INFORMATION PROVIDED TO ASSIST THE TENDERER FOR THE SUPPLY OF:

ITEM: **SPECIFICATION FOR JOINTS AND TERMINATIONS FOR ELECTRICITY CABLES USED DURING THE INSTALLATION OF NEW CONNECTIONS**

REFERRED TO IN EACH:

HARMONISATION DOCUMENT / EUROPEAN STANDARD

I.E.C.

BRITISH STANDARD 6910, 4579, 7654, 7657, 7888

DEROGATIONS (IF ANY)

1 SCOPE

This specification is intended to be used by contractors installing new connections that will be adopted by SSE Power Distribution (SSEPD).

2 LOW VOLTAGE JOINTS AND TERMINATIONS

All joints and connectors must be tested, as appropriate, to the following standards :-

Reference	Title
BS 7888	LV and MV accessories for power cables with rated voltage from 0.6/1 kV (U_m = 1·2 kV) up to and including 20·8 /36 kV (U_m = 42 kV)
BS 6910	Cold pour resin compound and heat shrink cable joints in the range up to 1000 V a.c. and 1500 V d.c.
BS 4579	Performance of mechanical and compression joints in electric cable and wire connectors
ENA ER C79	Energy Networks Association Engineering Recommendation C79 - Type approval tests for connectors and terminations for aluminium conductors of insulated power cables
ENA ER C81	Energy Networks Association Engineering Recommendation C81 - Type approval tests for joints for 600/1000 V
SP-PS-023	SSEPD specification for underground link boxes
SP-PS-047	SSEPD specification for heavy duty cut-outs
SP-PS-352	SSEPD specification for meter boards

3 METER BOARDS

The minimum sizes of meter board to are as follows :-

Single phase 100 A supply –500 mm high × 300 mm wide
Three phase 100 A supply – 600 mm high × 450 mm wide

Meter boards to SSEPD specification SP-PS-352 are to be manufactured from 12 mm thick resin bonded chipboard supplied with 5 rigid plastic bushes 20 mm long, 20 mm diameter and 6·5 mm hole.

The cut-out must be installed on the left hand side corner of the meter board with the meter installed above it on top left hand side of the board.

4 100 AMP CUT-OUTS

All 100 amp domestic type cut-outs single and three phase with combined neutral earth and connector blocks are to comply with following standard :-

Reference	Title
BS 7657	Specification for fuses (cut-outs), ancillary terminal blocks and interconnecting units up to 100 A rating, for power supplies to buildings

Cut-outs must have their phase colour (brown, black or grey or red, yellow or blue when cables are jointed to cables with the old core colours) indicated using a round paper self adhesive label or disk secured to the meter board close to the right hand side of the cut-out.

Cut-outs must be sealed using nylon security seals.

5 25 AMP STREET LIGHT CUT-OUTS

Single phase 25 amp cut-outs for supplies to street lights and furniture are to comply with following standard :-

Reference	Title
BS 7654	Specification for single phase street lighting fuses (cut-outs) for low voltage public electricity distribution systems - 25A rating for highway power supplies and street furniture.

6 200 A, 400 A & 600 A HEAVY DUTY CUT-OUTS

Heavy duty cut-outs for 200 A, 400 A and 600 A LV supplies to SSEPD Technical Specification SP-PS-047.

Note : 200 A cut-outs are only to be used for whole current metering. 400 A and 600 A cut-outs must be used when CT metering is required.

7 UNDERGROUND LINK BOXES

Two way underground link boxes SSEPD Technical Specification SP-PS-023.

8 11 & 33kV JOINTS

All straight, breeches and pot end joints are to be tested to the following standards :-

Reference	Title
BS 7888	LV and MV accessories for power cables with rated voltage from 0·6/1 kV (U_m = 1·2 kV) up to and including 20·8 /36 kV (U_m = 42 kV)
BS 4579	Performance of mechanical and compression joints in electric cable and wire connectors
ER C90	Energy Networks Association Engineering Recommendation C90 - Type approval tests for straight joints for 6350/11000 volts three core mass impregnated non-draining insulated solid cables.
ER C79	Energy Networks Association Engineering Recommendation C79 - Type approval tests for connectors and terminations for aluminium conductors of insulated power cables

9 11 & 33kV TERMINATIONS

All plant terminations are to be made with dry type terminations in unfilled cable boxes. When applicable the following documents should be complied with the following standards :-

Reference	Title
BS 7888	LV and MV accessories for power cables with rated voltage from 0.6/1 kV (U_m = 1.2 kV) up to and including 20.8 /36 kV (U_m = 42 kV)
BS 4579	Performance of mechanical and compression joints in electric cable and wire connectors
ENATS 09-13	Energy Networks Association Performance Standard for high voltage heat - shrinkable components for use with high voltage solid type cables up to and including 33,000 volts.
ER C79	ENA Engineering Recommendation C79 - Type approval tests for connectors and terminations for aluminium conductors of insulated power cables
ER C93	Energy Networks Association Engineering Recommendation C93 - Type approval for mechanical connections to metallic sheaths of cables.

10 JOINTING

10.1 General

Cables will be jointed in accordance with manufacturers guide lines and best Industry practice.

10.2 Joint Positions

Cables must enter and leave the joint shell 'straight' i.e. not on a bend. At least 1200 mm space must left between joints on a main to enable future work on the cable.

10.3 Support

Bricks, or other items, used to support the cable or joint will be removed before backfilling. Cables are to be lifted adjacent to joints to eliminate undue stresses being imposed during backfilling / compaction.

10.4 Final Connection

Excavations adjacent to existing cables must be carried out in accordance with the Health and Safety Executive publication HS(G)47 - 'Avoiding Danger From Underground Services'

When excavating joint bays for the final connection the following are the minimum size bays required.

LV 1·2 m long × 0·9 m wide × 0·6 m depth

HV 2·2 m long × 1·05 m wide × 0·9 m depth

EHV 2.5 m long × 1·2 m wide × 1·2 m deep

The cable needs to be in the centre of the joint bay, the length of the joint bay being measured from the point where the new cable is parallel to and touching the existing cable. At least 150 mm clearance under LV cables and 250 mm clearance under HV cables is required.

Where the cable to be jointed onto is fouled by an existing joint, adjacent cable or other obstruction, then it will be necessary to extend the joint bay so that the cable can be pulled clear of the obstruction, or an alternative position agreed with SSEPD.

10.5 Location of other cables in vicinity

Were it is indicated that more than one cable exists in the vicinity of the joint bay then ALL cables should be exposed to facilitate identification.

10.6 Joint Identification

All joints and terminations must be fitted with a permanent identification tag or label detailing the following information :-

- Jointers name or initials
- Main Contractor's Name
- Sub Contractor's Name (if applicable)
- Date Installed (Month / Year)

10.7 Service terminations and service cable pot ends

No service may be energised until it is terminated in its final position and the service position is secure and weather proof. Temporary pot ended service cables must not be taken into insecure buildings or left exposed above ground.

It is permissible to leave a short service cable stub/s permanently pot ended close to the mains service breeches joint and then connect the service cable with a concentric service straight joint to the tail when the service is ready to be connected.

10.8 PLASTIC MARKER TAPE FOR BURIED ELECTRICITY CABLES

10.8.1 LV and 11kV Warning Tape

Marker tape manufactured to ENA TS 12-23 will be installed over all mains cables, service cables, ducts and service tubes. The tape will be placed 150 mm directly above the cable or duct.

10.8.2 33kV Plastic Cable Tiles

Plastic marker tiles with minimum dimension of 1000 mm long, 244 mm wide and 12 mm thick with plastic marker tape manufactured to ENA TS 12-23 bonded to the upper surface of the tile. The tiles will pegged or secured together and will be placed 150 mm above the cable trefoil group or duct at a depth of 150 mm on every circuit.

Reference	Title
ENATS 12-23	Energy Networks Association polythene warning tape and polythene protection tape for buried electricity supply cable.

11 TESTING LOW VOLTAGE CABLES

11.1 SSEPD require mains and service cables to be tested and the results recorded.

11.2 For mains cables a 500 volt insulation resistance test is required between all phase cores and between all cores and earth. An insulation test is also required between the cable earth screen and an independent earth matt or rod where the cable installation was not witnessed and commissioning delayed more than 7 days from installation, minimum

acceptable insulation resistance value shall be 50 megohms. A continuity test on all cores is also required.

11.3 For service cables the same tests in par. 11.2 above. In addition an earth loop impedance test is required (0·35 ohms for PME (Protective Multiple Earthing) single phase services and 0·8 ohms for SNE (Separate Neutral Earthing)) and correct polarity confirmed.

11.4 All results must be recorded on 'Declaration of test results for LV New Cable Installations & Declaration Test Results for New Substation Equipment'.

12 TESTING 11kV & 33kV CABLES

12.1 Testing to be carried out in accordance with SSEPD procedure PR-PS-063 and include a 5 kV sheath test to prove the integrity of the cable sheath where the cable installation was not witnessed and / or commissioning delayed over 7 days from the installation.

12.2 All results must be recorded on 'Declaration of Test Results for New HV Cable Installations & Declaration Test Results for New Substation Equipment'

13 ACCESSORY APPROVAL

Documentary evidence must be supplied giving details of manufacturer, types of joints and accessories being used and that the joints and accessories are tested to the relevant standards.

The joints and jointing must comply with the requirements of the Electricity, Safety, Quality and Continuity Regulations 2002.

Copies of jointing instructions and procedures are to be sent to SSEPD when requested.

14 APPLICABLE STANDARDS

14.1 Third Parties will obtain copies of non SSEPD Standards from the issuing organisations at their own expense.

14.2 Third Parties will obtain copies of SSEPD Standards from the Scottish & Southern Energy Power Systems Document Administrator, Inveralmond House, 200 Dunkeld Road, Perth. PH1 3AQ.

14.3 There will be a cost of £50 for each Standard requested to cover administration and copying costs.