The Tony Davies High Voltage Laboratory

UNIVERSITY OF Southampton

Test Report

Report CRE-11-SPS_2-1 issued to:	**Start date of test:** 17th November 2011
Shrink Polymer Systems Unit E3 Crown Way Crown Park Industrial Estate Rushden, Northants NN10 6FD, UK	**End date of test:** 30th November 2011 **Test type:** Humidity test (300 hour) **Test Specification:** HD 629.1 S2:2006 + A1:2008 / BS 7888-4.1:2006, Table 3, Test number 12 and 13.
Tel: +44 (0) 1933 356758 **Fax:** +44 (0) 1933 413821 **Web:** www.shrinkpolymersystems.co.uk	**Product tested:** Indoor termination / 3TIS-12X-C/E
	Enquiry No.: CEN-11-62-1
Contact: Richard Poulter Managing Director - UK	**Quotation No.:** CQU-11-69-1
Email: richard.poulter@shrinkpolymersystems.co.uk	**Order No.:** 9038

An indoor termination product number 3TIS-12X-C/E supplied by Shrink Polymer Systems was submitted for parts of type test, in accordance with HD 629.1 S2:2006 + A1:2008 / BS 7888-4.1:2006, Table 3, Test number 12 and 13.

Test Sequence

1.0 Humidity test (300 hours)
1.1 Examination

Summary

The indoor termination submitted for testing passed all the test acceptance criteria. This report applies only to the sample tested. The responsibility for conformity of this product to the test criteria rests with Shrink Polymer Systems.

Place of Test:	**Report prepared by:**	
The Tony Davies High Voltage Laboratory Building 20, University Crescent Electronics and Electrical Engineering Faculty of Physics and Applied Science University of Southampton Southampton, SO17 1BJ UK	Neil Palmer	Not valid without stamp.
Tel: 023 8059 3238 **Fax:** 023 8059 3709	**Reviewed by:**	
Email: nlp@ecs.soton.ac.uk **Contact:** Neil Palmer.	Prof Paul Lewin CEng FIET SMIEEE	
	Date:	

Contents

List of Figures

List of Tables

Part 1: Test Method

1.1 Humidity test.

Two off indoor termination test samples were assembled on site by a sub-contracted jointer supplied by Shrink polymer systems using the cable identified in appendix B.
The test samples were mounted in a vertical position within a humidity chamber and connected to a three-phase a.c voltage source where they were subjected to the conditions detailed in section 2.2 of this report, in accordance with BS EN 61442:2005 / IEC 61442:2005, section 13 “Humidity and salt fog test”.

1.2 Examination.

The test samples were visually examined against the criteria detailed in section 3.2 of this report, in accordance with HD 629.1 S2:2006 + A1:2008 / BS 7888-4.1:2006, Table 3, Test number 13.

Figure 1, Indoor termination / 3TIS-12X-C/E

Part 2: Equipment

2.1 Equipment used.

- Reference voltmeter 0-60kV (HV-466)
- 11kVA 3 phase transformer (8kV test voltage) with in series step up autotransformers
- Environmental chamber and fog delivery system, built in accordance with BS 923-1: 1990, IEC 60-1: 1989.
- 3 phase monitoring unit (voltage drop, earth league current and run time).

Figure 2, Environmental chamber set up.

Part 3: Test Setup

3.1 Test Setup for Humidity test.

Specification: HD 629.1 S2:2006 + A1:2008 / BS 7888-4.1:2006, Table 3, Test number 12.
Specification (test method): BS EN 61442:2005 / IEC 61442:2005, section13 “Humidity and salt fog test”.

3.2 Environmental conditions

Maximum ambient temperature	25 ºC
Minimum ambient temperature	12 ºC
Maximum temperature of sample	25 ºC
Minimum temperature of sample	12 ºC
Minimum atmospheric pressure	1028.0 mb
Minimum atmospheric pressure	998.0 mb

3.3 Test conditions

Water flow rate	(0.4 ± 0.1) l/h/m^3
Water conductivity	(70 ± 10) mS/m
Earth Leakage current protection (I_{max})	(1 ± 0.1) A
Test voltage, phase 1 (red)	8kV phase 1 (1.25 U_0 of 6.35/11kV)
Test voltage, phase 2 (yellow)	8kV phase 2 (1.25 U_0 of 6.35/11kV)
Test voltage, phase 3 (blue)	8kV phase 3 (1.25 U_0 of 6.35/11kV)
Test duration.	300 hours.
Closest Earth	Cable screen (no terminal box used)

3.4 Sample test conditions

Termination length	650mm (Crutch to lug)
Termination spacing	200 mm at Lug
Sheds	None
Orientation	vertical

For more details on termination tested see Appendix A and for cable type used see Appendix B.

Part 4: Results

4.1 Test requirements for salt fog

Specification: HD 629.1 S2:2006 + A1:2008 / BS 7888-4.1:2006, Table 3, Test number 12.

Criteria	Observation	Result
No more than 3 over current trips	No over current trips occurred during test duration.	Pass
Loss of dielectric quality due to track.	No dielectric quality was lost due to tracking	Pass
Erosion to a depth of 2mm or 50% of insulation, whichever is the smaller.	No erosion of insulation was evident	Pass
Splitting of material	No splitting of material was evident	Pass
Puncture of material	No punctures in material were evident	Pass

Table 1, Table of test Criteria

4.2 Requirements for examination

Specification: HD 629.1 S2:2006 + A1:2008 / BS 7888-4.1:2006, Table 3, Test number 13.

Examination	Observation	Result
Cracking in the filling media and/or tape or tube components	No cracking of components was evident	OK
A moisture path bridging a primary seal	No dielectric quality was lost due to tracking	OK
Corrosion and/or tracking and/or erosion	No excessive corrosion and No tracking or erosion was evident	OK
Leakage of any insulating material	No leakage of any material was evident	OK

Table 2, Table of examinations

4.3 Observation photographs of termination

Figure 3, termination at 300 hours

Figure 4, top of termination at 300 hours

Figure 5, Bottom of termination at 300 hours

Figure 6, Crutch of termination at 300 hours

Appendix A: Identification of test termination

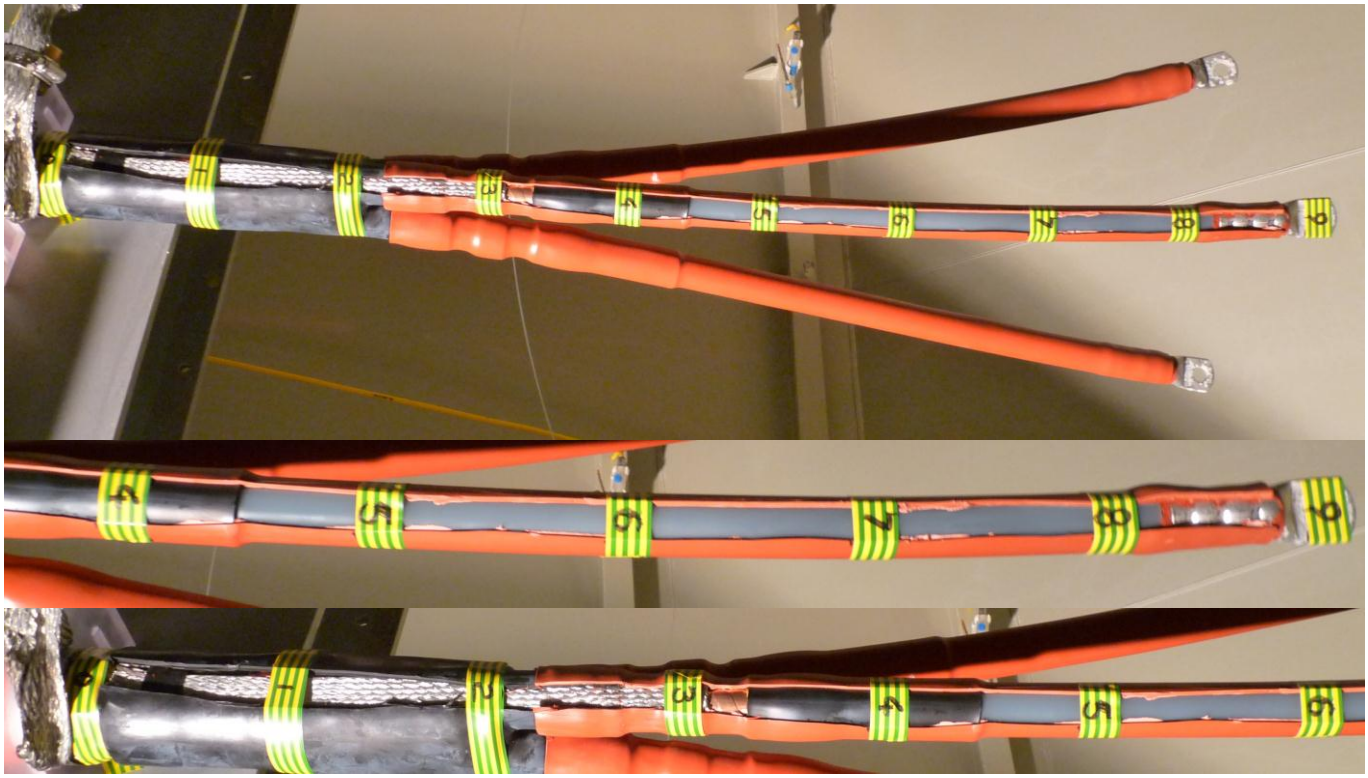

Figure 7, Identification of test termination lengths.

The yellow/green tape in figure 7 is positioned at 100mm centres to give indication of length and positioning of components.

Appendix B: Identification of test cable

Rated voltage $U_0/U(U_m)$:	6.35/11kV (12) kV
Construction:	3-core
Conductor:	Copper (Cu)
	Stranded
	Circular
	120 mm^2
Insulation:	XLPE
Insulation screen:	Strippable
Metallic screen:	Extruded
Armour:	Wire
Over Sheath:	PVC
Water blocking	None
Diameters:	Conductor mm
	Insuation mm
	Insulation screen mm
	Oversheath mm
Cable Marking	“0317 2008 Electric cable 1100V 3 x 120 BB 6622”