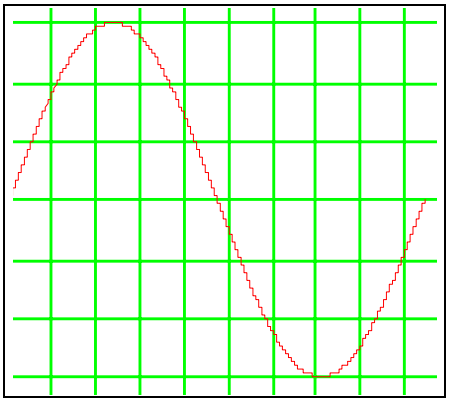

PPR 1343

Type Tests
on transition joints type
TRAJ 12/1x150-240
for 3-core
paper insulated cables
to single core
XLPE insulated
cables to 6 / 10 kV

Pages: 4

Appendices : ESD 2028

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1. SCOPE:

This report summarises type tests carried out on transition joints type TRAJ 12/1x150-240 in accordance with Cenelec HD 628 S1 and prHD 629.2 S1 (1995E).

In addition, a longterm three-phase high voltage test was carried out on further samples.

2. TEST SAMPLES:

2.1 Cables

Single-core polymeric insulated cable (extruded):

Type:	NA2XSY 1 x 150 RM/25 6/10 kV
Conductor:	Al, 150 mm² stranded compact, diameter 14,5 mm
Conductor screen:	Extruded semi-conductive compound
Insulation:	XLPE 3,4 mm, diameter over insulation 23 mm
Insulation screen:	Extruded, bonded, 0,5 mm
Metallic Screen:	Cu wires, 40 wires 0,8 mm diameter, ≅ 25mm²
Oversheath:	PE of medium density 2,5 mm Overall diameter 32 mm

Three-core belted paper insulated cable:

Type:	NAKBA 1 x 150 SM 6/10 kV
Conductor:	Al, 150 mm² stranded compact, sector width 23 mm, hight 12 mm
Insulation:	Draining oil impregnated paper, thickness core 3,2 mm, belt 0,5 mm
Metallic Sheath:	Lead, thickness 1,9 mm, diameter 45 mm
Oversheath:	Jute, overall diameter 55 mm

2.2 Joints

Type TRAJ 12 / 1 x 150-240,
including screw connectors for the main conductor.

No. of joints: 2 pieces for Cenelec testing
2 pieces for longterm high voltage test

2.3 Installation:

The installation was carried out in accordance with the Instruction ESD 2028 and the cabkle lengths as required in prHD 629.2 S1.
Each pair of joints was installed by a different jointer in order to check the uniformity of the installed product.

3. TESTS:

3.1 Type tests in accordance with HD 628.S1 and HD 629.2.S1

No.	Tests	Clause of HD 628	requirements for U_o/U (Um) 6.35/11 (12)kV	Tested
1	DC voltage withstand	5	15 minutes at 6 U_o = 38 kV	30 minutes at 8$U_o \cong$ 51 kV
2	AC voltage withstand	4	5 minutes at 4,5 U_o = 28,5 kV	5 minutes at 4,5 $U_o \cong$ 29 kV
3	Impact at ambient temperature	14	insulation resistance > 10 MΩ	insulation resistance >10 MΩ at 5kV
4	Impulse voltage at elevated temperature	6	10 impulses of each polarity 95 kV	10 impulses of each polarity 95 kV
5	Electrical heat cycling in air	9	63 cycles 5/3 h 70°C + 0 to 5K, 1,5 U_o = 9,5 kV	72 cycles 5/3 h 80°C conductor temp. on paper side 1,73 U_o = 11 kV Three phase supply for current and voltage
6	Electrical heatcycling in water	9	63 cycles 5/3 h 70°C + 0 to 5K, 1,5 U_o = 9,5 kV	66 cycles 5/3 h 80°C conductor temp. on paper side 1,73 U_o=11 kV Three phase supply for current and voltage
7	AC voltage withstand	4	4 h at 3 U_o=19kV	4 h at 4 $U_o \cong$26kV
8	Thermal short circuit (screen)	10	see PPR 1342	not tested
9	Thermal short circuit (conductor)	11	2 short circuits, conductor temp. raise (paperside) to 165°C in 1 sec.	2 short circuits conductor temp. sice (paperside) to180°C in 1 sec. (15,2 kA/1 sec.)
10	Dynamic short circuit		not required for currents below 63kA	------

No.	Tests	Clause of HD 628	Test requirements	Tested
11	Impulse voltage at ambient temperature	6	10 impulses of each polarity 95 kV	10 impulses of each polarity 95 kV
12	AC voltage withstand	4	15 minutes at 2,5 U_o = 16 kV	15 minutes at 2,5 U_o = 16 kV
13	Examination	/	for information only	No degredation of joint, joint components and cables observed

All tests with the exception of 9 were carried out at Raychem's HV Laboratory, Ottobrunn in the period Nov.93 through Feb.94.

The short circuit test was performed at EPM Munich.

All 4 samples passes the tests 1 through 13.

3.2 Longterm High Voltage Test

Test	Voltage	Time
3 phase AC Voltage	20 kV phase to phase	16.500 h (test continuing)

Location: Outdoor testfield Raychem, Ottobrunn

4. CONCLUSION:

The test results of the 2 samples exceed the requirements of HD629.2 S1.

These results and the result of the longterm high voltage test allow the assessment that the expected lifetime of this product will be equal to that of the cables.