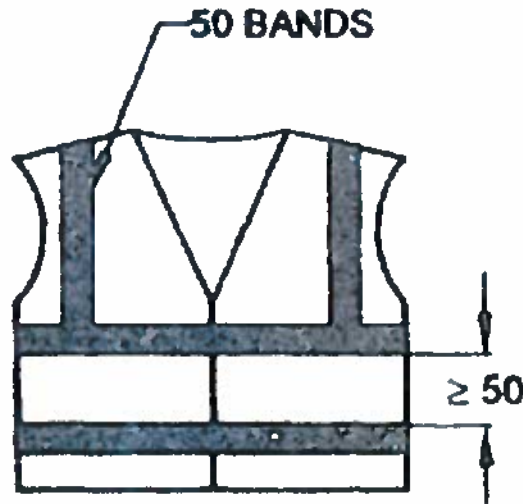


Fig. 2: Illustration of a high visibility vest

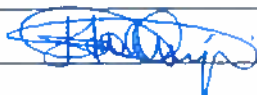
4.4.2. Background Fabric

- 4.4.2.1. The fabric content shall be Polyester-Cotton with 65% Polyester and 35% Cotton (+/- 5%). This fabric shall be ISO 20471 approved for colour fastness from a well-known testing laboratory (Test certificate to be submitted with the tender).
- 4.4.2.2. The background fabric shall be 65:35 Polyester Cotton pertaining to BS EN 1150 or ISO 20471 standards and shall have following features:-
- The basic fabric used shall be high visibility fluorescent dyed material (yellow in colour) for enhanced day time visibility consisting of 100% Polyester yarn in warp and 100% Cotton yarn in weft. So that polyester yarn in warp having high reflection property will project on the upper surface of the garment and cotton yarn in weft having low reflection property will remain in the inner surface of the garment and provide sufficient comfort to the wearer even though worn over regular clothing.
 - Blend Composition: The overall blend composition shall be 65:35 Polyester Cotton.
 - GSM: Mass of background material shall be 170 – 180 g/mm².
 - Comfort Level: The cotton yarn will remain in the inner portion of garment enhancing the comfort level of the wearer, even in hot conditions.

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4.5. RETRO-REFLECTIVE LOGO AND SAFETY MESSAGE:

- 4.5.1. A PVC type retro-reflective Kenya Power logo - The logo used shall be visible in the dark and reflective when light falls on it thus creating the brand leverage and total visibility. Retro-reflective logo shall be stitched on front left upper side of the vest as shall be determined by the sample. The logo printing shall be done on the inner surface of micro prismatic reflective sheet and border to be sealed for better life of the logo.
- 4.5.2. A PVC type retro-reflective safety message "SAFETY FIRST" - This shall be of the same quality and performance as clause 4.5.1, symmetrically attached at the back of the vest, two thirds from the bottom edge of the vest.

4.6. SIZE DESIGNATION

- 4.6.1.1. Jackets used as protective clothing shall be marked with its size based on body dimensions measured in centimetres. Exceptions shall be specified in detail in the relevant product standards, e.g. Genital protectors for use in sports.
- 4.6.1.2. Measurement procedures and the designation of dimensions shall correspond to EN 13402. The size designation of each garment shall comprise the control dimensions for the chest or burst girth and height.
- 4.6.1.3. The sizes shall be as per Table 4a & b.

Table 4a: Size designation of Men's High Visibility Jackets and Vests

| Size designation | Bust | Waist | Hip | Inseam | Height |
|------------------|---------|---------|----------|--------|---------|
| XS | 89-93 | 73-77 | 89-93 | 76 | 171-174 |
| S | 95-99 | 79-83 | 95-99 | 81 | 174-177 |
| M | 101-105 | 85-89 | 101-105 | 86 | 177-180 |
| L | 107-111 | 91-95 | 107-111 | 87 | 180-183 |
| XL | 113-117 | 97-101 | 113-117 | 91 | 183-186 |
| XXL | 119-123 | 103-107 | 119-123 | 92 | 186-189 |
| XXXL | 125-129 | 109-113 | 125-129" | 96 | 189-192 |
| XXXXL | 131-135 | 115-119 | 131-135 | 96 | 192-195 |

All dimensions in centimetres, cm

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Table 4b: Size designation of Women's High Visibility Jackets and Vests

| Size designation | Bust | Waist | Hip | Inseam | Height |
|------------------|---------|--------------|---------|--------|---------|
| S | 89-93 | 69-73 | 93-97 | 79 | 166-169 |
| M | 95-99 | 75-79 | 99-103 | 81 | 169-172 |
| L | 101-105 | 81-85 | 105-109 | 83 | 172-175 |
| XL | 107-111 | 87-91 | 111-115 | 85 | 175-178 |
| XXL | 113-117 | 93-97 | 117-121 | 85 | 178-181 |

All dimensions in centimetres, cm

4.7. QUALITY MANAGEMENT SYSTEM

- 4.7.1. The supplier shall submit a quality assurance plan (QAP) that will be used to ensure that the design, material, workmanship, tests, service capability, maintenance and documentation of the high visibility jackets fulfil the requirements stated in the contract documents, standards, specifications and regulations. The QAP shall be based on and include relevant parts to fulfil the requirements of ISO 9001:2008.
- 4.7.2. The Manufacturer's Declaration of Conformity to applicable standards and copies of quality management certifications including copy of valid and relevant ISO 9001: 2008 certificate shall be submitted with the tender for evaluation.

5.0. TESTS AND INSPECTION

- 5.1. The high visibility clothing shall be inspected and tested in accordance with the requirements of ISO 2047, BS EN 420, BS EN 388, BS EN 12477, BS EN 407, BS EN 7318, applicable Kenyan standards and all the provisions of this specification. It shall be the responsibility of the supplier to perform or to have performed the tests specified and whatever other tests he normally performs at works.
- 5.2. Copies of previous Type Tests Reports issued by a third party testing laboratory that is accredited to ISO/IEC 17025 shall be submitted with the tender for the purpose of technical evaluation. The accreditation certificate to ISO/IEC 17025 for the same third party testing laboratory used shall also be submitted with the tender document (all in English Language). The type tests shall include:
 - a) Material composition
 - b) Verification of gloves sizes
 - c) Abrasion resistant test
 - d) Blade cut resistance test

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- e) Tear resistance test
- f) Puncture resistance test

5.3. The high visibilityclothings shall be subject to acceptance tests at the manufacturer's workshop before dispatch. Acceptance tests shall be witnessed by at least two (2) Tender Processing Committee members appointed by The Kenya Power and Lighting Company Limited (KPLC). Routine and Sample Test Reports for the high visibility jackets to be supplied shall be submitted to KPLC for approval before delivery of the goods. The tests to be witnessed shall include;

- a) Material composition
- b) Verification of gloves sizes
- c) Abrasion resistant test
- d) Blade cut resistance test
- e) Tear resistance test
- f) Puncture resistance test

5.4. On receipt of the gloves, KPLC will perform any of the tests specified in order to verify compliance with this specification. The supplier shall replace without charge to KPLC the high visibility jackets which upon examination, test or use; fail to meet any of the requirements in the specification.

6.0. MARKING AND PACKING

6.1. MARKINGS

6.1.1. The following information shall be printed on a suitable label firmly attached to each packaging:

- a) Purchase order number/tender
- b) Manufacturer's name
- c) Year of manufacture
- a) Pictogram symbol - each pictogram is followed by the levels of performance according to EN 407 and EN 388
- d) High visibility jackets catalog number
- e) The words, "PROPERTY OF KPLC"

6.1.2. Marking of high visibility clothing shall be in accordance with EN 420 and EN 12477:

- b) Each high visibility clothing shall be marked with standard number (EN 12477), followed by the letter of the type (A or B).
- c) The smallest packaging shall be marked with the pictogram of gloves for protection against thermal risks and (optional) mechanical risks with the number of the standard.

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d) Each pictogram is followed by the levels of performance according to EN 407 and EN 388

6.2. PACKAGING

6.2.1. The high visibility clothing shall be packed in a manner so as to protect it from damage during transportation and storage. Instructions for storage and handling shall be included in each package, all in English Language.

7. DOCUMENTATION

7.1. The bidder shall submit its tender complete with technical documents required by Annex A (Guaranteed Technical Particulars) for tender evaluation. The technical documents to be submitted (all in English language) for tender evaluation shall include the following:

- a) Guaranteed Technical Particulars signed by the manufacturer;
- b) Copies of the Manufacturer's catalogues, brochures, drawings and technical data;
- c) Details of manufacturing capacity and the manufacturer's experience;
- d) Copies of required type test reports by a third party testing laboratory accredited to ISO/IEC 17025;
- e) Copy of accreditation certificate to ISO/IEC 17025 for the third party testing laboratory;
- f) Manufacturers letter of authorization, ISO 9001:2008 certificate and other technical documents required in the tender.

7.2. The successful bidder (supplier) shall submit the following documents/details to The Kenya Power & Lighting Company for approval before manufacture:

- a) Guaranteed Technical Particulars signed by the manufacturer;
- b) Design Drawings with details of high visibility clothing to be manufactured for KPLC.
- c) Quality assurance plan (QAP) that will be used to ensure that the design, material; workmanship, tests, service capability, maintenance and documentation will fulfill the requirements stated in the contract documents, standards, specifications and regulations. The QAP shall be based on and include relevant parts to fulfill the requirements of ISO 9001:2008
- d) Detailed test program to be used during factory testing;
- e) Marking details and method to be used in marking the high visibility clothing;
- f) Manufacturer's undertaking to ensure adequacy of the design, good engineering practice, adherence to the specification and applicable standards and regulations as well as ensuring good workmanship in the manufacture of the high visibility clothing for The Kenya Power & Lighting Company;

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**SPECIFICATION FOR
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EQUIPMENT - PROTECTIVE
CLOTHING**

Part 4: High visibility clothing

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g) Packaging details (including packaging materials).

7.3. The supplier shall submit recommendations for use, care, storage and routine inspection/testing procedures, all in the English Language, during delivery of the high visibility clothing to KPLC stores.

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ANNEX A: Guaranteed Technical Particulars (to be filled and signed by the Manufacturer and submitted together with relevant copies of the Manufacturer's catalogues, brochures, drawings, technical data, sales records, four customer reference letters, the manufacturer's experience and copies of complete type test reports for tender evaluation, all in English Language)

Tender No.

| Clause | Description | Guaranteed Technical Particulars offered | |
|--|---|--|---------|
| | Name of Manufacturer & Country of manufacture | specify | |
| | Type/Model Reference Number | | |
| | General requirements for High visibility clothing – ISO 20471 | specify | |
| | Background material | Colour | specify |
| | | Chromaticity coordinates | specify |
| | | Gap width | specify |
| | | Area covered | specify |
| | Retro-reflective material for logo and band | Colour | specify |
| | | Chromaticity coordinates | specify |
| | | Gap width | specify |
| | | Area covered | specify |
| | Technology of manufacture | specify | |
| Performance requirements of background material | Colour fastness | Domestic and commercial laundering | specify |
| | | Dry cleaning | specify |
| | | Hot pressing | specify |
| | | After xenon test | specify |
| | Colour coordinates | Colour | specify |
| | | Chromaticity coordinates | specify |
| | | Background luminance factor | specify |
| | Combined performance | specify | |
| Retro-reflective performance requirements | Abrasion | specify | |
| | Flexing | specify | |
| | Folding at cold temperatures | specify | |
| | Temperatures variation | specify | |
| | Washing | specify | |
| | Dry cleaning | specify | |
| | Convective Heat: RA ≥ 100 | specify | |
| | Wet Reflectivity: RA ≥ 100 | specify | |
| Coefficient of retro-reflective material R', measured at observation angle 12° and entrance angle 5° | specify | | |

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|---|---|--|------------|---------|
| | | Coefficient of combined performance material R', measured at observation angle 12' and entrance angle 5° | specify | |
| | | Coefficient of retro-reflection for retro-reflective material | | |
| High visibility Jacket | | | | |
| Standards of manufacture | | | specify | |
| Type designation or model as per catalogue number | | | specify | |
| Construction | Safety class as per ISO 20471 or BS EN 1150 | | specify | |
| | Water resistant | | specify | |
| | Stretchable three layer construction | | specify | |
| | Body material | Upper portion | specify | |
| | | Lower portion | specify | |
| | Jacket lining | Material | | specify |
| | | Properties | Breathable | specify |
| | | | Waterproof | specify |
| Windproof | | | specify | |
| Comfortable brushed fleece | specify | | | |
| Fabric materials | Background material | | specify | |
| | Background contrasting material | | specify | |
| | Retro-reflective material | | specify | |
| Compliance to clauses 4.3.2.3 to 4.3.2.10 | | | specify | |
| Collar design and dimensions | | | specify | |
| Zipper material and length | | | specify | |
| Zipper cover design and material | | | specify | |
| Hood design | | | specify | |
| Additional features | Zip closure with tunnel collar | | specify | |
| | Zippered side waist pockets | | specify | |
| | Zippered cell phone pocket at the chest | | specify | |
| | Draw string hem with barrel lock | | specify | |
| | Quick adjust rubber tab fastener with hook & loop cuffs | | specify | |
| High visibility Vest | | | | |
| Name of Manufacturer & Country of manufacture | | | specify | |
| Type/Model Reference Number | | | specify | |
| Standards of manufacture | | | specify | |
| General requirements for High visibility clothing – ISO 20471 | | | specify | |
| Background material | Colour | | specify | |
| | Chromaticity coordinates | | specify | |
| | Gap width | | specify | |
| | Area covered | | specify | |
| Retro-reflective material for logo and band | Colour | | specify | |
| | Chromaticity coordinates | | specify | |
| | Gap width | | specify | |
| | Area covered | | specify | |
| | Technology of manufacture | | specify | |

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| | | | |
|---|---|------------------------------------|---------|
| Performance requirements of background material | Certificate of approval by accredited laboratory to IEC/ISO 17025 | specify | |
| | Minimum reflectivity, cd/lux | specify | |
| | Visibility distance, m | specify | |
| | Colour fastness | Domestic and commercial laundering | specify |
| | | Dry cleaning | specify |
| | | Hot pressing | specify |
| | | After xenon test | specify |
| | Colour coordinates | Colour | specify |
| | | Chromaticity coordinates | specify |
| | | Background luminance factor | specify |
| Combined performance | | specify | |
| Retro-reflective performance requirements | Abrasion | specify | |
| | Flexing | specify | |
| | Folding at cold temperatures | specify | |
| | Temperatures variation | specify | |
| | Washing | specify | |
| | Dry cleaning | specify | |
| | Convective Heat: RA \geq 100 | specify | |
| | Wet Reflectivity: RA \geq 100 | specify | |
| | Coefficient of retro-reflective material R', measured at observation angle 12'and entrance angle 5 $^{\circ}$ | specify | |
| | Coefficient of combined performance material R', measured at observation angle 12'and entrance angle 5 $^{\circ}$ | specify | |
| Coefficient of retro-reflection for retro-reflective material | specify | | |
| Construction | Comfort and maneuverability | specify | |
| | Collar and throat tab design | specify | |
| | New shoulder shape and decreased side sleeve to allow full rotation mobility in shoulder and arm | specify | |
| | Arm cut design | specify | |
| | No joints in the fabric | specify | |
| | Polyamide zip fasteners with metallic stoppers on both ends | specify | |
| | 100% polyester 3-ply threading for stitching | specify | |
| Fabric material | Background fabric material | specify | |
| | Blend composition, % | specify | |
| | Colour | specify | |
| | Warp material | specify | |
| | Weft material | specify | |
| | Mass, g/mm 2 | specify | |
| | Comfort level | specify | |
| Size designation | Shall be as per table 6 conforming to EN 13402 | Specify and attach a | |

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| | | drawing |
| 4.5 | Retro-reflective logo and safety message | specify |
| 4.6. | Quality Management System | specify |
| | Quality Assurance Plan | provide |
| | Copy of ISO 9001:2008 Certificate | provide |
| | Manufacturer's experience | provide |
| | Manufacturing Capacity (units per month) | provide |
| | List of previous customers | provide |
| | Customer reference letters | provide |
| 5.1 | Test standards and responsibility of carrying out tests | provide |
| 5.2 | Copies of Type Test Reports submitted with tender | provide |
| 5.3 | Test reports to be submitted by supplier to KPLC for approval | provide |
| 5.4 | Replacement of rejected High visibility jackets and vests | specify |
| 6.1 | Marking | specify |
| 6.2 | Packing | specify |
| 7.1 | Documents submitted with tender | provide |
| 7.2 | Documents to be submitted by supplier to KPLC for approval before manufacture | provide |
| 8.0 | Manufacturer's Guarantee and Warranty | provide |
| 9.0 | List catalogues, brochures, technical data and drawings submitted to support the offer | provide |
| 10.0 | List customer sales records and reference letters submitted to support the offer. | provide |
| 11.0 | List Test Certificates submitted with tender | provide |
| 12.0 | List test reports of the wrenches to be submitted to KPLC for approval before shipment | provide |
| 13.0 | Statement of compliance to specification (indicate deviations if any & supporting documents) | provide |

.....
Manufacturer's Name, Signature, Stamp and Date

NOTE:

The Guaranteed Technical Particulars (GTP), test reports & their certificates, drawings and/or catalogues shall form the basis of technical tender evaluation. Bidders shall ensure that the offered values for the item conform to the values in the test reports and their certificates, drawings, catalogue references and/or brochures. Failure to adhere by this requirement shall lead to automatic disqualification at the technical evaluation stage.

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