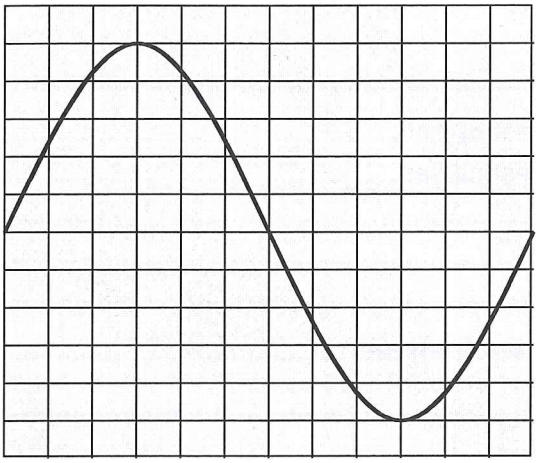

Test Report
PPR-3202

Test object: Cold Shrink Indoor Termination type CSTI and Cold Shrink Outdoor Termination Type CSTO for screened single core polymeric cables without armour
TE Connectivity reference: CSTI-6152-ML-7-13, CSTO-6152-ML-7-13, CSTO-6162-ML-8-21

Test performed: Requirements according to CENELEC HD 629.1 S3 from 2015-09 (Draft) Table 6 Sequence A1 and Table 7 Sequence A1 for rated voltage U_0/U (U_m) 20,8/36(42) kV

Test result: All samples passed the test requirements in accordance with the CENELEC HD 629.1 S3:2015 (Draft) table 6 Sequence A1 and table 7 Sequence A1 for rated voltage U_0/U (U_m) 20,8/36(42) kV

Pages: 41

Tested by:	**Bayram Cataltepe** (Laboratory Technician)	Signature:	Date: 23.02.17
Prepared by:	**Christoph Baier** (Laboratory Manager)	Signature: Chr. Baier	Date: 23.02.17
Released by:	**Per Christian Olving** (Product Manager)	Signature:	Date: 23/2-17

Tyco Electronics Raychem GmbH
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Content

1 General information

1.1 Description of the test objects

Test objects:	4 indoor terminations type CSTI-6152-ML-7-13 installed on 500mm^2 (test objects A), 4 outdoor terminations type CSTO-6152-ML-7-13 installed on 500mm^2 (test objects B), 4 outdoor terminations type CSTO-6162-ML-8-21 installed on 1000mm^2 (test objects C)
Manufacturer:	TE Connectivity Kunshan PRC
TE kit reference:	CSTI-6152-ML-7-13, CSTO-6152-ML-7-13, CSTO-6162-ML-8-21
Part description:	CSTI-35-BD-32-583-FS, CSTO-35-BD-32-581-FS
Rated voltage U_0/U (U_m):	20,8/36 (42) kV
Connector type:	Mechanical cable lug type BLMT-500/630 MK2-13 (test object A and B), Mechanical cable lug type BLMT-800/1000-21 (test object C)
Installation instructions:	EPP-2828-2/17 (see **Appendix A.3**)
List of kit content:	See **Appendix A.4**

1.2 Description of the test cables

Length of each test loop:	3.5 m (without test object)
Cable type:	Single core cable with XLPE insulation, type VDE 0276 NA2XS(F)2Y (see **Appendix A.1**)
Cable conductor material:	Copper
Cable conductor cross-section:	500 mm^2
Rated voltage of cable U_0/U (U_m):	18/30 (36) kV

Length of each test loop:	3.5 m (without test object)
Cable type:	Single core cable with XLPE insulation, type Charleroi NEXANS EAXeCWB (see **Appendix A.2**)
Cable conductor material:	Aluminium
Cable conductor cross-section:	1000 mm^2
Rated voltage of cable U_0/U (U_m):	20.8/36(42) kV

1.3 Test standards

Requirements according to CENELEC HD 629.1 S3 from 2015-09 (Draft): *Test requirements on accessories for use on power cables of rated voltage from 3,6/6 (7,2) kV up to 20,8/36 (42) kV, Part 1: Cables with extruded insulation*; Table 6 Sequence A1 and Table 7 Sequence A1 for rated voltages U_0/U (U_m) 20,8/36(42) kV

1.4 Test facilities

The installation of the test objects as well as the electrical tests were carried out by technicians of Tyco Electronics Raychem GmbH in the High Voltage Laboratory in Ottobrunn/Germany.

1.5 Test dates

CSTI-6152-ML-7-13:	30.09.2016 – 16.12.2016
CSTO-6152-ML-7-13:	30.09.2016 – 25.01.2017
CSTO-6162-ML-8-21:	19.10.2016 – 06.02.2017

2 Test sequence and requirements

The test requirements are according to CENELEC HD 629.1 S3 from 2015-09 (Draft), Table 6 Sequence A1 and Table 7 Sequence A1 for rated voltage U_0/U (U_m) 20,8/36 (42) kV.

	Test	Test clause of EN 61442	Test requirements	Notes
1	AC voltage dry withstand	4	5 min at 93,5 kV, no breakdown	-
2	Partial discharge at ambient temperature	7	Max. 10 pC at 42 kV	-
3	Impulse voltage at elevated tempera-ture	6	10 impulses of each polarity at ±200 kV, target temperature 95 - 100°C, no breakdown	-
4	Heating cycle voltage in air	9	126 heat cycles, target tem-perature 95 - 100°C, 52 kV, no breakdown	-
5	Immersion	9.4	10 heat cycles, target temper-ature 95 - 100°C	Only required for outdoor terminations;
6	Partial discharge at elevated tempera-ture	7	Heating up, target tempera-ture 95 - 100°C, max. 10 pC at 42 kV	-
7	Partial discharge at ambient temperature	7	Max. 10 pC at 42 kV	-
8	Impulse voltage at ambient temperature	6	10 impulses of each polarity at ±200 kV, no breakdown	-
9	AC voltage dry withstand	4	5 min at 93,5 kV, no break-down	-
10	Partial discharge at ambient temperature	7	Max. 10 pC at 42 kV	-
11	Examination	-	-	-

3 Test setups

3.1 AC voltage dry withstand

The cable conductors of the test objects were connected to an AC voltage provided by a test transformer, the screens were put on ground potential (**Figure 1**). The voltage measurement was carried out with a capacitive divider. The measuring uncertainty within a range of 10 kV to 300 kV was 0.91%.

Technical data:

TT	Test transformer:	350 kV, 175 kVA, 50 Hz
C-Div	Capacitive divider:	75 pF (high voltage side)
TO	Test object	

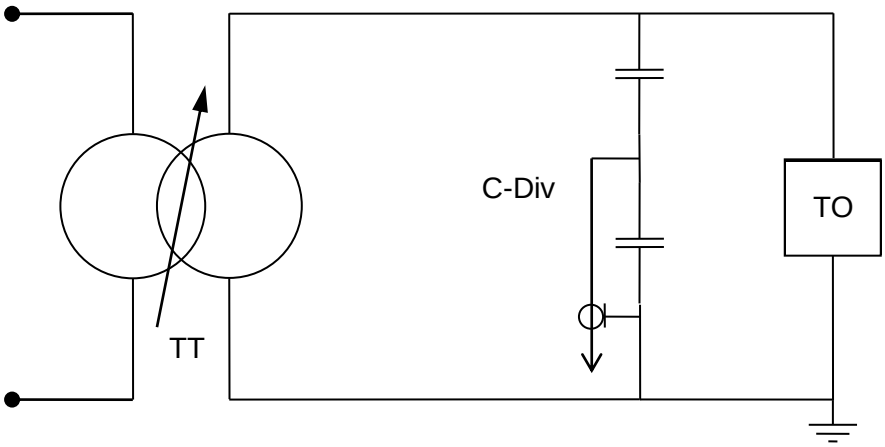


Figure 1: AC voltage dry withstand test setup

Measurement equipment:

Object	Type	Calibration number	Calibration date
Capacitive divider	TUR MCF 75/350 P	000132 D-K-17601-01-00	2015-03
Coaxial cable	-	000132 D-K-17601-01-00	2015-03
AC peak voltmeter	LDIC voltage unit	000132 D-K-17601-01-00	2015-03

3.2 Partial discharge at ambient temperature

The cable conductors of the test objects were connected to an AC voltage provided by a test transformer, the screens were put on ground potential (**Figure 2**). The voltage measurement was carried out with a capacitive divider. The measuring uncertainty within a range of 10 kV to 300 kV was 0.91%. For the extraction of the partial discharge (PD) signals, a coupling capacitor and a quadrupole (i.e. measuring impedance) were used. A coil was installed to block interferences coming from the transformer side of the test setup. Prior to the test, the complete test arrangement including the test object was calibrated using a PD-calibrator.

Technical data:

TT	Test transformer:	350 kV, 175 kVA, 50 Hz
C-Div	Capacitive divider:	75 pF (high voltage side)
C-C	Coupling capacitor:	1000 pF
Q	Quadrupole	
L	Coil	
TO	Test object	

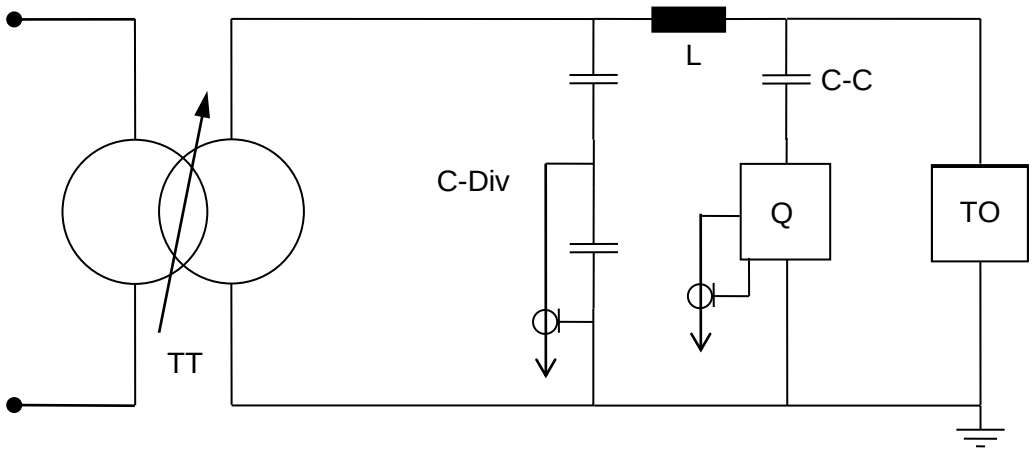


Figure 2: Partial discharge test setup

Measurement equipment:

Object	Type	Calibration number	Calibration date
Capacitive divider	TUR MCF 75/350 P	000132 D-K-17601-01-00	2015-03
Coaxial cable	-	000132 D-K-17601-01-00	2015-03
AC peak voltmeter	LDIC voltage unit	000132 D-K-17601-01-00	2015-03
PD-measurement system	LDIC LDD-5	calibrated with PD-calibrator	n/a
PD-calibrator	LDIC LDC-5	RY-1341 & verified with PD-calibrator tester	2016-06-01
PD-calibrator tester	LDIC LDT-5	RY-1222	2016-07-15

3.3 Partial discharge at elevated temperature

The cable conductors of the test objects were connected to an AC voltage provided by a test transformer, the screens were put on ground potential (**Figure 2**). The voltage measurement was carried out with a capacitive divider. The measuring uncertainty within a range of 10 kV to 300 kV was 0.92%. For the extraction of the partial discharge (PD) signals, a coupling capacitor and a quadrupole (i.e. measuring impedance) were used. A coil was installed to block interferences coming from the transformer side of the test setup. Prior to the test, the complete test arrangement including the test object was calibrated using a PD-calibrator. The test objects were installed in a way that a closed loop was formed, which could be heated using an induced AC current provided by a heating transformer supplied by a variable transformer. The cable should be heated to a conductor temperature 5 - 10 K above the maximum cable conductor temperature in operation, i.e. 95 - 100°C for XLPE-cables. The temperature of the cable conductor was measured in-line using a reference cable of the same type as the test loops with a length of 3 m, a type K thermocouple and fibre optical temperature measurement transmission systems. The current was measured by a clamp meter.

3.4 Impulse voltage

The cable conductors of the test objects were connected to a Marx-generator with 8 stages, a maximum cumulative charging voltage of 800 kV and a maximum impulse energy of 24 kJ, the screens were put on ground potential (**Figure 3**). The voltage measurement was carried out with a resistive-capacitive divider and an impulse measurement system. The measuring uncertainty for the voltage amplitude within a range of 50 kV to 450 kV was 0.88% and for the time max. 4.76%.

Technical data:

Configuration	4 times 2 parallel stages in series:	400 kV max. charging voltage
RC-Div	Damped capacitive divider:	670 pF, 100 Ω (high voltage side)
TO	Test object	

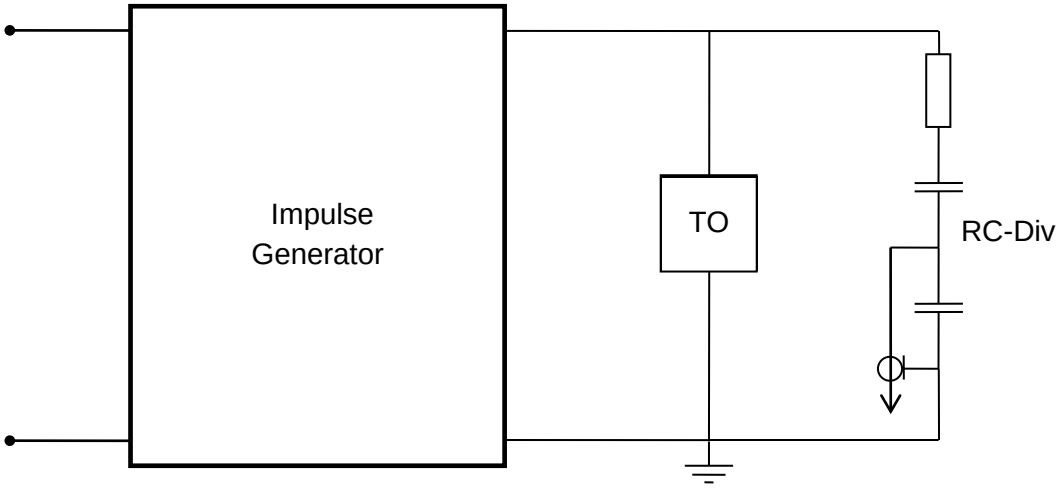


Figure 3: Impulse voltage test setup

Measurement equipment:

Object	Type	Calibration number	Calibration date
Damped capacitive divider	Haefely CS1000	000177 D-K-17601-01-00	2015-03
Coaxial cable	-	000177 D-K-17601-01-00	2015-03
Digital transient re-corder	Haefely DiAS 733	000177 D-K-17601-01-00	2015-03

3.5 Heating cycle voltage in air

The cable conductors of the test objects were connected to an AC voltage provided by a test transformer, the screens were put on ground potential (**Figure 4**).The voltage measurement was carried out with a capacitive divider. The measuring uncertainty within a range of 10 kV to 100 kV was 0.59%. The test objects were installed in a way that a closed loop was formed, which could be heated using an induced AC current provided by a heating transformer supplied by a variable transformer. The cable should be heated to a conductor temperature 5 - 10 K above the maximum cable conductor temperature in operation, i.e. 95 - 100°C for XLPE-cables. The temperature of the cable conductor was measured in-line using a reference cable of the same type as the test loops with a length of 3 m, a type K thermocouple and fibre optical temperature measurement transmission systems. The heating cycles were controlled by an automated regulation system.

Technical data:

TT	Test transformer:	100 kV, 100 kVA, 50 Hz
C-Div	Capacitive divider:	100 pF (high voltage side)
VT	Variable transformer:	230 V, 6.9 kVA, 50 Hz
HT	Heating transformer:	9.2 kVA
TC	Thermocouple:	Type K
TO	Test object	

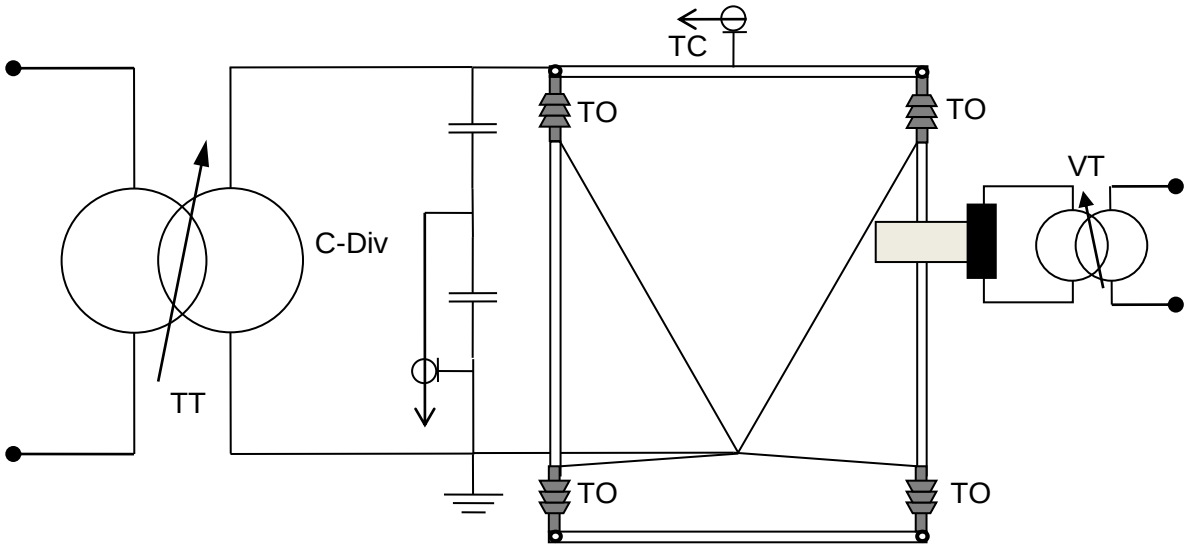


Figure 4: Heating cycle voltage test setup (exemplary for one cable cross section and one type of termination)

3.6 Immersion test for outdoor terminations

The test objects were installed in a way that a closed loop was formed, which could be heated using an induced AC current provided by a heating transformer supplied by a variable transformer. The cable should be heated to a conductor temperature 5 - 10 K above the maximum cable conductor temperature in operation, i.e. 95 - 100°C for XLPE-cables. The temperature of the cable conductor was measured in-line using a reference cable of the same type as the test loops with a length of 3 m, a type K thermocouple and fibre optical temperature measurement transmission systems. The heating cycles were controlled by an automated regulation system. The test objects were mounted upside down in a water tank with a water height of min. 0.3 m above every part of the termination.

4 Results

4.1 AC voltage dry withstand

Date: 2016-09-30 (Test object A and B)
Ambient temperature: 25°C
Ambient relative humidity: 33%
Ambient pressure: 962 hPa

Date: 2016-10-19 (Test object C)
Ambient temperature: 25°C
Ambient relative humidity: 43%
Ambient pressure: 955 hPa

Test objects	Test voltage û/√2	Duration	Result
A	93,3 kV	5 min	No breakdown
B			No breakdown
C	93,5 kV	5 min	No breakdown

Note: All test objects installed on the same cable cross section were tested simultaneously.
Requirement: No breakdown shall occur.
Result: All test objects passed the test.

4.2 Partial discharge at ambient temperature

Date: 2016-09-30 (Test object A and B)
Ambient temperature: 25°C
Ambient relative humidity: 33%
Ambient pressure: 962 hPa

Date: 2016-10-19 (Test object C)
Ambient temperature: 25°C
Ambient relative humidity: 43%
Ambient pressure: 955 hPa

Test object	Test voltage û/√2	Calibration charge	Noise	Result
A	42 kV	10 pC	≤ 3 pC	PD-level ≤ 3 pC
B	42 kV	10 pC	≤ 3 pC	PD-level ≤ 3 pC
C	42 kV	10 pC	≤ 3 pC	PD-level ≤ 3 pC

Note: All test objects of the same type of termination and cable cross section were tested simultaneously.
Requirement: Partial discharge level shall not exceed 10 pC.
Result: All test objects passed the test.

4.3 Impulse voltage at elevated temperature

The test object were exposed to 10 impulses of positive and negative polarity each. Before each series of 10 impulses, 3 calibration impulses of 50%, 65% and 80% of the test voltage level were applied. The recorded impulses are shown in **Figure 5** to **Figure 7**.

Date: 2016-10-12 (Test object A and B)
Ambient temperature: 25°C
Ambient relative humidity: 38%
Ambient pressure: 952 hPa

Date: 2016-10-25 (Test object C)
Ambient temperature: 25°C
Ambient relative humidity: 50%
Ambient pressure: 960 hPa

Test object	Voltage û	Front time	Time to half-value	Number of impulses	Result
A	±200 kV	1.773 µs to 1.786 µs	51.276 µs to 51.554 µs	10 of each polarity	No breakdown
B					No breakdown
C	±200 kV	1.175 µs to 1.178 µs	49.273 µs to 49.326 µs	10 of each polarity	No breakdown

Note: All test objects installed on the same cable cross section were tested simultaneously.
Requirement: Each test object shall withstand 10 positive and 10 negative impulses without breakdown.
Result: All test objects passed the test.

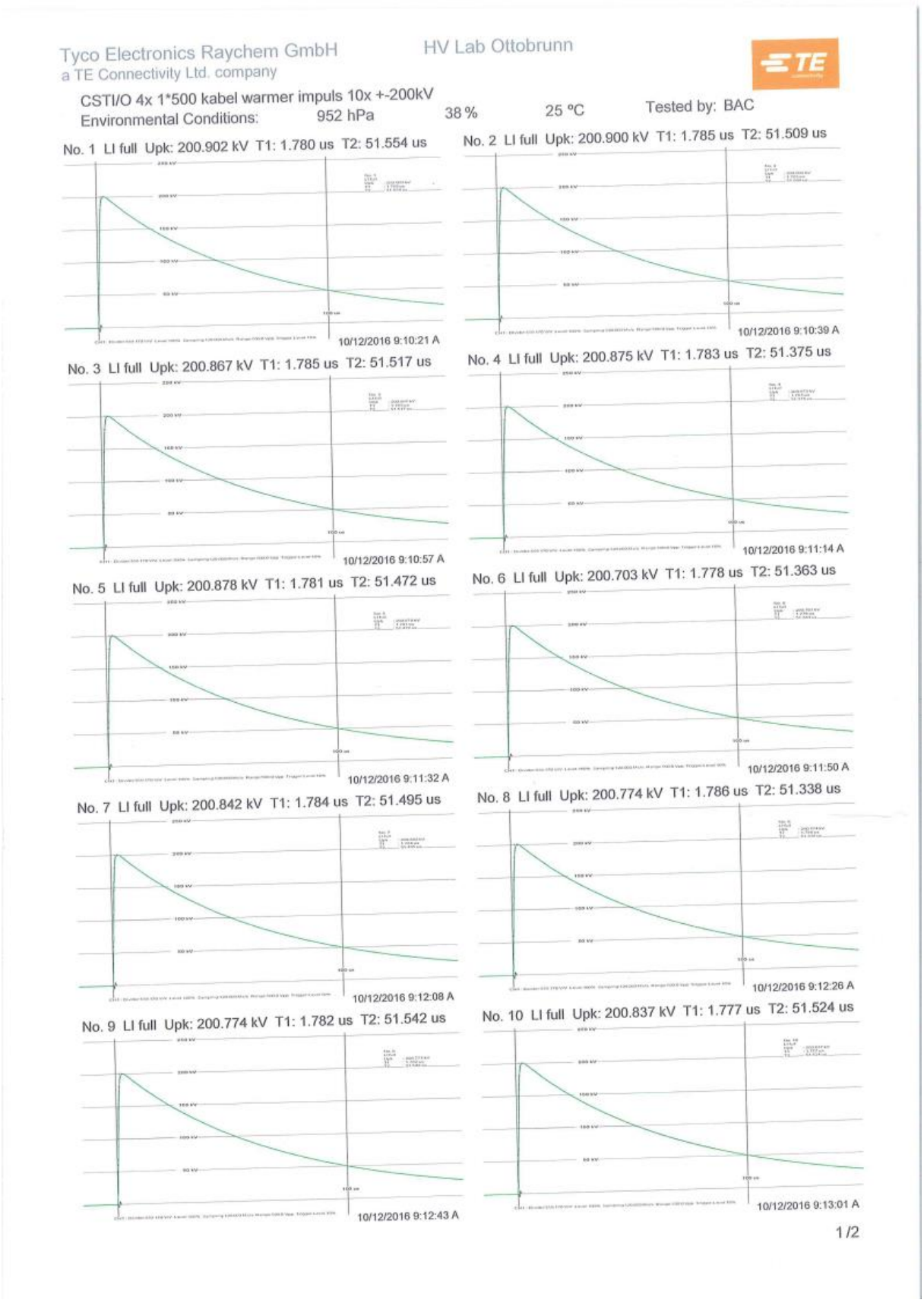


Figure 5: Positive impulses at elevated temperature on test objects A and B (500 mm^2)

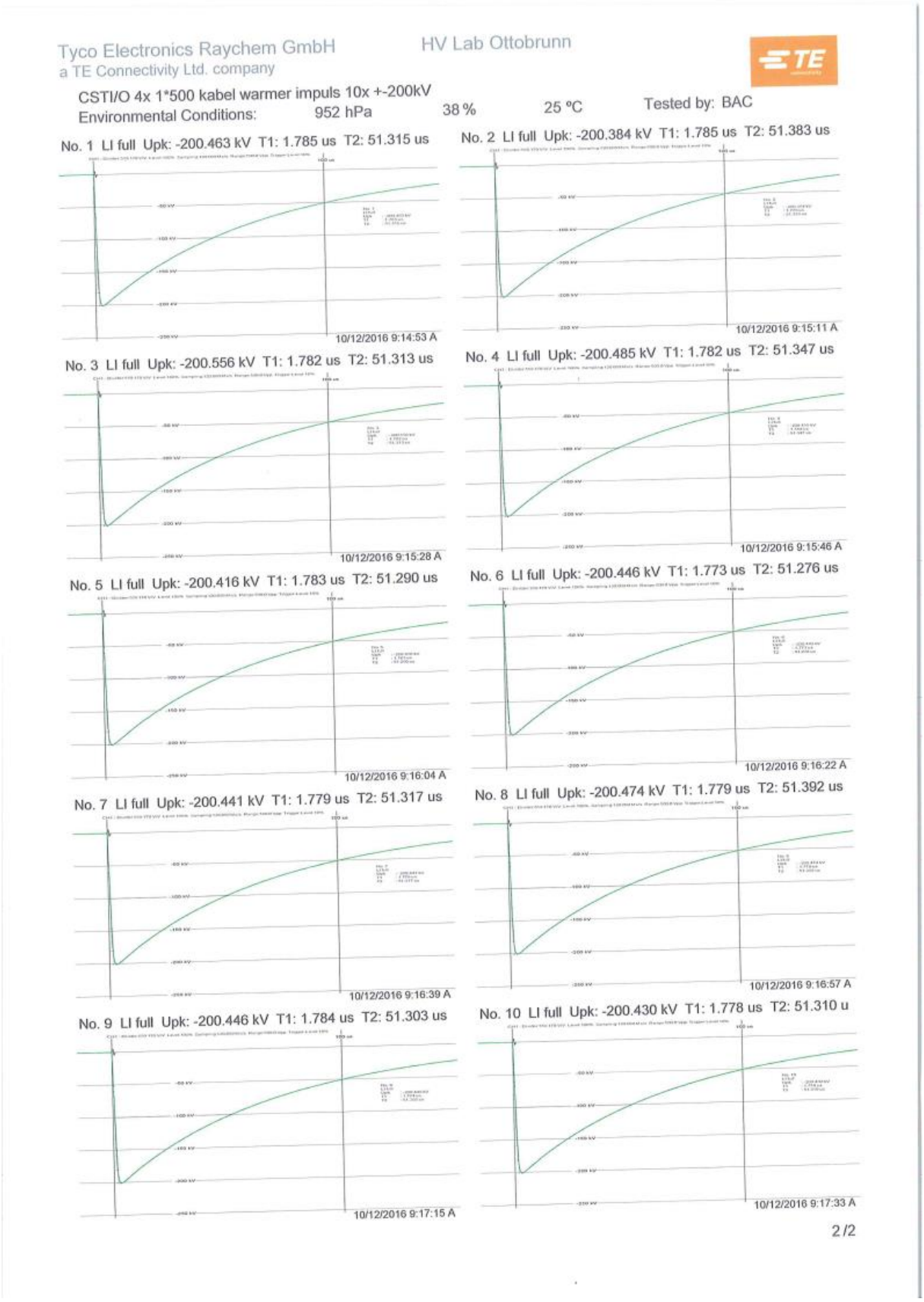


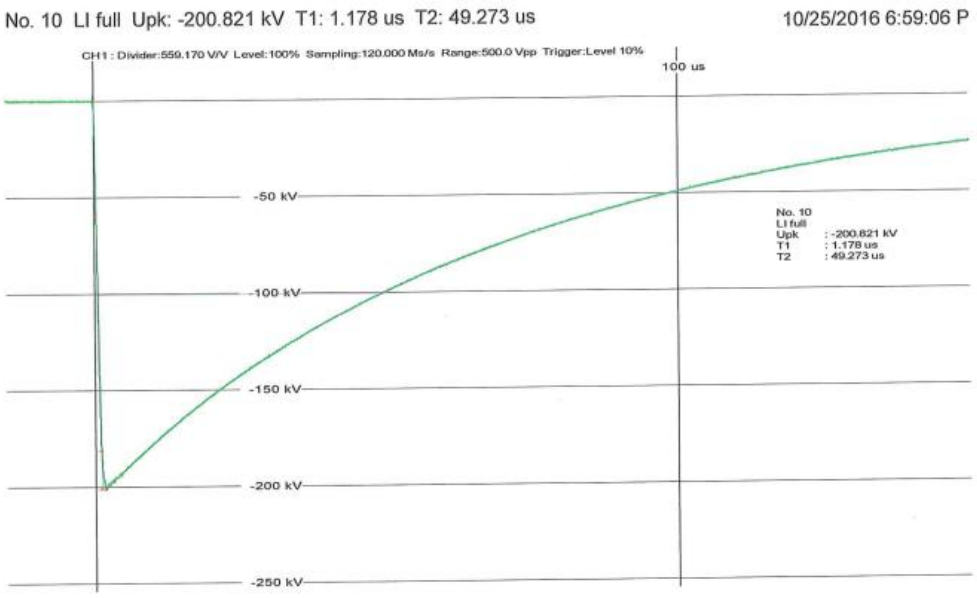
Figure 6: Negative impulses at elevated temperature on test objects A and B (500 mm²)

Tyco Electronics Raychem GmbH
a TE Connectivity Ltd. company

HV Lab Ottobrunn

CSTI-O 1000mm2 Loop 3+4 warmer Impuls +-200kV

Environmental Conditions: 960 hPa 50 % 25 °C Tested by: BAC



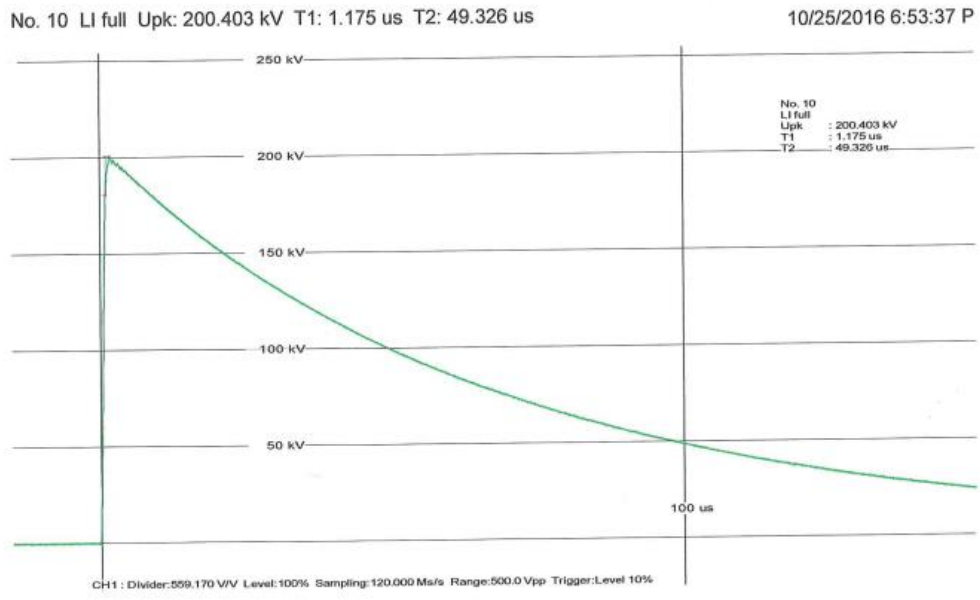


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Figure 7: 10th positive and 10th negative impulse at elevated temperature on test objects C (1000 mm²)

4.4 Heating cycle voltage in air

The recorded values of the test voltage, heating current, ambient temperature and cable conductor temperature are shown in **Figure 8** and **Figure 9**.

Date: 2016-10-14 to 2016-12-08 (test objects A and B)
2016-11-15 to 2016-12-29 (test object C)

Test object	Test voltage û/√2	Time of heating	Time of cooling	Number of cycles	Result
A	52 kV	5 h	3 h	126	No breakdown
B					No breakdown
C	52 kV	5 h	3 h	126	No breakdown

Note: All test objects installed on the same cable cross section were tested simultaneously.
Requirement: No breakdown shall occur.
Result: All test objects passed the test.

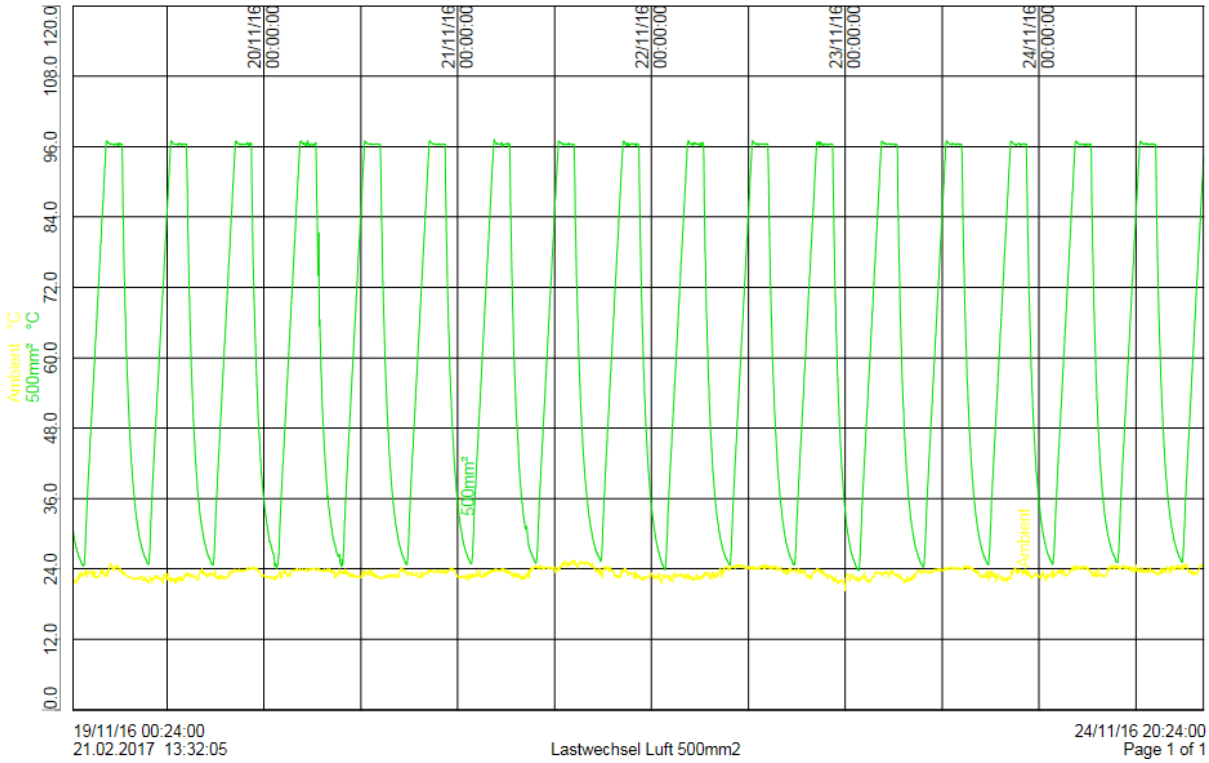


Figure 8: Recorded values of ambient temperature (yellow) and cable conductor temperature 500 mm2 (green) during heat cycle voltage test in air

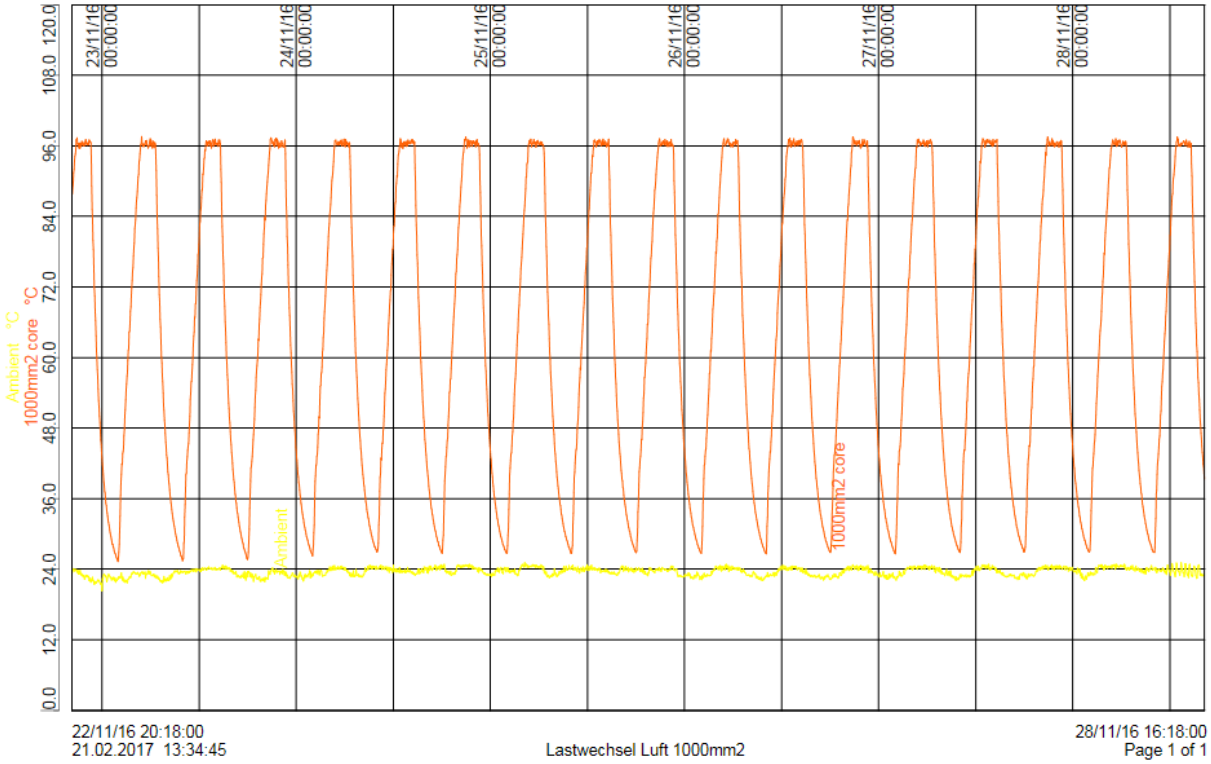


Figure 9: Recorded values of ambient temperature (yellow) and cable conductor temperature 1000 mm2 (orange) during heat cycle voltage test in air

4.5 Immersion test for outdoor terminations

The recorded values ambient temperature and cable conductor temperatures are shown in **Figure 10** and **Figure 11**.

Date: 2017-01-16 to 2017-01-24 (test object B)
2017-01-24 to 2017-02-03 (test object C)

Test object	Time of heating	Time of cooling	Number of cycles	Result
A	n/a			-
B	5 h	3 h	10	Ok
C	5 h	3 h	10	Ok

Note: Based on the large cable-cross section and the test setup only two test objects have been tested in parallel. Therefore in total 20 cycles are shown on **Figure 10** and **Figure 11**.

Result: All test objects passed the test.

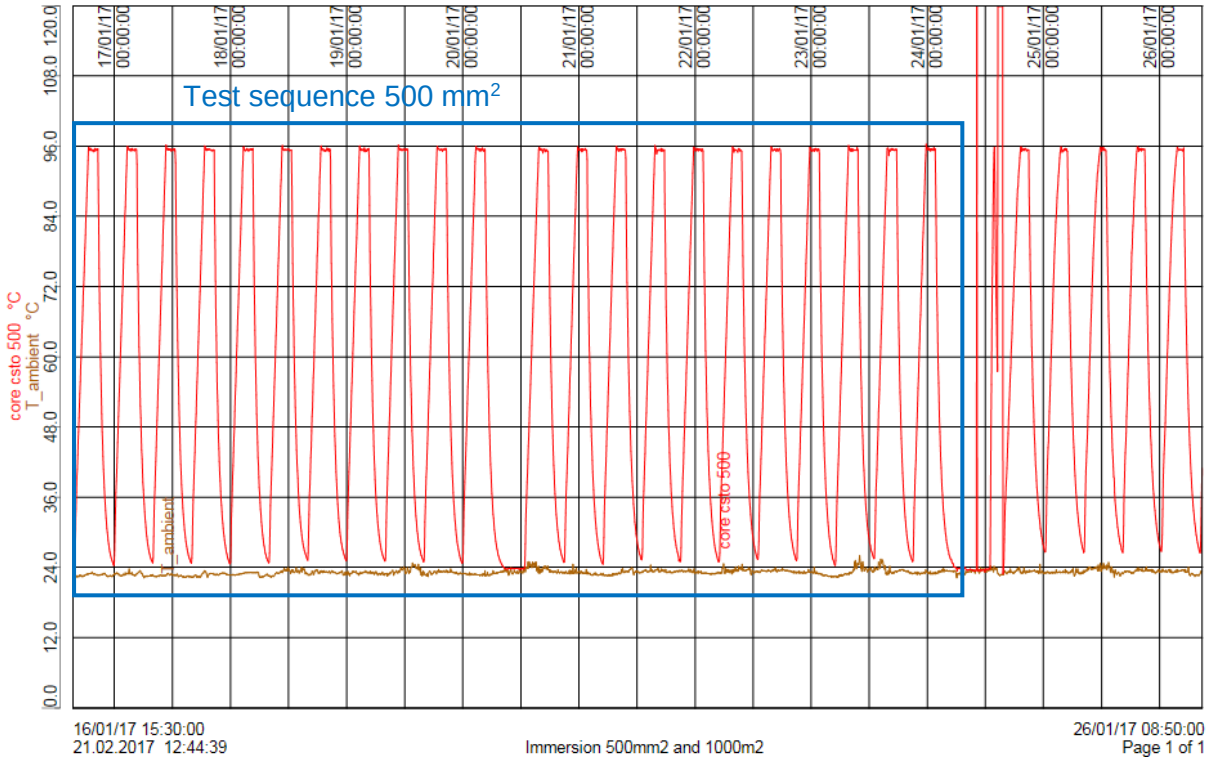


Figure 10: Recorded values of ambient temperature (brown) and cable conductor temperature 500 mm² (red) during immersion test of test objects B

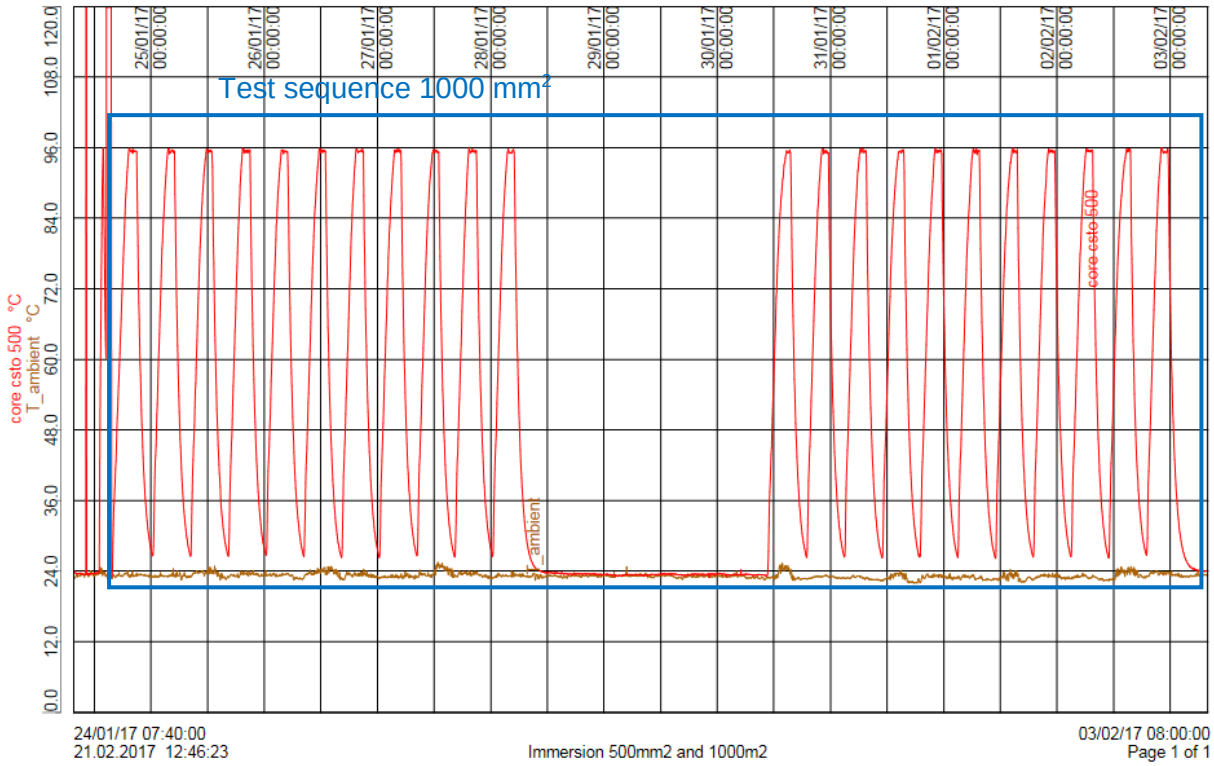


Figure 11: Recorded values of ambient temperature (brown) and cable conductor temperature 1000 mm² (red) during immersion test of test objects C

4.6 Partial discharge at elevated and ambient temperature

4.6.1 Elevated temperature

Date: 2016-12-15 (Test object A)
Ambient temperature: 25°C
Ambient relative humidity: 33%
Ambient pressure: 960 hPa

Date: 2017-01-24 (Test object B)
Ambient temperature: 25°C
Ambient relative humidity: 33%
Ambient pressure: 960 hPa

Date: 2017-02-03 (Test object C)
Ambient temperature: 25°C
Ambient relative humidity: 33%
Ambient pressure: 945 hPa

Test object	Test voltage û/√2	Time of heating	Calibration charge	Noise	Result
A	42 kV	5 h	10 pC	≤ 3 pC	PD-level ≤ 3 pC
B					PD-level ≤ 3 pC
C	42 kV	5 h	10 pC	≤ 3 pC	PD-level ≤ 3 pC

Note: All test objects installed on the same cable cross section were tested simultaneously.
Requirement: Partial discharge level shall not exceed 10 pC.
Result: All test objects passed the test.

4.6.2 Ambient temperature

Date: 2016-12-15 (Test object A)
Ambient temperature: 25°C
Ambient relative humidity: 33%
Ambient pressure: 960 hPa

Date: 2017-01-25 (Test object B)
Ambient temperature: 25°C
Ambient relative humidity: 33%
Ambient pressure: 960 hPa

Date: 2017-02-06 (Test object C)
Ambient temperature: 23°C
Ambient relative humidity: 33%
Ambient pressure: 950 hPa

Test object	Test voltage û/√2	Calibration charge	Noise	Result
A	42 kV	10 pC	≤ 3 pC	PD-level ≤ 3 pC
B	42 kV	10 pC	≤ 4 pC	PD-level ≤ 4 pC
C	42 kV	10 pC	≤ 4 pC	PD-level ≤ 4 pC

Note: All test objects of the same type of termination and cable cross section were tested simultaneously.
Requirement: Partial discharge level shall not exceed 10 pC.
Result: All test objects passed the test.

4.7 Impulse voltage at ambient temperature

The test object were exposed to 10 impulses of positive and negative polarity each. Before each series of 10 impulses, 3 calibration impulses of 50%, 65% and 80% of the test voltage level were applied. The recorded impulses are shown in **Figure 12** to **Figure 17**.

Date: 2016-12-16 (Test object A)
Ambient temperature: 25°C
Ambient relative humidity: 33%
Ambient pressure: 963 hPa

Date: 2017-01-25 (Test object B)
Ambient temperature: 25°C
Ambient relative humidity: 33%
Ambient pressure: 960 hPa

Date: 2017-02-06 (Test object C)
Ambient temperature: 23°C
Ambient relative humidity: 33%
Ambient pressure: 950 hPa

Test object	Voltage û	Front time	Time to half-value	Number of impulses	Result
A	±200 kV	1.375 µs to 1.443 µs	50.404 µs to 50.651 µs	10 of each polarity	No breakdown
B	±200 kV	1.400 µs to 1.422 µs	50.537 µs to 50.667 µs	10 of each polarity	No breakdown
C	±200 kV	1.204 µs to 1.251 µs	49.907 µs to 50.143 µs	10 of each polarity	No breakdown

Note: All test objects of the same type of termination and cable cross section were tested simultaneously.
Requirement: Each test object shall withstand 10 positive and 10 negative impulses without breakdown.
Result: All test objects passed the test.

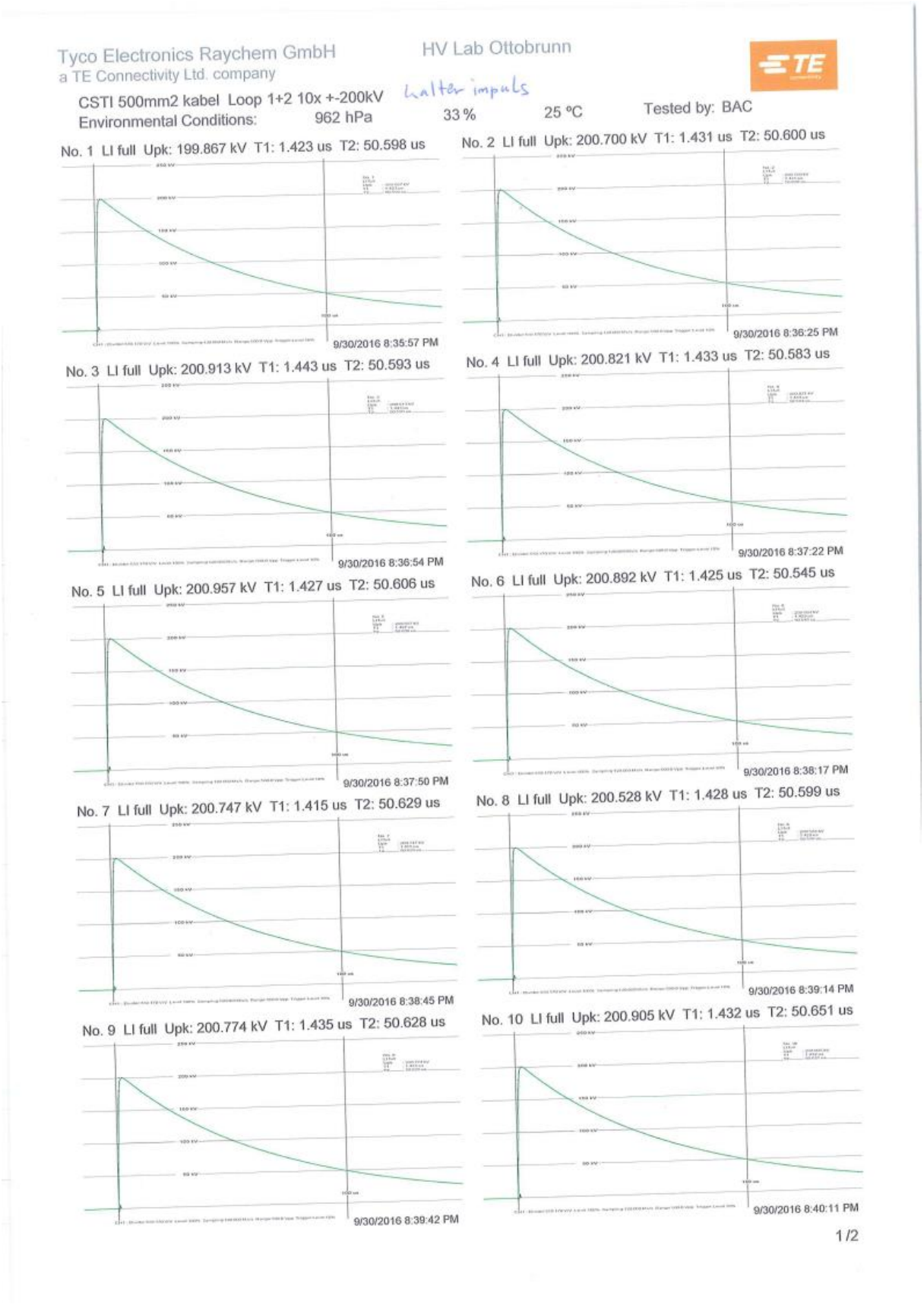


Figure 12: Positive impulses at ambient temperature on test object A (500 mm^2)

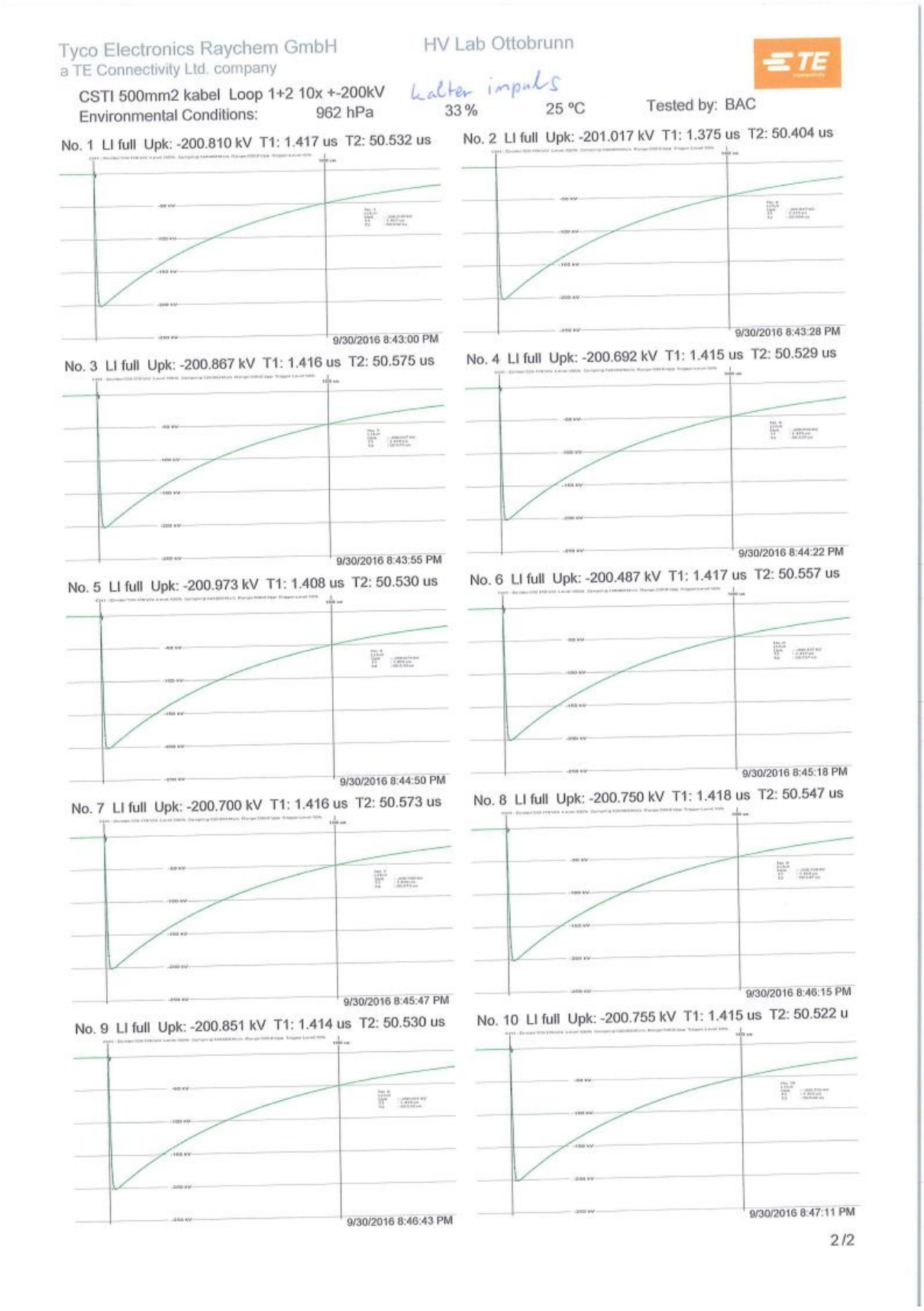


Figure 13: Negative impulses at ambient temperature on test object A (500 mm²)

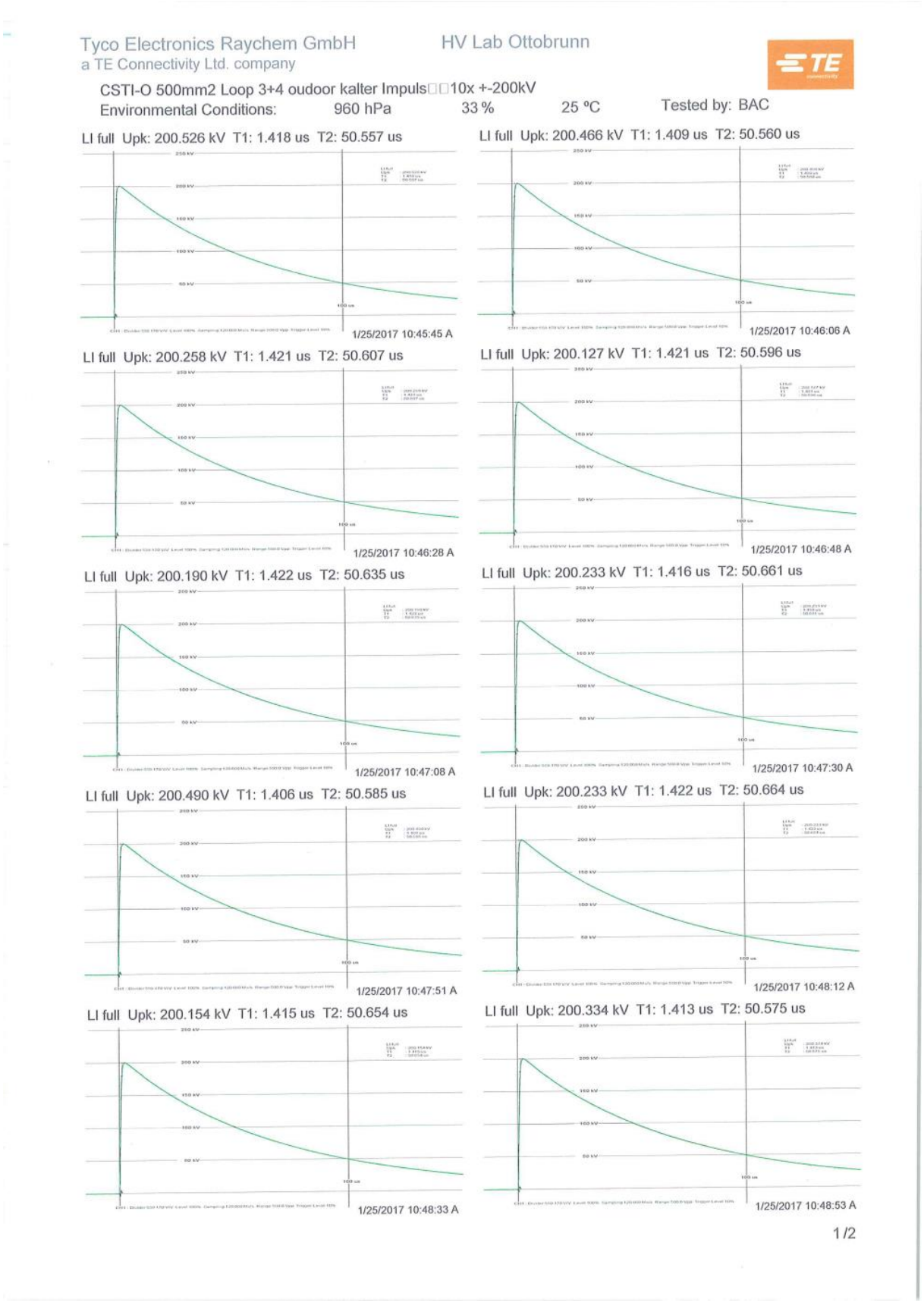


Figure 14: Positive impulses at ambient temperature on test object B (500 mm^2)

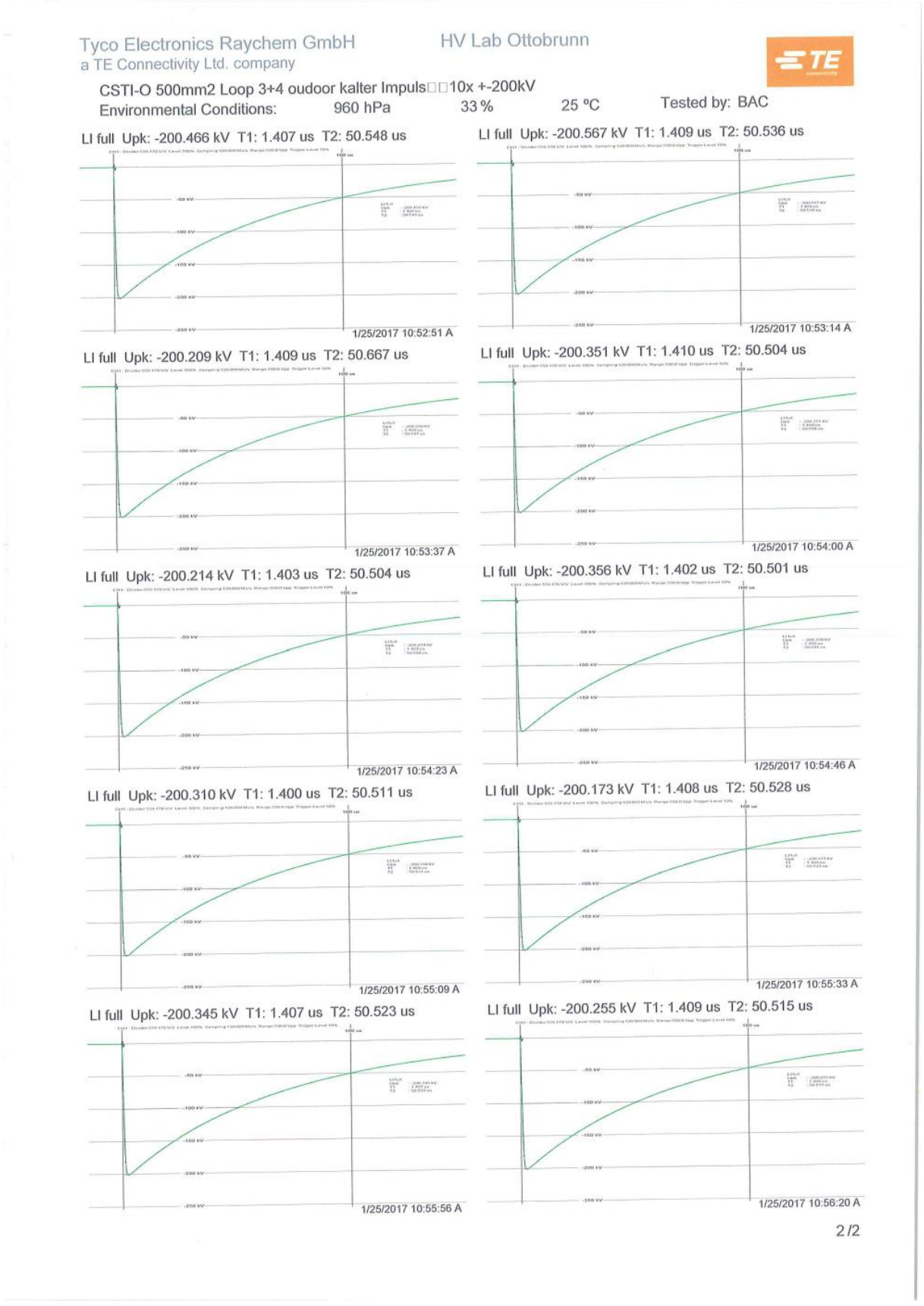


Figure 15: Negative impulses at ambient temperature on test object B (500 mm²)

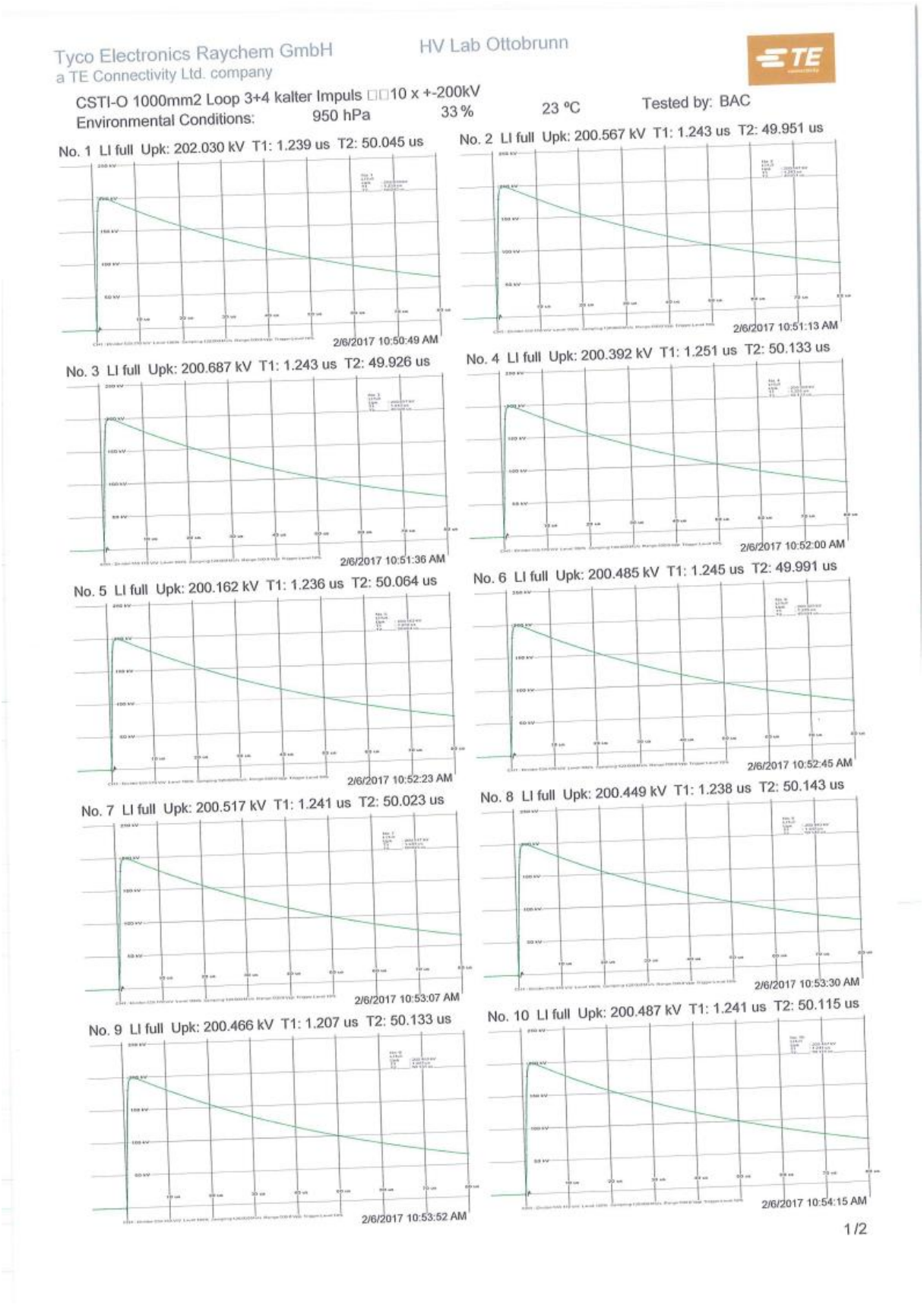


Figure 16: Positive impulses at ambient temperature on test object C (1000 mm²)

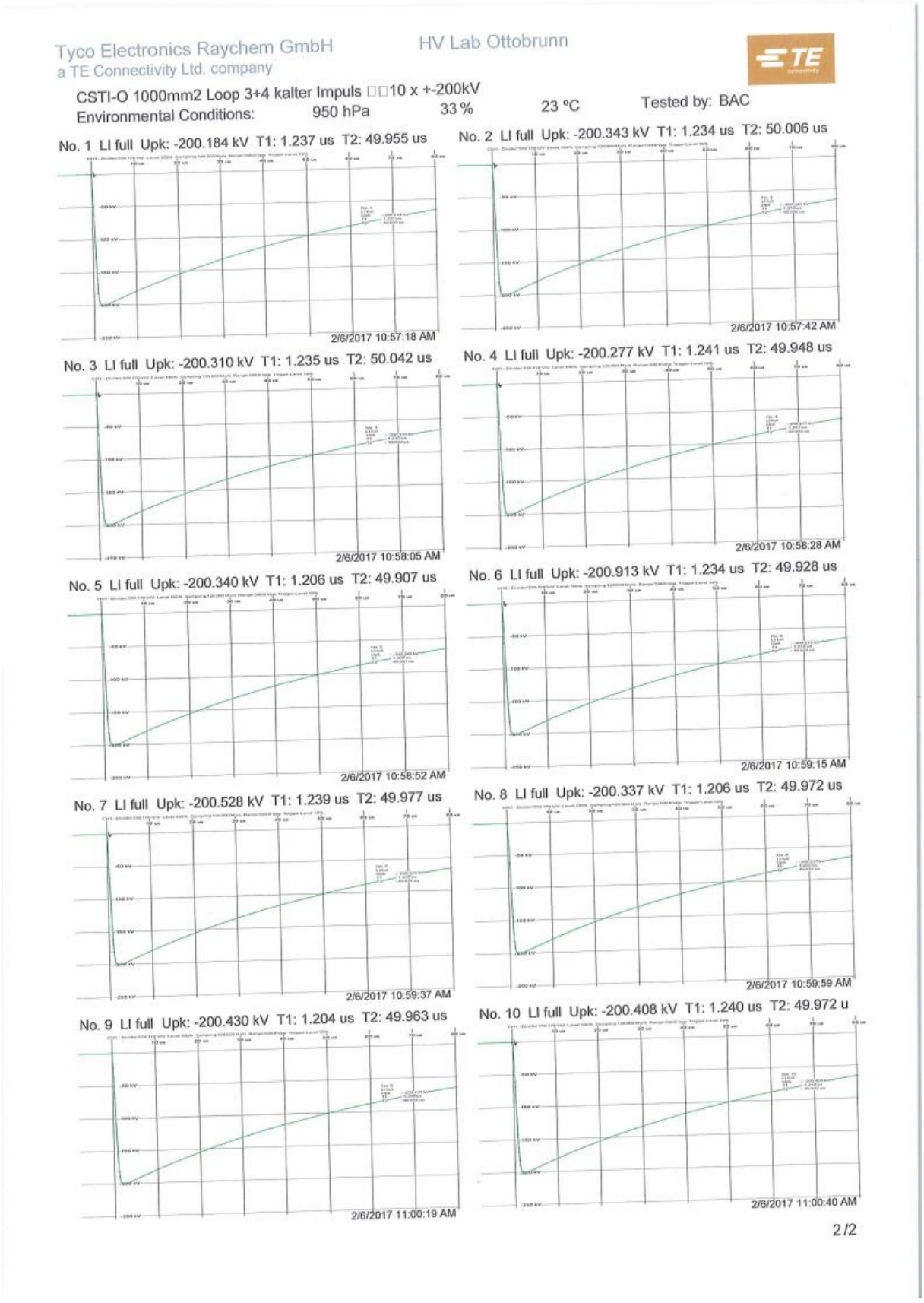


Figure 17: Negative impulses at ambient temperature on test object C (1000 mm^2)

4.8 AC voltage dry withstand

Date: 2016-12-16 (Test object A)
Ambient temperature: 25°C
Ambient relative humidity: 33%
Ambient pressure: 963 hPa

Date: 2017-01-25 (Test object B)
Ambient temperature: 25°C
Ambient relative humidity: 33%
Ambient pressure: 960 hPa

Date: 2017-02-06 (Test object C)
Ambient temperature: 23°C
Ambient relative humidity: 33%
Ambient pressure: 950 hPa

Test object	Test voltage û/√2	Duration	Result
A	93,5 kV	5 min	No breakdown
B			No breakdown
C	93,5 kV	5 min	No breakdown

Note: All test objects installed on the same cable cross section were tested simultaneously.
Requirement: No breakdown shall occur.
Result: All test objects passed the test.

4.9 Partial discharge at ambient temperature

Date: 2016-12-16 (Test object A)
Ambient temperature: 25°C
Ambient relative humidity: 33%
Ambient pressure: 963 hPa

Date: 2017-01-25 (Test object B)
Ambient temperature: 25°C
Ambient relative humidity: 33%
Ambient pressure: 960 hPa

Date: 2017-02-06 (Test object C)
Ambient temperature: 23°C
Ambient relative humidity: 33%
Ambient pressure: 950 hPa

Test object	Test voltage û/√2	Calibration charge	Noise	Result
A	42 kV	10 pC	≤ 4 pC	PD-level ≤ 4 pC
B	42 kV	10 pC	≤ 4 pC	PD-level ≤ 4 pC
C	42 kV	10 pC	≤ 4 pC	PD-level ≤ 4 pC

Note: All test objects of the same type of termination and cable cross section were tested simultaneously.
Requirement: Partial discharge level shall not exceed 10 pC.
Result: All test objects passed the test.

4.10 Examination

Date: 2017-02-10 (CSTI-6152-ML-7-13, CSTO-6152-ML-7-13)
2017-02-10 (CSTO-6162-ML-8-21)

The test samples were examined for the following criteria:
(i) cracking in the filling media and/or tape or tube components
(ii) a moisture path bridging a primary seal
(iii) corrosion and/or tracking and/or erosion
(iv) leakage of any insulating material

Test object	Criteria (i)	Criteria (ii)	Criteria (iii)	Criteria (iv)
A	Not found	Not found	Not found	Not found
B	Not found	Not found	Not found	Not found
C	Not found	Not found	Not found	Not found

A. Appendices

A.1 Identification of test cable 500 mm^2

Rated voltage U_0/U (U_m): 18/30 (36) kV

Cable construction:	☒ 1-core	☐ 3-core	☐ Individually screen
			☐ Overall screen
Conductors:	☒ Al	☐ Cu	
	☒ Stranded	☐ Solid	
	☒ Circular	☐ Shaped	
	☐ 120mm^2	☐ 150mm^2	☐ 185mm^2
	☐ 240mm^2		
	☒ Other cross section:	500 mm^2	
Insulation:	☒ XLPE	☐ Other:	
	☐ EPR	☐ HEPR	
Insulation screen:	☒ Bonded	☐ Strippable	
Metallic screen:	☒ Wires	☐ Tapes	☐ Extruded
	☐ Al	☒ Cu	☐ Other
Armour:	☐ Wire	☐ Tape	
Oversheath:	☐ PVC	☒ PE (state type)	
Water blocking, if any:	☐ Within conductor	☒ Under oversheath	
Diameters:	Conductor:	26.0 mm	
	Insulation:	43.1 mm	
	Insulation screen:	44.7 mm	
	Oversheath:	52.4 mm	
Cable marking:	VDE0276 NA2XS(F)2Y 1 x 500/35RM 18/30kV 2015 FACAB 06201		

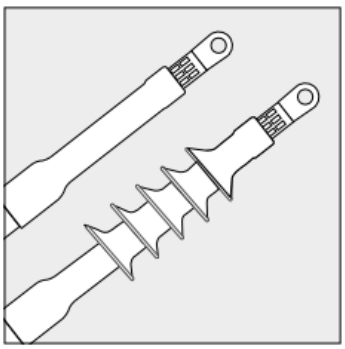
A.2 Identification of test cable 1000 mm^2

Rated voltage U_0/U (U_m): 20.8/36 (42) kV

Cable construction:	☒ 1-core	☐ 3-core	☐ Individually screen
			☒ Overall screen
Conductors:	☒ Al	☐ Cu	
	☒ Stranded	☐ Solid	
	☒ Circular	☐ Shaped	
	☐ 120mm^2	☐ 150mm^2	☐ 185mm^2
	☐ 240mm^2		
	☐ Other cross section:	1000 mm^2	
Insulation:	☒ XLPE	☐ Other:	
	☐ EPR	☐ HEPR	
Insulation screen:	☒ Bonded	☐ Strippable	
Metallic screen:	☒ Wires	☐ Tapes	☐ Extruded
	☐ Al	☒ Cu	☐ Other
Armour:	☐ Wire	☐ Tape	
Oversheath:	☐ PVC	☒ PE (state type)	
Water blocking, if any:	☐ Within conductor	☒ Under oversheath	
Diameters:	Conductor:	40.0 mm	
	Insulation:	53.5 mm	
	Insulation screen:	56.0 mm	
	Oversheath:	65.5 mm	
Cable marking:	Charleroi NEXANS EAXeCWB 20.8/36(42)kV 1 x 1000/35 6.0mm 2010		

A.3 Installation instructions

Raychem
from TE Connectivity



Installation Instruction
EPP-2828-2/17

Raychem
Termination for Screened
Single Core Polymeric Cable
without Armour

Type: CSTI/CSTO
Indoor/Outdoor

36 kV / 42 kV

To view the TE Energy website:

Tyco Electronics Raychem GmbH
a TE Connectivity Ltd. Company
TE Energy
Finsinger Feld 1
85521 Ottobrunn/Munich, Germany
Tel: +49-89-6089-0
Fax: +49-89-6096-345
energy.te.com

Before Starting

Check to ensure that the kit you are going to use fits the cable.

Refer to the kit label and the title of the installation instructions.

Components or working steps may have been modified since you last installed this product.

Carefully read and follow the steps in the installation instructions.

General Instructions

Clean and degrease all parts that will come into contact with adhesive.

If a solvent is used follow the manufacturer's handling instructions.

Check core preparation dimensions before installing the termination.

Grease the prepared cable only with the provided grease.

Check cable ends for ingress of moisture before starting with cable preparation.

For easy strip screen layers always use a round file to cut radially through the core screen.

Cable Preparation

Before Starting

Check to ensure that the kit you are going to use fits the cable.
Refer to the kit label and the title of the installation instruction.
Components or work steps may have been improved since you last installed this product.
Carefully read and follow the steps in the installation instruction.

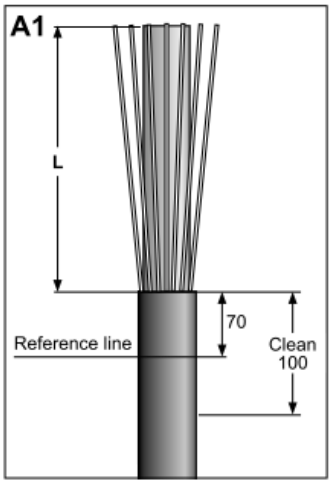
Table for cutback dimensions

	Cable	L
Mechanical lug BLMT	**Cross Section AL / Cu**	**Indoor/Outdoor 36 kV/42 kV**
	mm²	**mm**
BLMT 25/95	**95**	**435**
BLMT 35/150	**50**	**460**
BLMT 35/150	**95**	**450**
BLMT 35/150	**150**	**450**
BLMT 95/240	**120**	**430**
BLMT 95/240	**185**	**450**
BLMT 95/240	**240**	**440**
BLMT 185/400	**185**	**475**
BLMT 185/400	**400**	**445**
BLMT 500/630	**500**	**485**
BLMT 500/630	**630**	**485**
BLMT 800/1000	**1000**	**460**

For cable cross section 50 - 630 mm²

Cut the cable to the required length. Remove the oversheath according to **L**. Clean and degrease the end of the oversheath for approximately 100 mm.

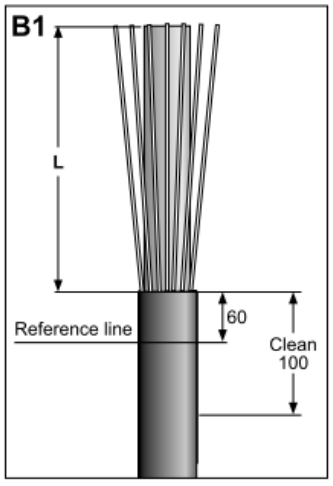
Mark a line 70 mm below the oversheath cut.



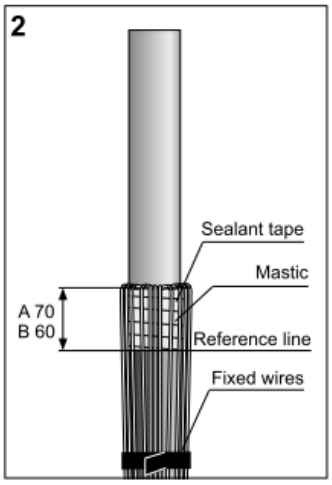
For cable cross section 800 - 1000 mm²

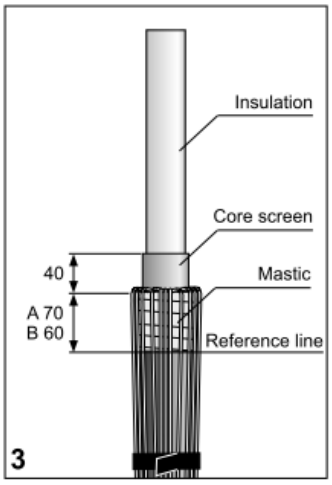
Cut the cable to the required length. Remove the oversheath according to **L**. Clean and degrease the end of the oversheath for approximately 100 mm.

Mark a line 60 mm below the oversheath cut.



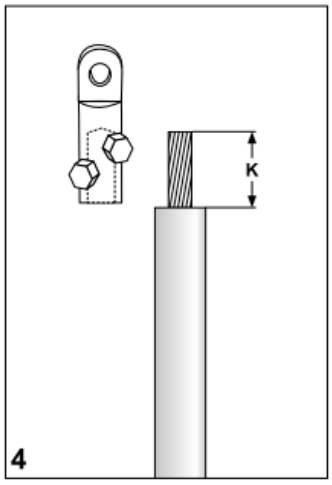
Wrap two layers of sealant tape (grey) with a small overlap and slight tension around the end of the oversheath as shown. Bend the shielding wires back onto the oversheath. Avoid crossing the individual wires. Fix the shielding wires with a tape to the oversheath.



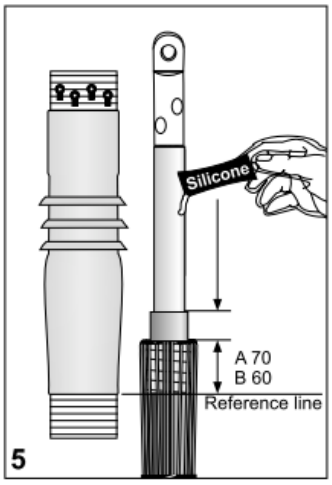


Thoroughly remove the core screen to within 40 mm of the oversheath cut. The surface of the insulation should be free from all traces of conductive material.
Smooth out any irregularities.

Note: Do not nick the insulation.



Cut back the insulation according to **Mechanical lugs:**
K = depth of cable lug barrel hole
Install the cable lug and remove all sharp edges. Clean and degrease the core insulation and the lug.



Apply a thin layer of silicone grease onto the insulation and the core screen cut.

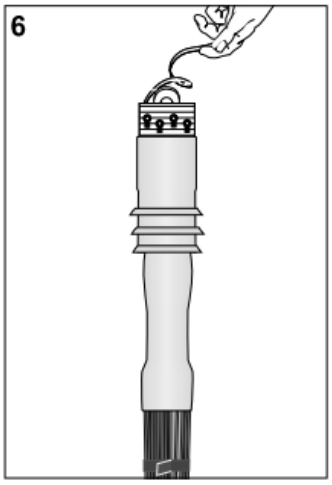
Position the termination body.

Pull the spiral gently until the termination body butts to the reference line.

If the termination is not correctly positioned, it is possible to gently slide it into place.

Remove the spiral holdout completely from the termination by pulling it counterclockwise.

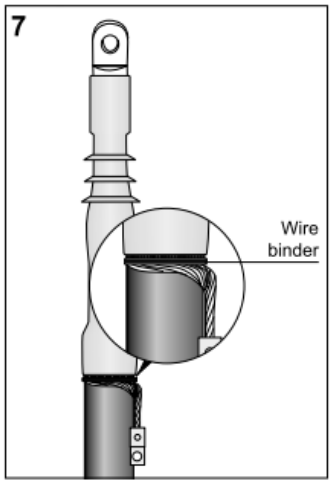
Do not twist the spiral holdout during removal. Avoid the spiral to hook up over the termination.



Degrease and clean the termination.

Fix the shield wires with a wire binder along the lower edge of the termination body. Install the cable lug on the shield wires.

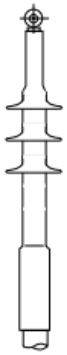
Termination completed.



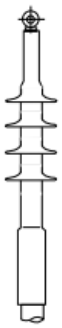
Please dispose of all waste according to local environmental regulations.

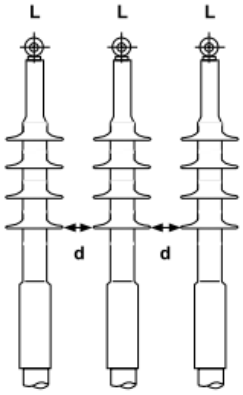
CSTI/CSTO – Product family

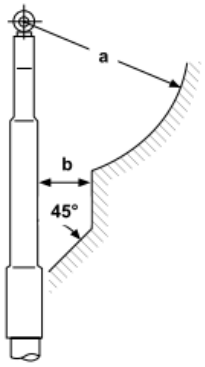
Indoor



Outdoor







Min. clearances	Max. system voltage in kV	
	36	42
a Air clearance	as for local specifications	
b ph/ph and ph/ground in mm	35	45
d Between skirts in mm	25	35

A.4 Kit content lists

CSTO-6152-ML-7-13

1	482406-000	S1278-1-300(B100)
2	EK3103-001	EPP-2828-8/16
3	E74727-000	EPPA-004
4	724277N001	EXRM-0568
5	CV2903-000	EPPA-076-5
6	989771-000	EPPA-029-3-3000
7	E43601-000	HEL-2070.1-Z-AK
8	2107410-1	BLMT-500/630 MK2-13
9	2304322-6	CSTO-35-BD-32-581-FS

CSTI-6152-7-13

1	482406-000	S1278-1-300(B100)
2	EK3103-001	EPP-2828-8/16
3	E74727-000	EPPA-004
4	724277N001	EXRM-0568
5	CV2903-000	EPPA-076-5
6	989771-000	EPPA-029-3-3000
7	E43601-000	HEL-2070.1-Z-AK
8	2107410-1	BLMT-500/630 MK2-13
9	2304321-6	CSTI-35-BD-32-583-FS

CSTO-6162-ML-8-21

1	482406-000	S1278-1-300(B100)
2	EK3103-001	EPP-2828-8/16
3	E74727-000	EPPA-004
4	724277N001	EXRM-0568
5	CV2903-000	EPPA-076-5
6	989771-000	EPPA-029-3-3000
7	E43601-000	HEL-2070.1-Z-AK
8	2304322-6	CSTO-35-BD-32-581-FS
9	2832081-2	BLMT-800/1000-21