

FEWA-PL-SS-E-0065 REV.0

**TECHNICAL SPECIFICATION
LOW VOLTAGE AND AUXILIARY CABLES**

TABLE OF CONTENTS

	Page
1. General requirements	3
2. Low Voltage power cables	3
2.1. Design	3
2.2. Conductor	3
2.3. Insulation	3
2.4. Inner Sheath	3
2.5. Armour	3
2.6. Outer Sheath	3
2.7. Voltage Marking & Identification	3
3. Multicore Control Cables	3
4. Laying Of Cables	4
5. Termination of Auxiliary Cables and Identification of Cores	4
6. Sealing and Drumming	4
7. Labelling	4
8. Tests in Factory	5
8.1. Type Test Certificates / Type Tests	5
8.2. Routine Tests	5
9. Applicable Standards	5

1. GENERAL REQUIREMENTS

The requirements specified in electrical small wiring and terminations are applicable as appropriate.

2. LOW VOLTAGE POWER CABLES

2.1. DESIGN

LVAC cables shall be single or multicore having copper conductors, XLPE insulated and aluminium wire armoured and PVC sheathed (flame retardant) 1,000 volt grade cables designed to meet the requirements of IEC 60502.

Cables for lighting and socket installation up to 20 KVA three phase load shall have cores for the phases, and one core of adequate size for the separate neutral (N). Higher rated loads shall separately be connected to the station earthing system.

2.2. CONDUCTOR

Conductors shall be of stranded plain annealed copper wires to IEC 228.

A semi-conducting separator tape shall be applied over the copper conductor.

2.3. INSULATION

The insulation shall be extruded cross-linked polyethylene.

A separator of PETP or poly propylene (PP) film shall be applied over the insulation.

2.4. INNER SHEATH

The armour bedding shall be an extruded PVC (flame retardant) sheath.

2.5. ARMOUR

Armour shall comprise a layer of round aluminium wires, which shall be applied helically with a suitable left hand lay.

2.6. OUTER SHEATH

An extruded layer of black type ST2 PVC (flame retardant) shall be applied over the armouring wires.

2.7. VOLTAGE MARKING & IDENTIFICATION

The requirements are subject to FEWA approval during detail design stage.

3. MULTICORE CONTROL CABLES

Multicore auxiliary cables shall be 6000/1,000 volt grade PVC insulated PVC sheathed, galvanised steel wire armoured and PVC sheathed overall. Conductors shall be of stranded copper wires and the size of the conductor core shall be 2.5 sq. mm. The number of conductors and material thickness shall be as stated in the Schedules.

PVC compounds shall have reduced flame and toxic gas emissions meeting the requirements of IEC 332, shall be black and embossed as detailed in 2.7 above.

The cables shall conform to approved National Standards compatible with IEC recommendations.

4. LAYING OF CABLES

Requirements specified elsewhere are applicable as appropriate.

5. TERMINATION OF AUXILIARY CABLES AND IDENTIFICATION OF CORES

The ends of each cable shall be terminated in brass, compression type cable glands of the correct size, which shall secure the cable inner sheath and ensure effective electrical continuity between the cable armouring wires and the metal enclosures on which the cable is terminated. Cable glands fitted on outdoor equipment shall also incorporate suitable compression seals to secure the outer sheath and shall be so designed and fitted that water cannot enter the cable or the equipment via the cable termination. Where required, a barrier shall be incorporated to prevent ingress of moisture via the interstitial spaces in the cable. At all rising terminations, the cable inner sheath shall pass through the gland to terminate approximately 6 mm above the gland. Insulated glands and glands not in an environmentally controlled atmosphere, shall be supplied complete with close fitting insulating shrouds.

Where multicore cables provided under this Contract connect with plant and equipment supplied under another Contract, the Cable Contractor shall leave sufficient length of tails to connect up to the terminal boards. The Contractor shall also strip, insulate, ring through and identify the tails with temporary tags, and shall provide, fit and install the cable glands in accordance with the requirements specified above.

Termination of wires and identification of cables shall be as specified in electrical small wiring and termination Section 3.5.

6. SEALING AND DRUMMING

The sealing and drumming of these cables shall be in accordance with the requirements for Power Cables and Accessories.

7. LABELLING

All cables shall be identified below the termination at each end and at approved positions by means of identification plates engraved with the cable number, feeder name, size of cable, number of cores, phase colour etc., or such lettering as the Engineer may require. The termination plates shall be securely fastened in a permanent manner, and shall be made of material able to resist corrosion, damp and mechanical damage.

Cable boxes shall be marked with stamped brass labels indicating the purpose of the supply where such supply is not obvious.

8. TESTS IN FACTORY

8.1. TYPE TEST CERTIFICATES / TYPE TESTS

Certified copies of the type test certificates as per BS 5467 / IEC 502 for power cables and as per BS 6346 for control cables shall be supplied along with the offer. If these are not satisfactory, Authority reserves their right to ask the contractor to conduct any of the above tests at no extra cost to FEWA.

8.2. ROUTINE TESTS

Routine tests shall be as per BS 5467/ IEC 502 for LVAC power cables.

Routine tests for control cables shall be as per BS 6346.

9. APPLICABLE STANDARDS

- BS 4066 Tests on electric cables under fire conditions.
- BS 6346 PVC-insulated cables for electricity supply.
- BS 5467 Specification for cables with thermosetting insulation for electricity supply for rated voltages of up to and including 600/1000V and up to and including 1900/3300V.
- IEC 287 Calculation of continuous current rating of cables (100% load factor)
- BS 6746 Specification for PVC insulation and sheath of electric cables.
- IEC 332 Tests on electric cables under fire conditions.
- BS 6121 Mechanical cable glands.
- IEC 502 Extruded solid dielectric insulated power cables for rated voltages from 1kV up to 30 kV.
- BS6360 Specification for conductors in insulated cables and cords.
- IEC228 Conductors of insulated cables.
- BS1442 Specification for galvanised mild steel wire for armouring cable.
- BS6004 Specification for PVC insulated cables (non armoured) for electric power and lighting.
- BS6234 Specification for polythene insulation and sheath of electric cable.
- BS2484 Specification for straight concrete and clay ware cable covers.
- IEC885 Electric test methods for electric cables.
- IEC331 Fire resisting characteristics of electric cable.
- IEC 811 Common test methods for insulating and sheathing materials of electric cables.
- BS729 Specification for hot dip galvanized coatings on iron and steel articles.