

Company Directive

STANDARD TECHNIQUE: CA3A

Relating to Jointing Configurations for 33kV Cables

Policy Summary

This Standard Technique document details the standard Jointing Configurations that are available for jointing on the WPD 33kV underground cable networks.

This ST has not been written as a training document. It is not intended to be exhaustive in content and you must refer to your supervisor if you require training or instruction.

You shall work safely and skilfully, utilising the training/instruction you have already received, relating to the contents of this document and its cross-references.

You must make sure that you understand your job instructions and that you have the necessary tools and equipment for the job.

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Implementation Date: March 2017

Approved by



Policy Manager

Date:

14 March 2017

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IMPLEMENTATION PLAN

Introduction

This Standard Technique document contains the approved 33kV cables, joints and terminations that can be used on the 33kV system found in WPD.

Main Changes

Change from heat shrink and cold shrink technology jointing to cold applied and cold shrink termination jointing technology.

The document also lays out that all new 33kV circuits consisting of single core polymeric cable, these cables shall be laid in touching trefoil then both ends of the circuit shall be solidly bonded at the termination positions. This includes interplant cables that could have one or more cables per phase, the cables would be run between the primary transformers and the relevant switchgear; these interplant cables shall be laid in a touching trefoil group of L1, L2 and L3  and solidly bonded at both ends of the circuit to earth. If there are multiple cables per phase then each touching trefoil group shall have a minimum centre to centre spacing of 300mm between trefoil groups of L1, L2 and L3 cables.

Impact of Changes

Change from heat shrink and cold shrink technology jointing to cold applied jointing technology. All existing 33kV Joints will require re-training to the cold shrink techniques.

Implementation Actions

This Standard Technique shall be communicated to all relevant WPD engineers and site staff at the next Team Briefing by the Team Manager.

Conversion training of all existing 33kV Joints is to take place, and the Training Centres are to modify existing 33kV training courses to reflect the new jointing system.

Implementation Timetable

This Standard Technique can be implemented with immediate effect.

First conversion course for the 33kV Joints will be completed by the end of June 2016.

Document Revision & Review Table		
Date	Comments	Author
March 2017	This is a new document.	Peter White

ST: CA3A 33kV CABLE JOINTING CONFIGURATIONS

1.0 SCOPE

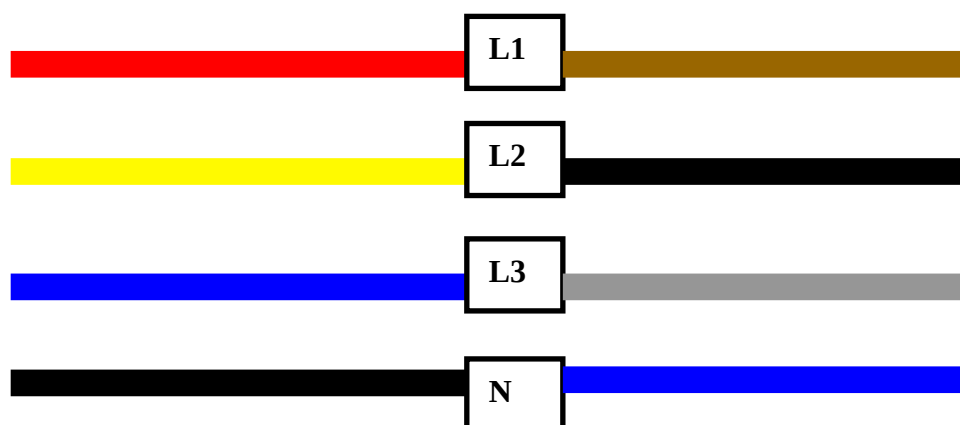
This Standard Technique document details the various 33kV jointing configurations, which are achievable using WPD standard practices.

If a jointing procedure is not covered by this 33kV Jointing Manual, advice should be obtained from the Policy Manager, Avonbank.

This Standard Technique document is an overview of the jointing configurations and for details of an individual joint; the appropriate jointing procedure should be consulted.

2.0 BACKGROUND

Since 01/04/06 the British Standards dictating the phase colours has changed, this change is mandatory, the old and new colours along with the associated alphanumeric are shown on the graphic below: -



These new colours apply to all electrical industries, including the electrical utilities, it should be noted that the old colours are no longer allowed to be purchased and used on the WPD system. Therefore when working on the existing “old colours” care shall be taken in jointing the new colours to the old. To avoid confusion when jointing the existing old colour red shall be marked with the alphanumeric tape L1 and the new colour brown shall also be marked with alphanumeric tape L1 and then the two L1’s shall be jointed together; to avoid confusion when jointing the existing old colour yellow shall be marked with the alphanumeric tape L2 and the new colour black shall also be marked with alphanumeric tape L2 and then the two L2’s shall be jointed together; to avoid confusion when jointing the existing old colour blue shall be marked with the alphanumeric tape L3 and the new colour grey shall also be marked with alphanumeric tape L3 and then the two L3’s shall be jointed together. This will ensure colour true jointing with no inadvertent crosses.

Any 33kV circuit shall be laid in a touching trefoil group of L1, L2 and L3,  the three cables shall be cable tied or two complete turns of Gorilla duct tape every 1.5m in a straight run and every 1m when going around a corner, the cable ties to be used are E 5 number 35370 and the Gorilla duct tape is 60928. If a second circuit is being laid in the same trench then there shall be a minimum centre to centre spacing of 300mm between the two circuits, at no time shall a phase of one trefoil group be laid with the second trefoil group.

As all new 33kV circuits consist of single core polymeric cable, these cables shall be laid in touching trefoil then both ends of the circuit shall be solidly bonded at the termination positions. This includes interplant cables that could have one or more cables per phase, the cables would be run between the primary transformers and the relevant switchgear; these interplant cables shall be laid in a touching trefoil group of L1, L2 and L3 and solidly bonded at both ends of the circuit to earth. If there are multiple cables per phase then each touching trefoil group shall have a minimum centre to centre spacing of 300mm between trefoil groups of L1, L2 and L3 cables.

IEC 60446 - Basic and Safety Principals for Man-Machine Interface, Marking and Identification (2007) – Quote: - “The identification by colours, for identification of conductors, the following colours are permitted: - black, brown, red, orange, yellow, green, blue, violet, grey, white, pink, turquoise.

The identification by colour shall be used at terminations and preferably throughout the length of the conductor either by colour of the insulation or by colour markers. Additional marking, for example alphanumerical or numerals, are allowed, provided that the colour identification remains unambiguous.”

Therefore at all times Jointers shall joint ‘colour true’, or if there is a mixture of old and new phase colours jointing shall be as indicated in the coloured graphic on page 4 of this document. The only dispensation for this is unless the Jointer has been instructed to do otherwise by their Team Manager.

Any reference to single core EPR applies equally to single core XLPE.

3.0 STRAIGHT JOINTS

Straight joints for all cables normally found on the WPD 33kV network are included, the jointing procedures are given in ST: CA3M/2.

3.1 EPR to EPR

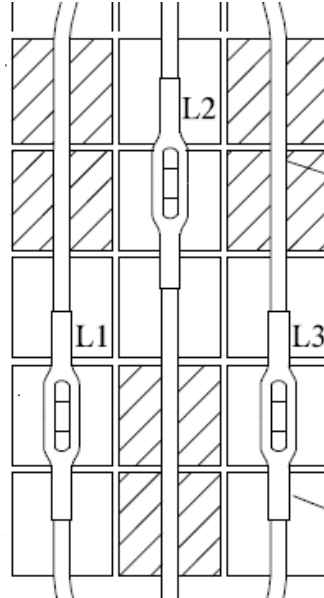
All sizes of EPR are to be straight jointed together using the Lovink M 85/M105 cold applied jointing system.

3.2 EPR to H cable Transition

All sizes of EPR to H cable is to be straight jointed together using the Lovink MK 125 cold applied transition jointing system.

3.3 EPR to PILC Transition

All sizes of EPR to PILC are to be straight jointed together using the Lovink M85/M105 cold applied jointing system.



The sketch above shows the typical offset layout of the 33kV single phase straight joints within a 33kV joint bay.

3.4 EPR to HSL cable Transition

All sizes of EPR to HSL cable are to be straight jointed together using the heat shrink splitter box and the Lovink MK 125 cold applied transition jointing system.

3.5 EPR to 3 core XLPE SWA Transition

All sizes of EPR to 3 core XLPE SWA are to be straight jointed together using the heat shrink splitter box and the Lovink MK 125 cold applied transition jointing system.

4.0 BRANCH JOINTS

Branch joints can only be carried out for all the current polymeric cables normally found on the WPD 33kV network. If a branch joint is to be installed onto H, HSL, 3 core XLPE or PILC cable then the paper or 3 core XLPE cable is to be engineered out and the branch joint made on to the single core EPR cables.

Branch joints for single core EPR cables normally found on the WPD 33kV network are included, the jointing procedures are given in ST: CA3L/2.

4.1 EPR to EPR underground branch joint

All sizes of EPR triplex are to be branch jointed together using the Pfisterer inner cone separable connector interference fit jointing system. Please note that size 3 inner cone connector need to be ordered specially from Pfisterer and shall be phosphor bronze in construction thereby preventing corrosion of the connector.

5.0 STOP ENDS

Stop Ends can only be carried out for all the current single core polymeric cables normally found on the WPD 33kV network are included, the jointing procedures are given in ST: CA3N/2.

5.1 EPR or XLPE

All sizes of EPR or XLPE cables can be stop ended using the Lovink M 85/M 105 cold applied jointing system.

6.0 TERMINATIONS

Only terminations for 185/300/400/630/800mm² EPR, are included in this 33kV Jointing Manual, the jointing procedures are given in ST: CA3V/2.

6.1 Terminations for the following applications are included: -

- (i) Indoor Ensto termination for dry cable boxes.
- (ii) Outdoor Ensto pole or open busbar termination.
- (iii) Outer cone Euromold interface C separable connector terminations.
- (iv) Outer cone Euromold interface C surge diverters.
- (v) Inner cone Pfisterer size 3 separable connector terminations.
- (vi) Inner cone Pfisterer size 3XL separable connector terminations.
- (vii) Inner cone Pfisterer size 3 surge diverters.
- (viii) Conversion of G 38 filled PILC cable boxes to take polymeric cables.

APPENDIX A

SUPERSEDED DOCUMENTATION

None, this is a new document and brings the format of the 33kV manual into line with the format used in the LV Services, LV Mains and 11kV manuals.

APPENDIX B

ASSOCIATED DOCUMENTATION

ST: CA3A, ST: CA3C/2, ST: CA3L/2, ST: CA3M/2, ST: CA3N/2, ST: CA3O, ST: CA3S, ST: CA3V, ST: CA7D.

APPENDIX C

IMPACT ON COMPANY POLICY

Change from heat shrink and cold shrink technology jointing to cold applied jointing technology. All existing 33kV Jointers will require re-training to the cold applied techniques.

APPENDIX D

IMPLEMENTATION OF POLICY

This Standard Technique shall be communicated to all relevant WPD engineers and site staff at the next Team Briefing by the Team Manager. All existing 33kV Jointers will require re-training to the cold applied techniques once trained they will be able to use the new system.

APPENDIX E

KEY WORDS

Jointing configurations for 33kV, straight joints, branch joints, inner cone separable connectors, outer cone separable connectors, indoor and outdoor terminations, stop ends.