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DAT-P-027/92-01

RWE Eurotest GmbH
ELEKTROTECHNISCHES PRÜFLABORATORIUM

RWE

Test report

No.: 03.08.22.154 **Version: 2/2**

Client	:	Euromold N.V. Industriezone Zuid III Industrielaan 12 B-9320 Erembodegem
Object tested	:	Shrink straight joint 0,6/1 kV
Type	:	SVME 4 x 35 - 150 mm²
Manufacturer	:	Euromold n.V.
Date received	:	15.08.2003
Date of Test	:	19.08.2003
Applied test regulations	:	DIN VDE 0278-623:1997-01(HD 623 S1:1996-02)
Test carried out	:	Type test
Test result	:	The shrink straight joint 0,6/1 kV , type SVME 4 x 35 -150 mm² manufactured by Euromold N.V. qualified in the type test according to DIN VDE 0278-623:1997-01(HD 623 S1:1996-02)
Specialist testers	:	Mr. A. Cichowski, Mr. Ch. Pieper, Mr. H. Walter

Dortmund, 10.11.2003

Mr. D. Borneburg
(Manager test laboratory)

Mr. M. Hassan
(Assistant manager test laboratory)

Report No. 03.08.22.154 contains 8 pages and 5 annex.

ВЯРНО С ОРИГИНАЛА

*) Scope of accredition an type of documentation see overleaf. Test results in this report are only valid fort he tested objects.
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Summary

RWE Eurotest GmbH carried out a type test according to DIN VDE 0278-623:1997-01 (HD623 S1:1996-02) on the shrink straight joint 0,6/1 kV, type SVME 4 x 35 -150 mm² manufactured by Euromold N.V.

The shrink straight joint 0,6/1 kV, type SVME 4 x 35 -150 mm² manufactured by Euromold N.V. qualified in the type test according to DIN VDE 0278-623:1997-01(HD 623 S1:1996-02) (Table 3).

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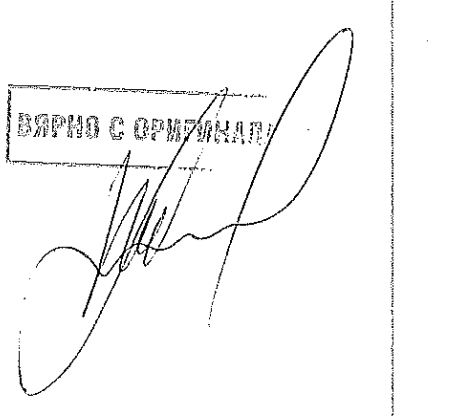
02a Heavy wall insulating tubes (2 sheet)
02b Medium wall insulating tubes (2 sheet)
03 Mechanical connector:
Type: 150 ALU-ZE and 35 ALU-ZE (1 sheet)
04 Load cycling in air
a) NA2XY-J 4x150 SE (1 sheet)
b) NA2XY-J 4x35 RE (1 sheet)
05 Load cycling in water
a) NA2XY-J 4x150 SE (1 sheet)
b) NA2XY-J 4x35 RE (1 sheet)



1. Applied test regulations

[DIN VDE 0278-623:1997-01

Power cable accessories with rated voltages *U*
up to 30 kV (*Um* up to 36 kV)
Part 623: Specification for joints, stop ends and outdoor terminations for distribution cables of rated voltage 0,6/1 kV;
German version HD 623 S1:1996-02

2. Technical data of the specimen

Shrink straight joint 0,6/1 kV:

Manufacturer:	Euromold N.V.
Type:	SVME 4 x 35 - 150 mm²
- outer sleeve type: GT 4-90	DSRTK 85 / 25 (Annex 02a)
- inner sleeve type: GT 3-30	MSRTK 25 / 8 (Annex 02b)
Designation:	Non-rigid straight joint
Manufacturing date:	2003
Maximum conductor cross section:	150 mm²
- material:	Aluminium
- shape of conductor:	shaped, solid
Minimum conductor cross section:	35 mm²
- material:	Aluminium
- shape of conductor:	round, solid
Largest cable diameter:	48 mm
Smallest cable diameter:	30 mm
Rated voltage U_0/U (U_m):	0,6/1,0 (1,2) kV
Installation instruction:	Annex 01

Connector:

Non-tension compression joint

for largest conductor size:
Cat. no. 150 ALU – ZE (Annex 03)

for smallest conductor size: mechanical connector
Cat. no. 35 ALU – ZE (Annex 03)

Manufacturer: Gerhard Petri GmbH & Co KG

Test cable:

The technical data of the cables used in the tests, the largest conductor size and the smallest conductor size, are summarized in table 2.

Specification	Test cable	
	largest conductor size	Smallest conductor size
Manufacturer	Pirelli Kabel	Pirelli Kabel
Standard	DIN VDE 0276-603: 2000-05	
Rated voltage	0,6 / 1 kV	
Cable construction	4-core, individually screened	
Conductors	Aluminium, solid	
	150 mm² shaped	35 mm² round
Insulation	XLPE	
Oversheath	PVC	
Water blocking	None	
Cable marking	Protothen NA2XY-J 4x150 SE	Protothen NA2XY-J 4x35 RE
Principal dimensions of cable	corresponding to DIN VDE 0276-603: 2000-05	
- Conductor	b: (16,25 – 16,69)mm d: (12,209 –12,32)mm	6,4 - 6,7 mm
- Insulation thickness	1,23 - 1,92 mm	0,95 - 1,26 mm
- Inner covering thickness	1,40 – 5,91 mm	1,3 – 5,92 mm
- Oversheath thickness	2,53 - 3,14 mm	2,10 - 2,56 mm
- Cable diameter	45,98 – 48,00 mm	29,23 – 30,0 mm
Year of manufacture	2002	2002

Table 1: Technical data of the cables

ВЯРНО С ОРИГИНАЛА

Structure of the test lengths:

The test specimens were assembled according to DIN VDE 0278-623:1997-01, table 6a, sequence A1 by the manufacturer. 2 test lengths were made (figure 1):

Test length 1: Test specimen with largest conductor size (150 mm²)

Test length 2: Test specimen with smallest conductor size (35 mm²)

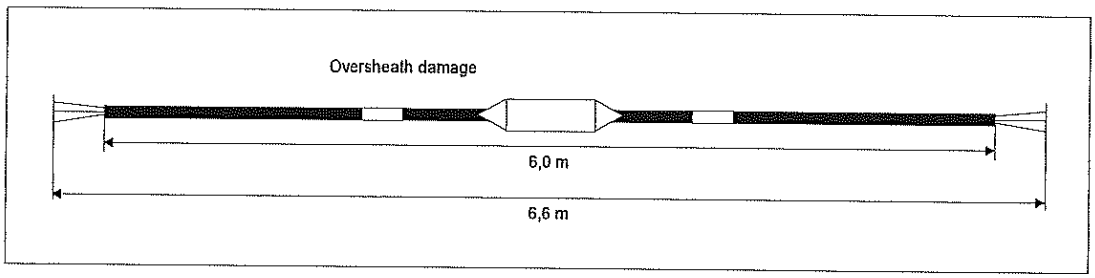


Figure 1: Shematic structure of the test lengths 1 and 2

3. Test equipment

Equip.-No.	cal.	Equipment	Type	Manufacturer
32	*	Hochspannungsprüfgenerator	PGK 10 AC/DC	BAUR
36	*	Hochspannungsprüfeinrichtung	Rack-Stelltrafo	Eigenbau
483	*	Isolationsmessgerät	MEGGER BM 21	BAUR
259 260 261	* * *	Stromwandler	UGSS 306	Ritz
277	*	Voltmetereinheit (Data-Unix-Control HP 3852 A)	HP 44701 A	Hewlett Packard
10 -13	*	Thermoelemente 0,5 mm	NiCr-Ni	Rössel
*) Measuring equipment is calibrated based on national and international reference standards. Calibration certificates are to be inspected on request.				

Table 2: Test equipment

The measurement uncertainty of the measuring instruments were calculated and archived by the RWE Eurotest. They can be inspected on request.

ВЯРНО С ОРИГИНАЛА

4. Test carried out and results

Realization of the tests

The calibration of conductor temperature was carried out according to DIN VDE 0278623:1997-01, annex 1, section A1.3.3, method 3: Test using a control cable (cable length about 6.6 m).

Tests with largest and smallest conductor size DIN VDE 0278-623: 1997-01, table 2, test specimen A1 and A2					
Tests	**1)**	**Requirements**	**Result**	**met**	**2)**
A.C. voltage withstand (in air)	6.6.4	1 min at 4 kV no breakdown	no break-down	yes	
Insulation resistance (in air)	6.6.7	≥ 50 MΩ	> 50 MΩ	yes	
A.C. voltage withstand (in water)	6.6.4	1 min at 4 kV no breakdown	no break-down	yes	
Insulation resistance (in water)	6.6.7	≥ 50 MΩ	> 50 MΩ	yes	
Load cycling in air - with largest conductor size - with smallest conductor size	6.6.8	63 Load cycles (90°C +5 to 10 K)			04
Load cycling in water (Oversheath damage) - with largest conductor size - with smallest conductor size	6.6.8	63 Load cycles (90°C +5 to 10 K)			05
A.C. voltage withstand (in water)	6.6.4	1 min at 4 kV no breakdown	no break-down	yes	
Insulation resistance (in water)	6.6.7	≥ 50 MΩ	> 50 MΩ	yes	
Examination	6.6.12		3)		
Screen short circuit	6.6.10	not applicable			

1) DIN VDE 0278-623 section
2) annex
3) According to agreement between the customer and the manufacturer this test is not subject of the type test.

Table 3: result of the tests

ВЯРНО С ОРИГИНАЛА

5. Overall result

The shrink straight joint 0,6/1 kV, type SVME 35 -150 mm² manufactured by Euromold N.V. qualified in the type test according to DIN VDE 0278-623:1997-01(HD 623 S1:1996-02)

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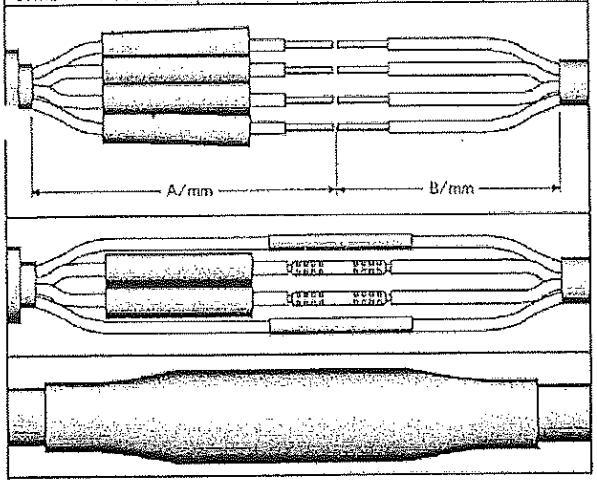
Annex: 01

Euromold
a Nexans Company

Installation instructions
Heat – Shrinkable – Straight – Joint
Type: SVME(S)

Table 1

Type	Cund. c.s. /mm²	A/mm	B/mm
SVME 4 x 1,5 · 6	4 x 1,5 · 6	90	40
SVME 4 x 1,5 · 16	4 x 1,5 · 16	130	80
SVMES* 4 x 6 · 25	4 x 6 · 25	170	110
SVME 4 x 16 · 50	4 x 16 · 50	230	110
SVMES* 4 x 16 · 50	4 x 16 · 50	230	110
SVME 4 x 25 · 95	4 x 25 · 90	290	140
SVME 4 x 35 · 150	4 x 35 · 150	360	170
SVME 4 x 95 · 300	4 x 95 · 300	450	220



1. Remove outer cable jackets according to dimension "A" for the first cable and dimension "B" for the second cable (see table 1 and see drawing).
2. Strip phases-insulation down to the conductor to the necessary dimension (half of the length of the contact +10mm).
3. Clean the outer cable jackets and the core-insulation in the area of the final position of the heat-shrink tubes. Attention: Use only a proper solvent which remains no grease on the surface.
4. Slip the great heat-shrink tube (only one) over the cable in it's parking position and slip the small heat shrink tubes (number of tubes depends on the number of cores) over the phases (parking area of this tubes is the cable which is prepared for dimension A).
5. Connect the conductors with hexagon compression connectors. Compression always from the middle to the edges of connectors. Attention: Remove all ridges, if necessary. (In case of Al-conductor / Al-contacts please remain all the overflowed contact-protection compound after crimping).
6. Slip the inner heat-shrink tubes over the contacts and centre. Shrink the tubes beginning from the middle, to the edges. Attention: In case of using a gas-burner choose a soft flame. Don't focus the flame at one point to long. Move the flame on the surface of the tubes continually. You can stop to heat the tubes when there are no pleats or air bubbles under the tube and the adhesive flows out at the ends of the tubes.
7. Slip the outer heat shrink tube over the whole connection and centre (the overlap of the tube to the outer sheath of the cables is equal on both sides). Shrink the tubes in accordance to the working methods described in point 6.
8. If the joint is cooled down to the environment temperature it is ready for service.

Heat – Shrinkable – Straight – Joint Type: SVME(S)	Drawing No.: NV-0949-1/E
Cable: XLPE-Cable	Produce: 28.02.2002 J. Gerlitz
Voltage: Uo/U = 0,6/1 kV	Supervisor: 28.02.2002 J. Langowski

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ВЯРНО С ОРИГИНАЛА

Report-No.: 03.08.22.154

Annex: 02a

Heavy wall insulating tubes
GT4 - GT9

Application

Heavy wall tubes offer good insulating and mechanical protection.
Tubes coated with thermoplastic adhesive can be used for all kinds of cable repairs and sealings.

Applicazione

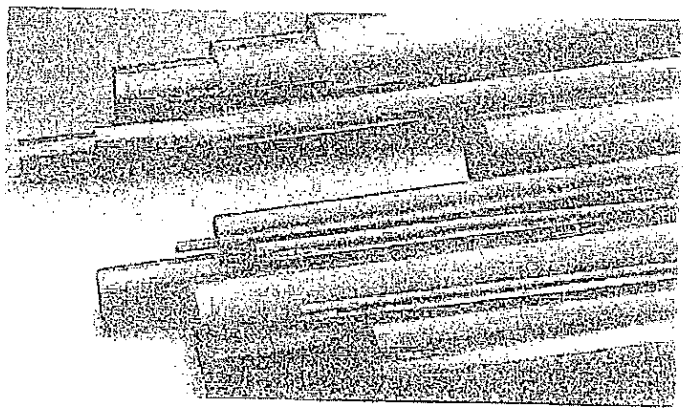
I tubi a forte spessore offrono una buona protezione meccanica e isolante.
I tubi con adesivo termoplastico interno possono essere usati per riparazioni e sigillature di cavi.

Product features

- Weather resistant
- Excellent insulating performance
- Excellent mechanical stability
- Easy and fast installation
- Unlimited shelf life

Caratteristiche

- Resistente agli agenti atmosferici
- Ottime proprietà isolanti
- Ottima stabilità meccanica
- Facilità e rapidità di installazione
- Tempo di stoccaggio illimitato



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Annex: 02a

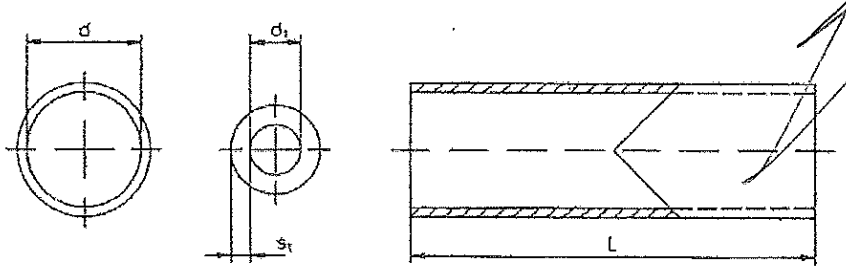
Properties

Material: Crosslinked modified polyolefin
Colour: black

Application temperature:	-40 to +85 °C	
Shrinking temperature:	125 °C	
Tensile strength:	23 N/mm²	DIN 53455 / ISO 37
Elongation at break:	600 %	DIN 53455 / ISO 37
Thermal ageing (168h / 150 °C)		ISO 188
Tensile strength:	21 N/mm²	DIN 53455 / ISO 37
Elongation at break:	500 %	DIN 53455 / ISO 37
Brittleness temperature	-40 °C	DIN 53546 / ISO R 812
Water absorption	< 0,2 %	DIN 53495 / ISO 62
Fungus and decay resistance	pass rate 1	ASTM G 21
Carbon black content (UV stab.)	>2,5 %	ASTM 2671

Chemical resistance (treatment with 0,1N Na_2SO_4, H_2SO_4, NaOH, NaCl)

Tensile strength:	21 N/mm²	DIN 53455 / ISO 37
Elongation at break:	500 %	DIN 53455 / ISO 37
Breakdown voltage	40 kV / mm	DIN / VDE 303 part 2
Volume resistivity	10^{13} Ohm cm	IEC93



Coated Type	Ref	Uncoated Type	Ref	d/d1 (mm)	s1 (mm)	L (m)
GT4-20	DSRTK 19/6	**GT9-20**	DSRU 19/6	23/6	2,4	1,5
GT4-30	DSRTK 30/8	**GT9-30**	DSRU 30/8	34/8	3,0	1,5
GT4-40	DSRTK 38/12	**GT9-40**	DSRU 38/12	42/12	3,7	1,5
GT4-50	DSRTK 51/16	**GT9-50**	DSRU 51/16	56/16	4,1	1,5
GT4-70	DSRTK 68/22	**GT9-70**	DSRU 68/22	73/22	4,1	1,5
GT4-90	DSRTK 85/25	**GT9-90**	DSRU 85/25	90/25	4,1	1,5
GT4-120	DSRTK 120/40	**GT9-120**	DSRU 120/40	130/40	4,2	1,5

Orders to: **Nexans Italia** Main Office - Via Trento 30 - 20059 Vimercate (MI) - Italy
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ВЯРНО С ОРИГИНАЛА

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Annex: 02b

Medium wall insulating tubes
GT3 - GT8

Application

Medium wall heat shrinkable tubes operate as mechanical protection of components. Tubes coated with thermoplastic adhesive can be used for all kinds of cable repair and sealings.

Product features

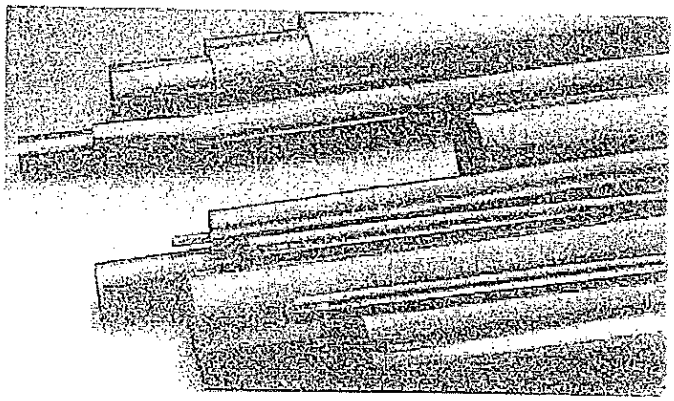
- Weather resistant
- Good mechanical properties and stability
- Easy and fast installation also at low temperatures
- Unlimited shelf life

Applicazione

I tubi a medio spessore offrono una buona protezione meccanica.
I tubi con adesivo termoplastico interno possono essere usati per riparazioni e sigillature di cavi.

Caratteristiche

- Resistente agli agenti atmosferici
- Buona stabilità e proprietà meccaniche
- Facilità e rapidità di installazione
- Tempo di stoccaggio illimitato



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Annex: 02b

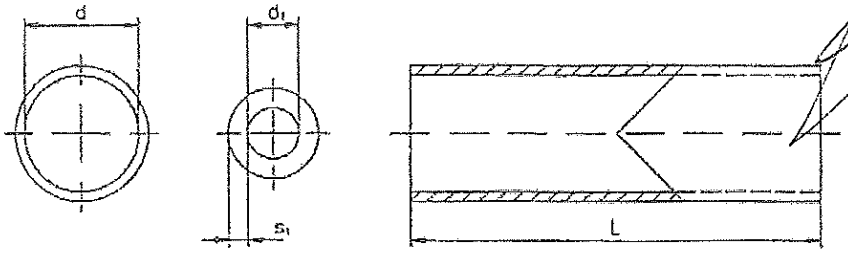
Properties

Material: Crosslinked modified polyolefin
Colour: black

Application temperature:	-40 to +85 °C	
Shrinking temperature:	125 °C	
Tensile strength:	23 N/mm²	DIN 53455 / ISO 37
Elongation at break:	600 %	DIN 53455 / ISO 37
Thermal ageing (168h / 150 °C)		ISO 188
Tensile strength:	21 N/mm²	DIN 53455 / ISO 37
Elongation at break:	500 %	DIN 53455 / ISO 37
Brittleness temperature	-40 °C	DIN 53546 / ISO R 812
Water absorption	< 0,2 %	DIN 53495 / ISO 62
Fungus and decay resistance	pass rate 1	ASTM G 21
Carbon black content (UV stab.)	>2,5 %	ASTM 2671

Chemical resistance (treatment with 0,1N Na_2SO_4, H_2SO_4, NaOH, NaCl)

Tensile strength:	21 N/mm²	DIN 53455 / ISO 37
Elongation at break:	500 %	DIN 53455 / ISO 37
Breakdown voltage	40 kV / mm	DIN / VDE 303 part 2
Volume resistivity	10^{15} Ohm cm	IEC93



Coated type	Ref	Uncoated type	Ref	d/d1 (mm)	s1 (mm)	L (m)
GT3-12		GT8-12		12/3	2,0	1,5
GT3-20	MSRTK 15/6	GT8-20	MSRU 15/6	19/6	2,2	1,5
GT3-30	MSRTK 25/8	GT8-30	MSRU 25/8	30/8	2,5	1,5
GT3-40	MSRTK 35/12	GT8-40	MSRU 35/12	41/12	2,5	1,5
GT3-50	MSRTK 50/16	GT8-50	MSRU 50/16	56/16	2,5	1,5
GT3-60	MSRTK 63/19	GT8-60	MSRU 63/19	69/19	2,5	1,5
GT3-70	MSRTK 75/22	GT8-70	MSRU 75/22	81/22	2,8	1,5
GT3-95	MSRTK 95/25	GT8-95	MSRU 95/25	101/25	3,0	1,5
GT3-120	MSRTK 115/34	GT8-120	MSRU 115/34	124/34	3,0	1,5
GT3-140	MSRTK 140/42	GT8-140	MSRU 140/42	149/42	3,5	1,5
GT3-160	MSRTK 160/50	GT8-160	MSRU 160/50	169/50	3,5	1,5
GT3-180	MSRTK 180/60	GT8-180	MSRU 180/60	189/60	3,5	1,5

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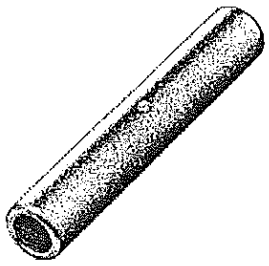


Zugentlastete PressverbinderAl 1-10 kV

für Aluminium und Aldreyseile nach DIN 48201 und Aluminiumkabel nach DIN VDE 0295

Werkstoff: Reinaluminium

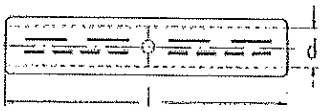
Oberfläche: blank

Non-tension compression joint AL 1-10 kV

for Al- and Al-alloy conductors acc. to DIN 48201 and aluminium cables acc. to DIN VDE 0295

Material: Aluminium

Surface: uncoated



Die Verbinder sind mit Kontaktfett gefüllt und in Plastikfolie eingeschweißt.

Connectors filled with compound and sealed in plastic.

Listen-Nr.	Leiterquerschnitt mm² rm/sm se	Leiterdurchmesser mm VDE 0295	Leiterdurchmesser mm DIN 48201/5	Kennzahl Presseinsatz	Maße in mm d l	Anzahl der Pressungen mech. hydr.	Gewicht 100 Stück ca. kg
Cat. no.	*Conductor cross section sq. mm strand. solid*	*Conductor diameter mm VDE 0295*	*Conductor diameter mm DIN 48201/5*	*Die Code no.*	*Dimensions mm d l*	*Number of compressions mech. hydr.*	*Weight 100 pcs. approx. kgs.*
16 ALU-ZE	16 25	5,2 - 5,6	5,1	12	5,4 55	3-3 2-2	1,5
25 ALU-ZE	25 35	5,6 - 6,7	6,3	12	6,8 70	4-4 2-2	1,8
35 ALU-ZE	35 50	6,6 - 7,8	7,5	14	8,0 85	5-5 2-2	3,0
50 ALU-ZE	50 70	7,7 - 8,6	9,0	16	9,8 85	5-5 2-2	3,8
70 ALU-ZE	70 95	9,3 - 10,2	10,5	18	11,2 105	6-6 3-3	5,7
95 ALU-ZE	95 120	11,0 - 12,0	12,5	22	13,2 105	6-6 3-3	8,9
120 ALU-ZE	120 150	12,5 - 13,5	14,0	22	14,7 105	6-6 3-3	8,6
150 ALU-ZE	150 185	13,9 - 15,0	15,8	25	16,3 125	6-6 3-3	11,2
185 ALU-ZE	185 240	15,5 - 16,8	17,5	28	18,3 125	6-6 3-3	16,4
240 ALU-ZE	240 300	17,8 - 19,2	20,3	32	21,0 145	8-8 3-3	20,8
300 ALU-ZE	300	20,0 - 21,6	22,5	34	23,3 145	8-8 3-3	27,5
400 ALU-ZE	400	22,9 - 24,6		38	26,0 210	4-4	60,0
500 ALU-ZE	500	25,7 - 27,6		44	29,0 210	4-4	92,5

N.B.: Bei der Verwendung von 240 mm² VPE-Kabeln empfehlen wir den Einsatz von Verbindern mit angepaßtem Innendurchmesser („RMV"-Serie).

Sektorleiter sind mit dem entsprechenden Einsatz rundzudrücken.

Zugentlastete Pressverbinder entsprechen DIN 46267, Teil 2.

When using 240 sq. mm VPE cable we recommend a connector with adjusted inner diameter („RMV"-series).

Sector shaped conductors must be rounded with special compression dies.

Compression joints, non tension, acc. to DIN 46267, part 2.

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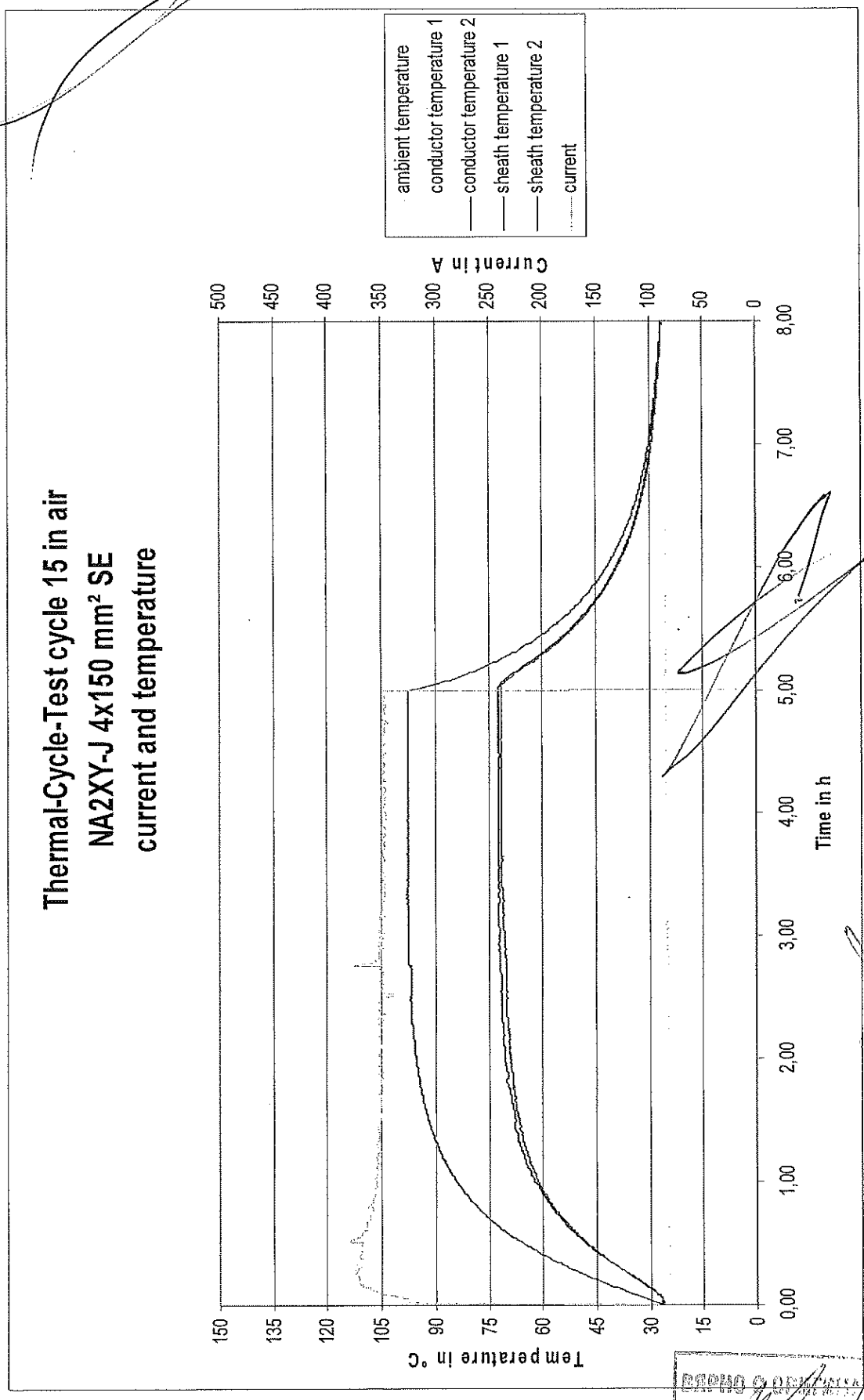
Annex: 04



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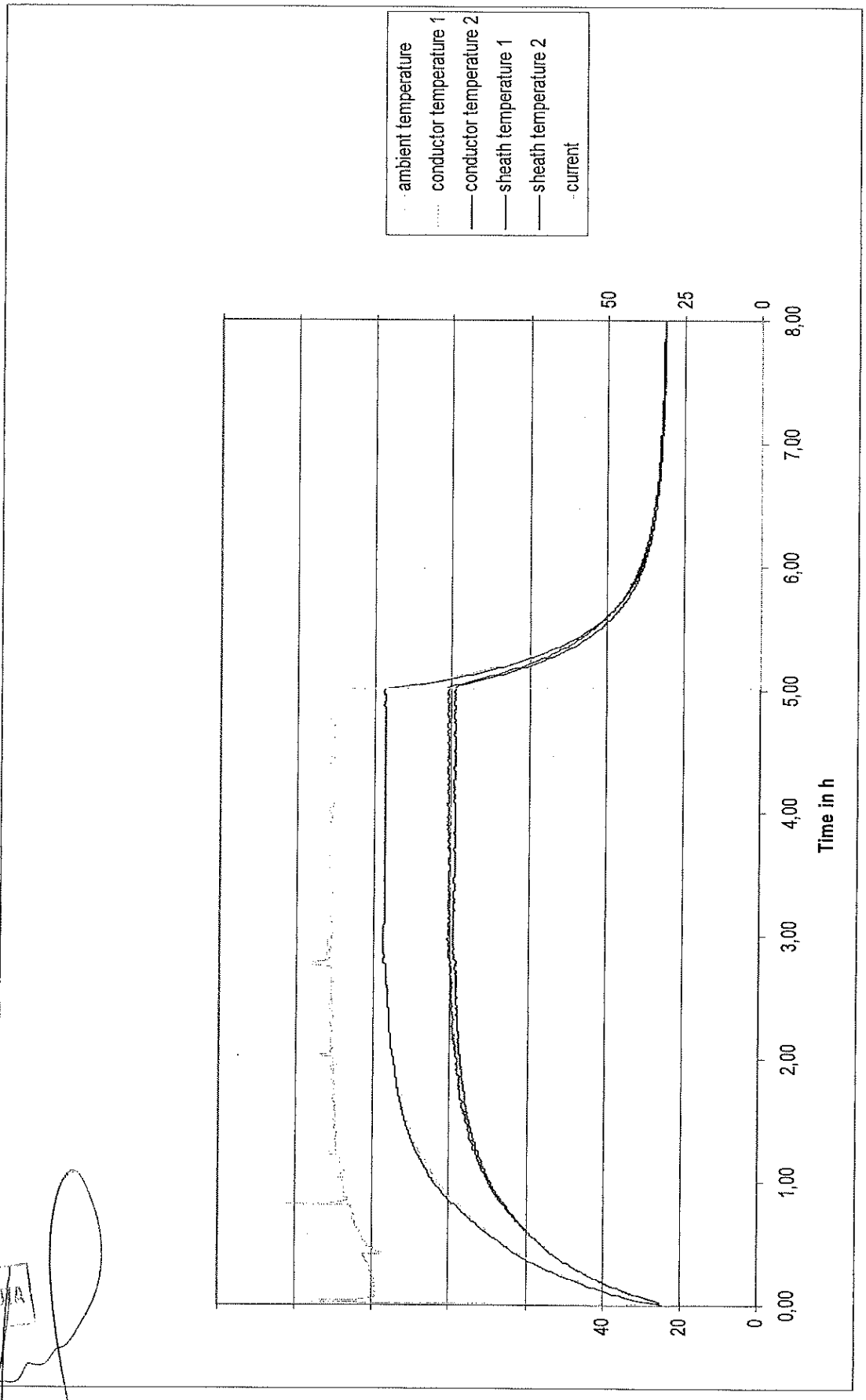
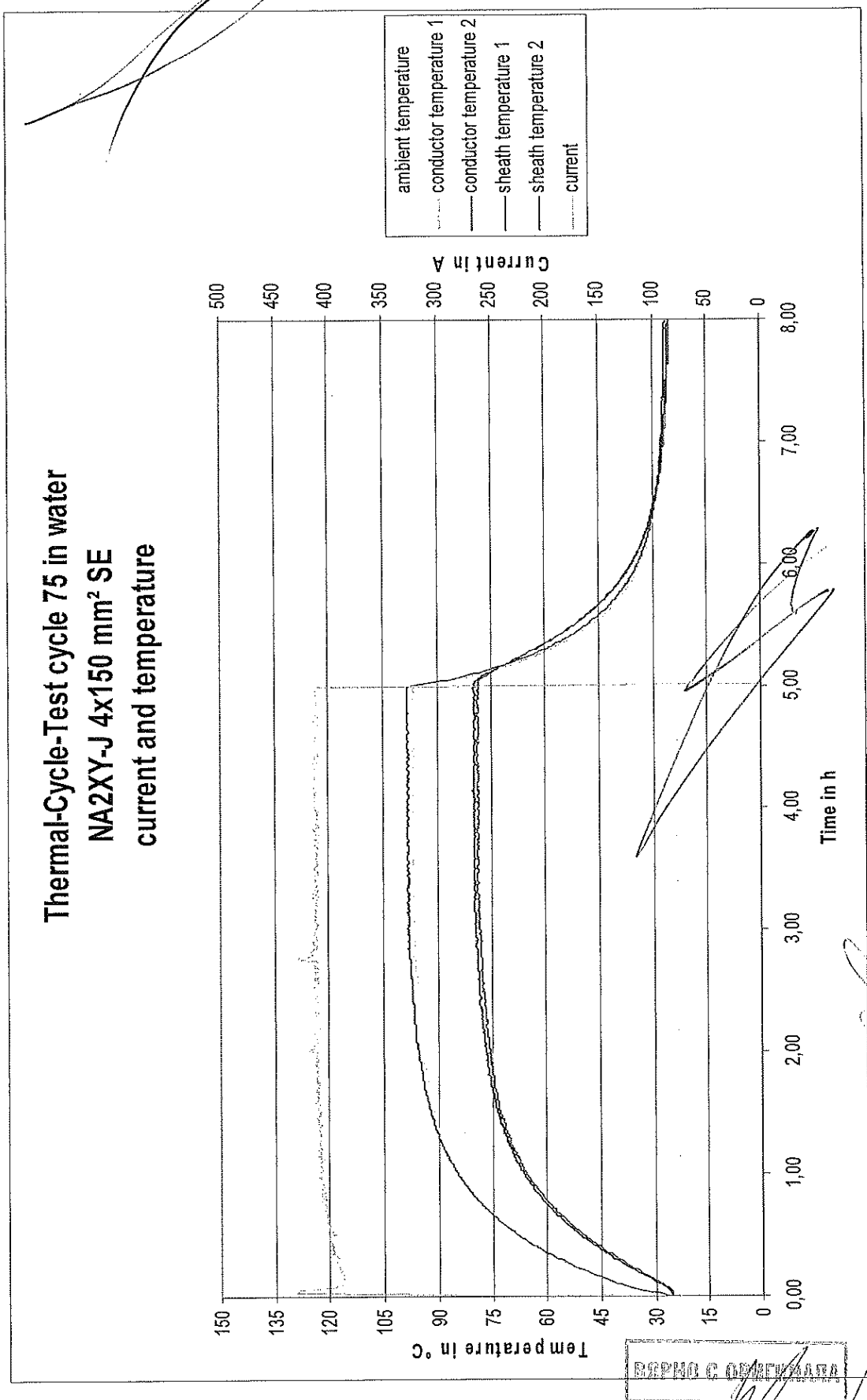
Annex: 04



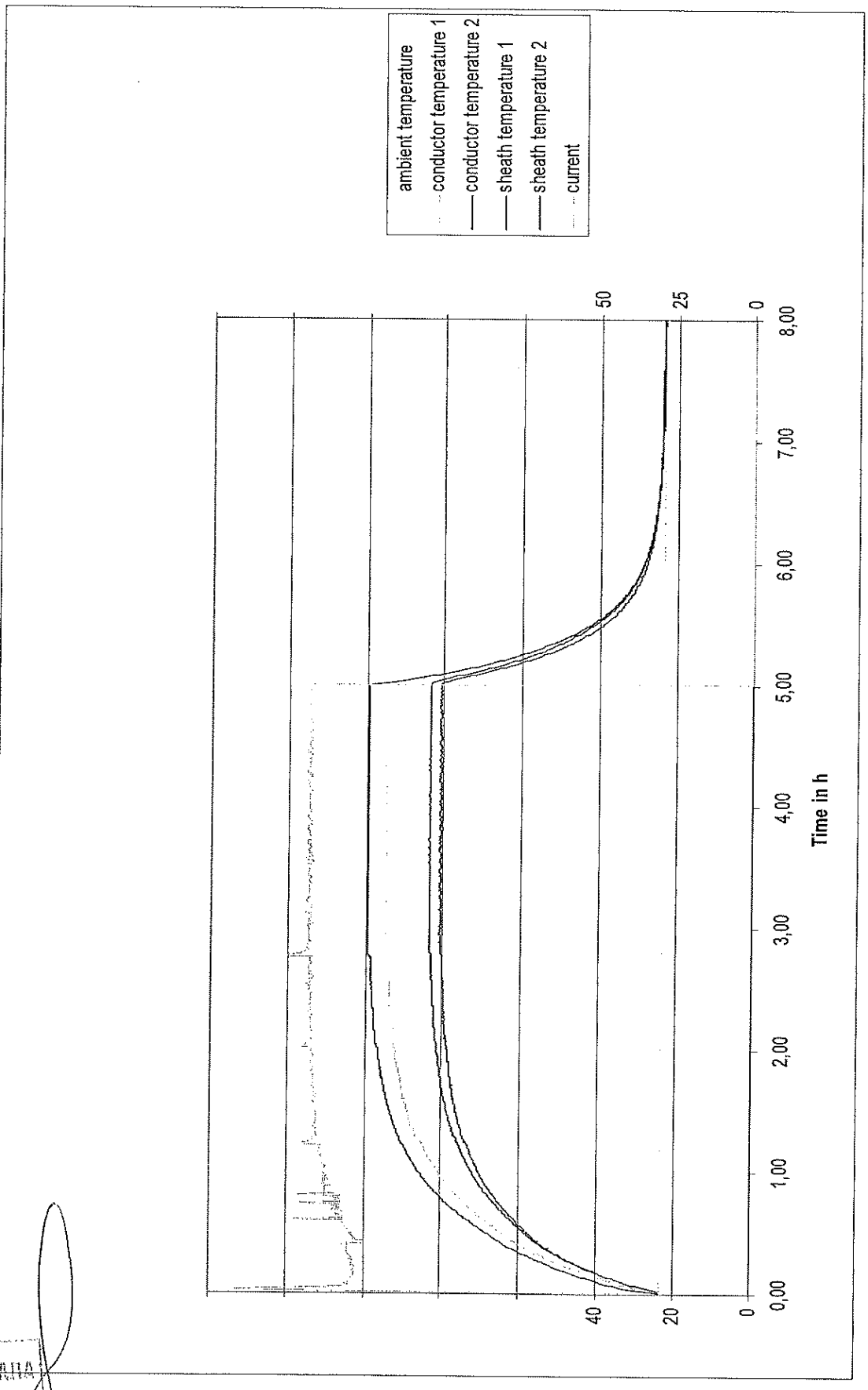
Report-No.: 03.08.22.154

Annex: 05



Report-No.: 03.08.22.154

Annex: 05



ПРИЛОЖЕНИЕ № 2.4

4. Проведени тестове и резултати

Реализиране на изпитанията

Калибрирането на температурата на проводника бе извършено съгласно DIN VDE 0278623:1997-01, приложение 1, раздел A1.3.3, метод 3: Изпитания, използващи контролна таблица (дължина на кабела около 6.6м).

Изпитания с най-голямо и на-малко сечение на проводника DIN VDE 0278-623:1997-01, таблица 2, тестови серии A1 и A2					
Изпитания	**1)**	**Изисквания**	**Резултат**	**преминал**	**2)**
AC напрежение на сухо (във въздух)	6.6.4	1.min при 4kV без повреда	без повреда	да	
Съпротивление на изолацията (въздух)	6.6.7	≥ 50 MΩ	> 50 MΩ	да	
AC напрежение на сухо (във вода)	6.6.4	1.min при 4kV без повреда	без повреда	да	
Съпротивление на изолацията (във вода)	6.6.7	≥ 50 MΩ	> 50 MΩ	да	
Циклично натоварване във въздух - с най-големия размер проводник - с най-малкия размер проводник	6.6.8	63 натоварващи цикъла (90°C + 5 до 10K)			04
Циклично натоварване във вода - с най-големия размер проводник - с най-малкия размер проводник	6.6.8	63 натоварващи цикъла (90°C + 5 до 10K)			05
AC напрежение на сухо (във вода)	6.6.4	1.min при 4kV без повреда	без повреда	да	
Съпротивление на изолацията (във вода)	6.6.7	≥ 50 MΩ	> 50 MΩ	да	
Късо съединение на екрана	6.6.12		3)		
	6.6.10	Не приложимо			

1) DIN VDE 0278-623 раздел
2) Приложение
3) Съгласно споразумение между клиент и производител този тест не е предмет на типовото изпитание.

Таблица 3: Резултати от изпитанието

ВЗЕТО С ОРИГИНАЛА

ПРИЛОЖЕНИЕ № 2.5

DAkkS
Deutsche
Akkreditierungsstelle

Deutsche Akkreditierungsstelle GmbH

Beliehene gemäß § 8 Absatz 1 AkkStelleG i.V.m. § 1 Absatz 1 AkkStelleGBV
Unterzeichnerin der Multilateralen Abkommen
von EA, ILAC und IAF zur gegenseitigen Anerkennung

Akkreditierung

Die Deutsche Akkreditierungsstelle GmbH bestätigt hiermit, dass das Prüflaboratorium

innogy SE
Opernplatz 1, 45128 Essen

Am Standort:

innogy SE
Eurotest
Unterste-Wilms-Straße 52, 44143 Dortmund

die Kompetenz nach DIN EN ISO/IEC 17025:2005 besitzt, Prüfungen in folgenden Bereichen durchzuführen:

Hochspannungsgeräte und -anlagen, Niederspannungs-Schaltgeräte-Kombinationen, Kabel, Starkstromkabel-Garnituren, Press- und Schraubverbinder, Isolierstoffe (Isolieröle), EMV, Erdungsanlagen, sowie von PSA bei Lichtbogeneinwirkung

Die Akkreditierungsurkunde gilt nur in Verbindung mit dem Bescheid vom 20.10.2016 mit der Akkreditierungsnummer D-PL-20575-01 und ist gültig bis 28.07.2021. Sie besteht aus diesem Deckblatt, der Rückseite des Deckblatts und der folgenden Anlage mit insgesamt 09 Seiten.

Registrierungsnummer der Urkunde: **D-PL-20575-01-00**

на основание чл. 36а, ал. 3 от ЗОП

Frankfurt am Main, 20.10.2016

Im Auftrag Dipl.-Ing. (FH) Ralf Egner
Abteilungsleiter

Siehe Hinweise auf der Rückseite

DAkkS Deutsche Akkreditierungsstelle

Deutsche Akkreditierungsstelle GmbH

Anlage zur Akkreditierungsurkunde D-PL-20575-01-00 nach DIN EN ISO/IEC 17025:2005

Gültigkeitsdauer: 29.07.2016 bis 28.07.2021 Ausstellungsdatum: 20.10.2016

Urkundeninhaber:

innogy SE
Opernplatz 1, 45128 Essen

Am Standort:

innogy SE
Eurotest
Unterste-Wilms-Straße 52, 44143 Dortmund

Prüfungen in den Bereichen:

Hochspannungsgeräte und -anlagen, Niederspannungs-Schaltgeräte-Kombinationen, Kabel, Starkstromkabel-Garnituren, Press- und Schraubverbinder, Isolierstoffe (Isolieröle), EMV, Erdungsanlagen, sowie von PSA bei Lichtbogeneinwirkung

Fach-bereich	Norm oder Prüfverfahren / Ausgabestand	Titel der Norm oder des Prüfverfahrens	Einschränkungen zum Prüfverfahren
Hoch-spannungs-geräte und -anlagen	VDE 0432-1:2011-10 DIN EN 60060-1:2011-10 EN 60060-1:2010 IEC 60060-1:2010	Hochspannungs-Prüftechnik – Teil 1: Allgemeine Begriffe und Prüfbedingungen.	Prüfbereich: Wechselspannung bis 600 kV Gleichspannung bis 350 kV Stoßspannung 1,2/50 µs bis 1,6 MV Stoßspannung 250/2500 µs bis 1,2 MV

ВЯРНО С ОРИГИНАЛА

DAkkS Deutsche Akkreditierungsstelle

Fach-bereich	Norm oder Prüfverfahren / Ausgabestand	Titel der Norm oder des Prüfverfahrens	Einschränkungen zum Prüfverfahren
	VDE 0434:2001-08 + Ber. 1:2002-11 DIN EN 60270:2001-08 + Ber. 1:2002-11 EN 60270:2001 IEC 60270:2000	Hochspannungs-Prüftechnik – Teilentladungsmessungen.	
	VDE 0682-411:2010-09 DIN EN 61243-1:2010-09 EN 61243-1:2005 + A1:2010 IEC 61243-1:2003 + Cor. 1:2005 + A1:2009	Arbeiten unter Spannung – Spannungsprüfer – Teil 1: Kapazitive Ausführung für Wechselspannungen über 1 kV.	Einschränkungen: Keine • Zweifelsfreie Wahrnehmbarkeit der optischen Anzeige, Abs. 6.2.2 • Zweifelsfreie Wahrnehmbarkeit der akustischen Anzeige, Abs. 6.2.3 • Frequenzabhängigkeit, Abs. 6.2.4 • Einfluss der eingebauten Energiequelle, Abs. 6.2.6 • Prüfung der Eigenprüfvorrichtung, Abs. 6.2.7 • Rüttelfestigkeit, Abs. 6.4.3 • Fallfestigkeit, Abs. 6.4.4 • Klimafestigkeit, Abs. 6.4.6.

DAkkS Deutsche Akkreditierungsstelle

Fach-bereich	Norm oder Prüfverfahren / Ausgabestand	Titel der Norm oder des Prüfverfahrens	Einschränkungen zum Prüfverfahren
	VDE 0682-431-1:2015-09 DIN EN 61481-1:2015-09 EN 61481-1:2014 IEC 61481-1:2014	Arbeiten unter Spannung – Phasenvergleicher – Teil 1: Kapazitive Ausführung für Wechselspannungen über 1 kV.	Einschränkungen: Keine • Eindeutige Wahrnehmbarkeit, Abs. 5.2.6 • Frequenzabhängigkeit, Abs. 5.2.7 • Einfluss der Energiequelle, Abs. 5.2.9 • Prüfung der Eigenprüfvorrichtung, Abs. 5.2.10 • Rüttelbeständigkeit, Abs. 5.4.3 • Fallbeständigkeit, Abs. 5.4.4 • Klimabeständigkeit, Abs. 5.4.6.
	VDE 0682-431-2:2015-09 DIN EN 61481-2:2015-09 EN 61481-2:2014 IEC 61481-2:2014	Arbeiten unter Spannung – Phasenvergleicher – Teil 2: Resistive (ohmsche) Ausführung für Wechselspannungen über 1 kV bis 36 kV.	Einschränkungen: Keine • Eindeutige Wahrnehmbarkeit, Abs. 5.2.5 • Frequenzabhängigkeit, Abs. 5.2.6 • Einfluss der Energiequelle, Abs. 5.2.8 • Prüfung der Eigenprüfvorrichtung, Abs. 5.2.9 • Rüttelbeständigkeit, Abs. 5.4.4 • Fallbeständigkeit, Abs. 5.4.5 • Klimabeständigkeit, Abs. 5.4.7.
	VDE 0101-2:2011-11 DIN EN 50522:2011-11 EN 50522:2010	Erdung von Starkstromanlagen mit Nennwechselspannungen über 1 kV.	Einschränkung: Nur Erdungsmessungen gemäß Anhang L.

DAkkS Deutsche Akkreditierungsstelle

Anlage zur Akkreditierungsurkunde D-PL-20575-01-00

Fach-bereich	Norm oder Prüfverfahren / Ausgabestand	Titel der Norm oder des Prüfverfahrens	Einschränkungen zum Prüfverfahren
Nieder-spannungs-geräte und -anlagen	VDE 0660-600-1:2012-06 DIN EN 61439-1:2012-06 EN 61439-1:2011 IEC 61439-1:2011	Niederspannungs-Schaltgerätekombinationen – Teil 1: Allgemeine Festlegungen.	
	VDE 0660-600-5:2015-10 DIN EN 61439-5:2015-10 EN 61439-5:2015 IEC 61439-5:2014 + Cor.:2015	Niederspannungs-Schaltgerätekombinationen – Teil 5: Schaltgerätekombinationen in öffentlichen Energieverteilungsnetzen.	
	VDE 0660-505:1998-10 DIN VDE 0660-505:1998-10	Niederspannungs-Schaltgerätekombinationen; Teil 505: Bestimmung für Hausanschlußkästen und Sicherungskästen.	
	VDE 0682-306-1-2:2015-08 DIN EN 61482-1-2:2015-08 EN 61482-1-2:2014 IEC 61482-1-2:2014	Arbeiten unter Spannung – Schutzkleidung gegen die thermischen Gefahren eines elektrischen Lichtbogens – Teil 1-2: Prüfverfahren – Verfahren 2: Bestimmung der Lichtbogen-Schutzklasse des Materials und der Kleidung unter Verwendung eines gerichteten Prüflichtbogens (Box-Test).	
	GS-ET-29:2011-05	Zusatzanforderungen für die Prüfung und Zertifizierung von Elektriker-Gesichtsschutz.	
	PIP001:2016-07	RWE International SE - RWE Eurotest: Prüfung der Störlichtbogenfestigkeit von Schutzkleidung.	
	VDE 0122-1:2012-01 DIN EN 61851-1:2012-01 EN 61851-1:2011 IEC 61851-1:2010	Elektrische Ausrüstung von Elektro-Straßenfahrzeugen – Konduktive Ladesysteme für Elektrofahrzeuge – Teil 1: Allgemeine Anforderungen.	
	VDE 0122-2-2:2002-10 DIN EN 61851-22:2002-10 EN 61851-22:2002 IEC 61851-22:2001	Elektrische Ausrüstung von Elektro-Straßenfahrzeugen – Konduktive Ladesysteme für Elektrofahrzeuge – Teil 2-2: Wechselstrom-Ladestation für Elektrofahrzeuge.	ВЯРНО С ОРИГИНАЛА

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Fach-bereich	Norm oder Prüfverfahren / Ausgabestand	Titel der Norm oder des Prüfverfahrens	Einschränkungen zum Prüfverfahren
EMV	DIN EN 50160:2011-02 EN 50160:2010 + Cor.:2010	Merkmale der Spannung in öffentlichen Elektrizitätsversorgungsnetzen.	Prüfbereich: Messungen bis 1000 V und 1000 A.
	VDE 0848-1:2009-08 DIN EN 50413:2009-08 EN 50413:2008	Grundnorm zu Mess- und Berechnungsverfahren der Exposition von Personen in elektrischen, magnetischen und elektromagnetischen Feldern (0 Hz bis 300 GHz);	Prüfbereich: Messung der elektrischen und magnetischen Felder von 0 - 30 kHz.
Kabel und Leitungen	VDE 0271:2007-01 DIN VDE 0271:2007-01	Starkstromkabel – Festlegungen für Starkstromkabel ab 0,6/1 kV für besondere Anwendungen.	Einschränkung: Kein Brennverhalten.
	VDE 0276- 603:2010-03 DIN VDE 0276-603:2010-03 HD 603 S1:1994 + A3:2007 Teile 0; 1; 3-G und 5-G	Starkstromkabel – Teil 603: Energieverteilungskabel mit Nennspannungen U_0/U 0,6/1 kV.	Einschränkung: Kein Brennverhalten.
	VDE 0276-605:2009-07 DIN VDE 0276-605:2009-07 HD 605 S2:2008	Starkstromkabel – Teil 605: Ergänzende Prüfverfahren.	Einschränkung: Kein • Weiterreißwiderstand • Druckprüfung • Bestimmung der Härte von Elastomeren Isolierhüllen und Mänteln • Umweltbeständigkeit UV; Bewitterung; • Wickelprüfungen • Biegeprüfungen • Torsionsprüfungen • Abriebprüfung • Kerbkraftprüfung • Verzinkungsgüte • Steifigkeit • Thermogravimetrische Prüfung • Wasseraufnahme durch Kapazitätsmessung • Vernetzungsgrad von VPE • Durchlaufspannungs-prüfung • Brandprüfungen.

ВЯРНО С ОРИГИНАЛА

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Fach-bereich	Norm oder Prüfverfahren / Ausgabestand	Titel der Norm oder des Prüfverfahrens	Einschränkungen zum Prüfverfahren
	VDE 0276-620:2010-11 DIN VDE 0276-620:2010-11 HD 620 S2:2010 Teile 0, 1 und 10-C	Starkstromkabel – Teil 620: Energieverteilungskabel mit extrudierter Isolierung für Nennspannungen U_0/U 3,6 / 6 kV bis 20,8 / 36 kV.	Einschränkungen: Kein • Brennverhalten • Langzeitprüfung.
	VDE 0276-626 + A1:1998-07 DIN VDE 0276-626 + A1:1998-07 HD 626 S1 + A1:1997	Starkstromkabel – Teil 626: Isolierte Freileitungsseile für oberirdische Verteilungsnetze mit Nennspannung U_0/U (U_m) 0,6/1 (1,2) kV.	Einschränkung: Bei HD 626 S1 + A1: nur Teil 4 F
	IEC 60840:2011-11	Power cables with extruded insulation and their accessories for rated voltages above 30 kV (U_m = 36 kV) up to 150 kV (U_m = 170 kV) – Test methods and requirements.	Einschränkung: Ohne Brandprüfungen.
Starkstrom-kabel-Garnituren	VDE 0278-393:2015-10 DIN EN 50393:2015-10 EN 50393:2015	Prüfverfahren und Prüfanforderungen für die Garnituren von Verteilerkabeln mit einer Nennspannung von 0,6/1,0 (1,2) kV.	
	VDE 0278-442:2006-01 DIN EN 61442:2006-01 EN 61442:2005 IEC 61442:2005	Prüfverfahren für Starkstromkabelgarnituren mit einer Nennspannung von 6 kV (U = 7,2 kV) bis 36 kV (U = 42 kV).	
	VDE 0278-629-1:2009-07 DIN VDE 0278-629-1:2009-07 HD 629.1 S2:2006 + A1:2008	Prüfanforderungen für Kabelgarnituren für Starkstromkabel mit einer Nennspannung von 3,6/6(7,2) kV bis 20,8/36(42) kV – Teil 1: Kabel mit extrudierter Kunststoffisolierung.	
	VDE 0278-629-2:2009-07 DIN VDE 0278-629-2:2009-07 HD 629.2 S2:2006 + A1:2008	Prüfanforderungen für Kabelgarnituren für Starkstromkabel mit einer Nennspannung von 3,6/6(7,2) kV bis 20,8/36(42) kV – Teil 2: Kabel mit massegetränkter Papierisolierung.	

ВЯРНО С ОРИГИНАЛА

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Fach-bereich	Norm oder Prüfverfahren / Ausgabestand	Titel der Norm oder des Prüfverfahrens	Einschränkungen zum Prüfverfahren
	IEC 60502-1:2009-11	Power cables with extruded insulation and their accessories for rated voltages from 1 kV (U_m = 1,2 kV) up to 30 kV (U_m = 36 kV) – Part 1: Cables for rated voltages of 1 kV (U_m = 1,2 kV) and 3 kV (U_m = 3,6 kV).	
	IEC 60502-2:2014	Power cables with extruded insulation and their accessories for rated voltages from 1 kV (U_m = 1,2 kV) up to 30 kV (U_m = 36 kV) – Part 2: Cables for rated voltages from 6 kV (U_m = 7,2 kV) up to 30 kV (U_m = 36 kV).	
	IEC 60502-4:2010-12	Power cables with extruded insulation and their accessories for rated voltages from 1 kV (U_m = 1,2 kV) up to 30 kV (U_m = 36 kV) – Part 4: Test requirements on accessories for cables with rated voltages from 6 kV (U_m = 7,2 kV) up to 30 kV (U_m = 36 kV).	
Preß- und Schraub-verbinder	VDE 0220-100:2004-03 DIN EN 61238-1:2004-03 EN 61238-1:2003 IEC 61238-1:2003	Pressverbinder und Schraubverbinder für Starkstromkabel für Nennspannungen bis einschließlich 36 kV (U_m = 42 kV) – Teil 1: Prüfverfahren und Anforderungen.	

ВЯРНО С ОРИГИНАЛА

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Fach-bereich	Norm oder Prüfverfahren / Ausgabestand	Titel der Norm oder des Prüfverfahrens	Einschränkungen zum Prüfverfahren
Isolierstoffe	VDE 0370-2:2013-11 DIN EN 60422:2013-11 EN 60422:2013 IEC 60422:2013	Isolieröle auf Mineralölbasis in elektrischen Betriebsmitteln – Leitlinie zur Überwachung und Wartung.	Einschränkungen: Keine • Farbe und Aussehen, Abs. 5.2 • Ablagerungen Schlamm, Abs. 5.8 • Grenzflächenspannung, Abs. 5.9 • Partikel, Abs. 5.10 • Oxidationsstabilität, Abs. 5.7 • Flammpunkt, Abs. 5.11 • Mischbarkeit, Abs. 5.12 • Pourpoint, Abs. 5.13 • Dichte, Abs. 5.14 • Viskosität, Abs. 5.15 • PCB, Abs. 5.16 • Korrosiver Schwefel, Abs. 5.17 • Gehalt Dibezyldisulphid (DBDS), Abs. 5.18 Gehalt an Passivatoren, Abs. 5.19.
	VDE 0370-5:1996-03 DIN EN 60156:1996-03 EN 60156:1995 IEC 60156:1995	Isolierflüssigkeiten – Bestimmung der Durchschlagspannung bei Netzfrequenz – Prüfverfahren.	
	VDE 0370-20:1999-03 DIN EN 60814:1999-03 EN 60814:1997 IEC 60814:1997	Isolierflüssigkeiten – Ölimprägniertes Papier und ölimprägnierter Pressspan – Bestimmung von Wasser mit automatischer Karl-Fischer-Titration.	
	VDE 0380-2:2005-01 DIN EN 60247:2005-01 EN 60247:2004 IEC 60247:2004	Isolierflüssigkeiten – Messung der Permittivitätszahl, des dielektrischen Verlustfaktors (tan δ) und des spezifischen Gleichstrom-Widerstandes.	

ВЯРНО С ОРИГИНАЛА

DAkkS Deutsche Akkreditierungsstelle

Fach-bereich	Norm oder Prüfverfahren / Ausgabestand	Titel der Norm oder des Prüfverfahrens	Einschränkungen zum Prüfverfahren
	VDE 0370-31:2004-04 DIN EN 62021-1:2004-06 EN 62021-1:2003 IEC 62021-1:2003	Isolierflüssigkeiten – Bestimmung des Säuregehaltes – Teil 1: Automatische potentiometrische Titration.	
	E VDE 0278-655-1:2015-08 E DIN EN 50655-1:2015-08 prEN 50655-1:2015	Kabel und isolierte Leitungen – Garnituren – Materialcharakterisierung – Teil 1: Fingerprintprüfungen für Reaktionsharzmassen.	Einschränkung: Keine Volumenschwindung.
	VDE 0355-3-8:2014-03 DIN EN 60455-3-8:2014-03 EN 60455-3-8:2013 IEC 60455-3-8:2013	Reaktionsharzmassen für die Elektroisolierung – Teil 3: Anforderungen an einzelne Werkstoffe – Blatt 8: Reaktionsharzmassen für Kabelgarnituren.	Einschränkung: Keine Volumenschwindung.

ВЯРНО С ОРИГИНАЛА

DAkkS Deutsche Akkreditierungsstelle

Немски Орган за Акредитация ООД

Възложено според раздел и подраздел 1 от Закон за акредитиращите (AkkStelleG) и във връзка с раздел 1 и подраздел 1 от Закон за регулиране на акредитиращите
Подписали многостранните споразумения на
EA, ILAC и IAF за взаимно признаване

АКРЕДИТАЦИЯ

Немският Орган за Акредитация ООД удостоверява, че изпитателната лаборатория

Иноги СЕ
Опернплатц 1, 45128 Есен

Местонахождение:

Иноги СЕ
Еротест
Унтерсте-Уилмс-Щрасе 52, Дортмунд

е компетентна според условията на DIN EN ISO/IEC 17025:2005 да провежда изпитания в следните области:

Уреди и съоръжения високо напрежение, комбинации ниско напрежение комутиращи уреди, кабели, гарнитури за силнотокови кабели, пресови и винтови съединители, изолационни материали (изолационни масла), Електромагнитна съвместимост (EMC), Заземителни съоръжения, както и лични предпазни средства при електродъгово въздействие

Сертификатът за акредитация е валиден само с известието за акредитация от 20.10.2016 г. с акредитационен номер D-PL-20575-01 и е валиден до 28.07.2021 г. Той съдържа заглавната страница, гърба на заглавната страница и следващото приложение от общо 9 страници.

Регистрационен номер на сертификата: **D-PL-20575-01-00**

Франкфурт на Майн, 20.10.2016

Дипл. Инж. Ралф Егнер
Ръководител направление
подпис

на основание чл. 36а, ал. 3 от ЗОП

ПРИЛОЖЕНИЕ № 2.6

ДЕКЛАРАЦИЯ

От Ганчо Желев Ганев ЕГН 6204087645
Управител на фирма "МАКРИС – ГПХ" ООД,
със седалище в гр. София, ул. "Арх. Франк Лойд Райт" №1Б
БУЛСТАТ 113030261

ДЕКЛАРИРАМ, че:

ОФЕРТИРАНИТЕ ОТ ФИРМА МАКРИС-ГПХ ООД СЪЕДИНИТЕЛНИ МУФИ ЗА КАБЕЛИ 0,6/1 KV С PVC ИЗОЛАЦИЯ И ОБВИВКА, ОТ 16 ММ^2 ДО 240 ММ^2, ТОПЛОСВИВАЕМИ СЪОТВЕТСТВАТ НА ИЗИСКВАНИЯТА НА ПАРАГРАФИ "ХАРАКТЕРИСТИКА НА МАТЕРИАЛА" И "СЪОТВЕТСТВИЕ НА ПРЕДЛОЖЕНОТО ИЗПЪЛНЕНИЕ С НОРМАТИВНО-ТЕХНИЧЕСКИТЕ ДОКУМЕНТИ" ОТ ДОКУМЕНТАЦИЯТА ЗА УЧАСТИЕ.

Настоящата декларация подавам във връзка с участие в „открита" по вид процедура за сключване на рамково споразумение с предмет:

ДОСТАВКА НА АРМАТУРА ЗА КАБЕЛИ И ПРОВОДНИЦИ
РЕФ. № PPD 19-009

- **организирана от "ЧЕЗ РАЗПРЕДЕЛЕНИЕ БЪЛГАРИЯ" АД.**

20.05.2019 год.
Гр. София

на основание чл. 36а, ал. 3 от ЗОП

Декларатор:
(инж. Ганчо Ганев
Управител)

МАКРИС-ГПХ
СОФИЯ
ООД

ПРИЛОЖЕНИЕ № 2.7

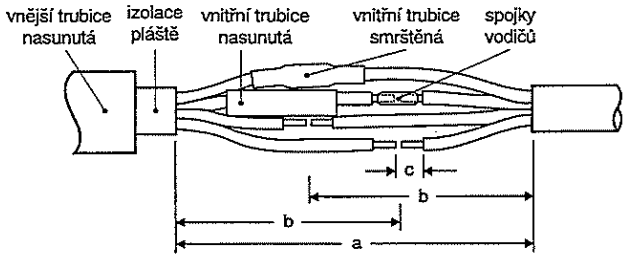
a Nexans company

МОНТАЖНИ ИНСТРУКЦИИ ЗА ТЕРМОСВИВАЕМИ МУФИ
за кабели с пластмасова изолация 2.5 mm² - 240 mm² 0,6/1 kV
редакция от 28.9.2017

Термосвиваемата муфа се състои от няколко малки термосвиваеми тръби за изолиране на съединителите (вътрешни тръби) и една голяма за възстановяване на външната обвивка (външна тръба). Вътрешната страна на тръбите е покрита с термотопимо лепило. Готовата муфа може да се полага в шахти, земни изкопи, тръби, инсталационни канали и др.

Монтажът може да се проведе по схемите от Вариант 1 или Вариант 2.

Вариант 1 - Съединителите са разместени



Вариант 2 -Съединителите са в една равнина

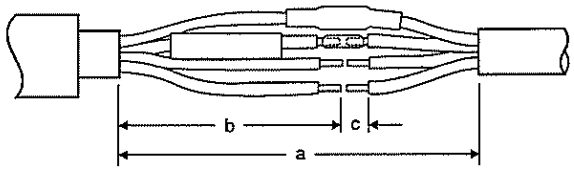


ТАБЛИЦА - Размери на кабелната разделка

Сечение на жилата *(mm²)*							
Тип SLV	2.5-10	6-25	16-50	25-95	35-185	120-240	240/1x120
Размери							
a (mm)	200	300	400	500	520	600	580
b	дължина на вътрешната тръба + дължината на съединителя						
c	половината дължина на съединителя + 10 mm (за пресов съединител)						

I. Подготовка на кабелите

1. Да се избере един от вариантите за монтаж - със съединителите в една равнина или разместени. Да се избере размера на муфата, съобразявайки се със сечението на кабелите. Да се отстрани външната обвивка на кабелите до размерите, дадени в таблицата. Да се оформят и позиционират жилата. Да се отрежат жилата до разделителните линии в съответствие с Вариант 1 или Вариант 2.

2. Да се свали изолацията на жилото на половината дължина на съединителя + 10 mm (за пресов съед.).

3. Да се почисти външната обвивка на двата кабела на разстояние дължината на външната тръба. Да се напъха външната тръба на единия от кабелите.

4. Да се напъхат вътрешните тръби на по-дългите краища на жилата.

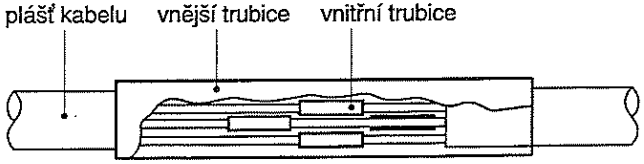
II. Свързване на жилата

Да се свържат жилата чрез съединителите (пресови, винтови или други). Да се отстранят внимателно острите ръбове или чепълците от съединителите. Старателно да се почисти и обезмасли изолацията на жилата.

III. Свиване на тръбите

Общи положения
Да се използва газ пропан. Да се регулира пламъкът, така че да се получи жълт (мек) пламък, което гарантира температура 120-140 С. ДА НЕ СЕ ИЗПОЛЗВА КОНЦЕНТРИРАН (СИН) ПЛАМЪК. В процеса на свиване пламъкът да се движи по посока на свиването за предварително подгряване на тръбата. Пламъкът да се движи непрекъснато, за да се избегнат местните прегрявания, със спокоен, плавен ход, кръгово и по дължината на тръбата. Винаги свиването на тръбата да се започва от средата към краищата ѝ. Винаги да се осигурява добра вентилация на работното помещение.

Последователност на монтажа
1. Да се центрират вътрешните тръби върху съединителите и да се свият.
2. Да се центрира външната тръба над мястото за съединяване и да се свие.



IV. Съдържание на комплекта

1. Вътрешна тръба	4 бр.
2. Външна тръба	1 бр.
3. Монтажни инструкции	1 бр.
4. Опаковка	1 бр.

МАКРИС - ГПХ ООД
СОФИЯ 1336
Ул. "Ген. Константин Константинов" 5

тел.: 02/ 925 08 68; тел./факс: 02/ 925 26 20
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ПРИЛОЖЕНИЕ № 2.8

ИНСТРУКЦИЯ ЗА СЪХРАНЕНИЕ И ТРАНСПОРТИРАНЕ НА ТЕРМОСВИВАЕМИ СЪЕДИНИТЕЛНИ МУФИ ЗА НН

1. **Съхранение:**
   Термосвиваемите съединителни муфи НН се съхраняват в сухи и закрити помещения в стандартната им опаковка.

2. **Транспортиране:**
   Термосвиваемите съединителни муфи НН се транспортират в стандартната им опаковка.

МАКРИС-ГПХ ООД

ПРИЛОЖЕНИЕ № 2.9

РЕМОНТНИ РЪКАВИ СЪС СТОМАНЕН ПРОФИЛ (ЦИП), ЗА КАБЕЛИ ДО 240 ММ^2 С PVC/PE ЗАЩИТНА ОБВИВКА, ТОПЛОСВИВАЕМИ

ТИП: GT 11 ...

ПРОИЗВОДИТЕЛ: NEXANS ITALIA S.p.A. – ИТАЛИЯ

КАТАЛОГ: POWER CABLE ACCESSORIES FOR LOW, MEDIUM AND LOW-HIGH VOLTAGE, 2016

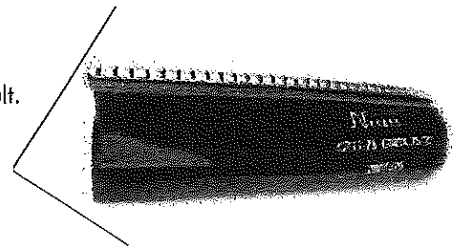
ПРИЛОЖЕНИЕ № 2.10

GT11/GT11 R

HEAT-SHRINKABLE ADHESIVE LINED WRAP AROUND REAPIR SLEEVE

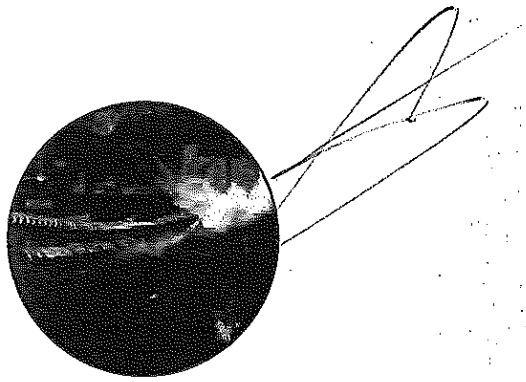
Application

GT11 is an adhesive lined wraparound sleeve, while GT11R is a fiber reinforced version.
Ideal for joint outer sheath rebuilding on both LV and MV applications when space is limited, or when parking the outer jacket tubing is difficult.
GT11 R provides superior impact and cut through resistance.

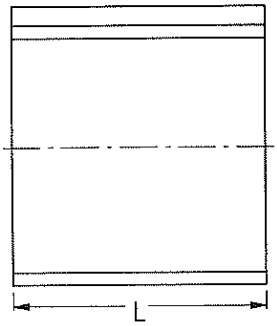


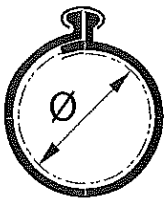
Technical characteristics

Material	Crosslinked polyolefin	
Colour	Black	
Continuous operating temp.	-40°C to +135°C	
Minimum shrink temp.	125°C	
Density	1,1 g/cm³±10%	ASTM D-1505 / ISO R1183
Tensile strength	20÷25 N/mm²	ASTM D-412 / ISO 37
Ultimate elongation	500%÷600%	ASTM D-412 / ISO 37
Dielectric constant	<5	IEC 250
Volume resistivity	>1x10¹³Ohm.cm	IEC 93
Dielectric strength	>15 kV/mm	IEC 243
Water absorption	<0,2%	DIN 53495 / ISO 92
Fungus and mildew resistance	V applied: 1, with: GL0	ASTM G 21
Contents of carbon black	>2,5%	ASTM 2671
Chemical resistance	(Treatment with 0,1NNa2SO4, H2SO4, NaOH, NaCl)	



type	Ø as supplied / after full recovery (mm)	Tk wall thickness after full recovery (mm)	L (m)
GT11-34 / GT11-34 R	41/10	2,5	1,0
GT11-50 / GT11-50 R	55/15	2,5	1,0
GT11-75 / GT11-75 R	75/22	2,8	1,0
GT11-105 / GT11-105 R	105/30	3	1,0
GT11-120 / GT11-120 R	120/40	3,5	1,0
GT11-146 / GT11-146 R	146/38	3,5	1,0
GT11-164 / GT11-164 R	164/42	3,5	1,0
GT11-200 / GT11-200 R	200/55	3,5	1,0





ПРИЛОЖЕНИЕ № 2.11

INSTITUT „PRÜFFELD FÜR ELEKTRISCHE HOCHLEISTUNGSTECHNIK" GMBH IPH BERLIN

Independent, accredited testing station · Member laboratory of STL and LOVAG

TEST REPORT

NO. 1569.0589.6.297

Euromold N.V. a NEXANS Company ZUID III - industrielaan 12 9320 Erembodegem BELGIUM	CLIENT
NEXANS Italia Spa. Contrada Tesino 181B 63035 OFFIDA, (AP) ITALY	MANUFACTURER
Transition joint for three-core belted cable with impregnated paper insulation to three single-core cables with extruded plastic insulation	TEST OBJECT
* 24GTM3.1.385CY	TYPE
1 test sample	MANUFACTURING NO.
Rated voltage U_0/U 6.35/11 kV Highest voltage for equipment U_m 12 kV Rated cross-section range 95..300 mm^2	RATED CHARACTERISTICS GIVEN BY THE CLIENT
IEC 60055-1: 2005-05 Edition 5.1	NORMATIVE DOCUMENT
Test series 2.3	RANGE OF TESTS PERFORMED
14 to 24 July 2006	DATE OF TEST
See Sub-clause 4.7	TEST RESULT

ВЯРНО С ОРИГИНАЛА

на основание чл. 36а, ал. 3 от ЗОП	на основание чл. 36а, ал. 3 от ЗОП
H. GLABSCH Head of test laboratories	J. WITTWER Test engineer in charge

Berlin, 20 April 2007

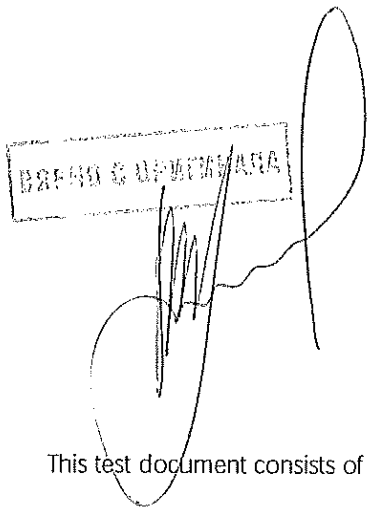
* Окомплектацията включва топлосвиваеми ръкавици ръкави със стави при цип тип GTM... (виж опис на комплекта от инструкцията за монтаж)

INSTITUT PRÜFFELD FÜR ELEKTRISCHE HOCHLEISTUNGSTECHNIK GMBH IPH BERLIN

Independent test laboratory, accredited by Deutsche Akkreditierungsstelle Technik (DATech) e.V. in the fields of h.v. apparatus and switchgear, power cables and power cable accessories, l.v. apparatus and switchgear, installation equipment and switching and control equipment.

Deutscher Akkreditierungs Rat DAR
DAT - P - 019/92

Contents



This test document consists of 34 sheets.

Distribution

Copy No.: 1

Copy No. 1 in English:

Euromold N.V. a NEXANS Company

1. Present at the test

Mr.	Wittwer	IPH test engineer in charge
Mr.	Borchert, Ronald	IPH test engineer (short-circuit tests)
Mr.	De Ridder	Euromold N.V. a NEXANS Company (partially present)

2. Test performed

The complete test series 2.3 in the following order:

Sequence of tests	Test	Type of test
2.3	1	DC withstand test [1)]
	2	AC withstand test [1)]
	3	Thermal short-circuit test (conductor)
	4	Dynamic short-circuit test (conductor)
	5	Impulse test
	6	AC withstand test

Notes:

[1)] IEC 60055: 2005-03 requires only one of either tests

3. Identity of the test object

3.1 Technical data and characteristics

The technical data and characteristics of the test objects are defined by the following parameters and specified by the client.

Test object:	Transition joint for three-core belted cable with impregnated paper insulation to three single-core cables with extruded plastic insulation			
Type:	24GTM3.1.385CY			
Manufacturer:	NEXANS Italia Spa.			
Serial No.:	1 test sample			
Year of manufacture:	2006			
Rated characteristics:	Rated voltage	U_0/U	6.35/11	kV
	Highest voltage for equipment	U_m	12	kV
	Rated cross-section range		95...300	mm²
Design:	Design of joint		Heat-shrink transition joint with tin plated crimp connector, hexagonal crimped, with oil barrier	
	Type of joint		I (without impact strength at ambient temperature)	
	Cable 1	Belted cable with mass-impregnated paper insulation		
	Cable 2	Three single-core cable with extruded plastic insulation		
	Cable marking	1	3x185 SM, Cu paper-insulated; 11	kV
		2	1x185 RE, Alu XLPE-insulated; 11	kV
	Manufacturer	Cable 1	KUNMING CABLE	
	Manufacturer	Cable 2	Nexans Hellas	

3.2 Identity documents

The manufacturer confirms that the test object has been manufactured in compliance with the drawings given in this document. IPH did not verify this compliance in detail. The identity of the test object is fixed by the following drawings and data submitted by the client:

Name of drawing	Drawing No.	Date of drawing	Author	Notes
Jointing Instruction 24GTM3.1....CY Sheet 1-10	IM857bi	19.04.2006	Nexans	Sheets 23 to 32

Entry of test objects at IPH: 13 July 2006

4. Test series 2.3

4.1 Test laboratory

High-voltage test laboratory, high-voltage hall 2 and
Low-voltage test laboratory, test room 2

4.2 Normative document

IEC 60055-1: 2005-05 Edition 5.1

4.3 Required test parameters

Test No.	Type of test	Required test parameters	
1	DC withstand test	Test voltage 6 x U_0: Duration of test: Polarity:	38 kV 15 min Negative
2	AC withstand test	Test voltage 4.5 x U_0: Test frequency: Duration of test:	28.5 kV 50 Hz 5 min
3	Thermal short-circuit test (conductor)	Short-circuit-conductor final temperature: Number of short-circuits:	160 °C 2
4	Dynamic short-circuit test (conductor)	Peak short-circuit current: Duration of short circuit: Number of short-circuits:	68 kA min. 10 ms 1
5	Impulse test	Front time: Virtual time to half value: Test voltage: Number of impulses: Polarity: Conductor temperature:	1.2 µs 50 µs 95 kV 10 impulses pos./neg. ϑ_u
6	AC withstand test	Test voltage 2.5 x U_0: Test frequency: Duration of test:	16 kV 50 Hz 15 min

Notes:
Since IEC 60055: 2005-05 gives test voltage parameters only for 6/10 (12) kV and not for 6.35/11 (12) kV, the higher parameters were taken from CENELEC Document HD 629.2 S2: 2006.

4.4 Test arrangement

The accessory was tested on one test line. For this, the client had mounted the transition joint under test of 24GTM3.1.385CY type (test object 1) onto an altogether approx. 7-m cable line of 3x185 SM, Cu paper-insulated; 11 kV and 1x185 RE, Alu XLPE-insulated; 11 kV type. The test object was centrally arranged, spaced by approx. 3 m. To apply the test voltage, the test line had additionally been equipped on each side with sealing ends (made by Euromold).

All test voltages were applied to the core against the cable screen and the armouring, which were connected to the test earth.
The tests did not start earlier than 24 hours after the installation of the accessories on the cable lines.

4.4.1 DC withstand test (test 1)

Test arrangement to IEC 61442: 2005, Clause 5.

The test voltage was applied subsequently to each of the conductors. The conductors were not under test and the screen was earthed.

4.4.2 AC withstand test (test 2)

Test arrangement to IEC 61442: 2005, Clause 4.

The test was three-phase. The three phase-displaced voltages were supplied by three single-phase transformers in star arrangement with earthed neutral point.

4.4.3 Thermal short-circuit test (conductor) (test 3)

Test arrangement to IEC 61442: 2005, Clause 11.

The cable conductors were tested three-pole. They were connected directly to the short-circuit test circuit. The other cable end was short-circuited by a bar.

4.4.4 Dynamic short-circuit test (conductor) (test 4)

Test arrangement to IEC 61442: 2005, Clause 12.

See Sub-clause 4.4.3

4.4.5 Impulse test (test 5)

Test arrangement to IEC 61442: 2005, Clause 6.

The test voltage was applied subsequently to each of the conductors. The conductors were not under test and the screen was earthed.

4.4.6 AC withstand test (test 6)

Test arrangement to CENELEC Harmonisation Document HD 628 S1 November 1996 + A1: 2001, Clause 4.

See Sub-clause 4.4.2

4.5 Test and measuring circuits

4.5.1 DC withstand test (test 1)

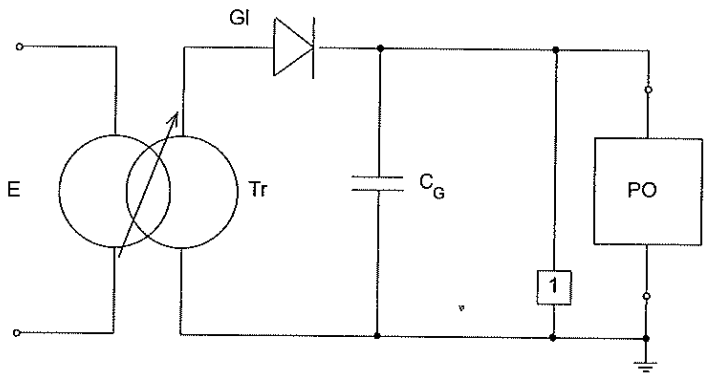
Technical data of test circuit

DC voltage source

Test transformer:	Rated voltage	100	kV
	Rated power	8	kVA
	Rated frequency	50	Hz
Rectifier:	Rated voltage	135	kV
	Rated current	15	mA
Smoothing capacitor:	Capacitance	10	nF

Technical data of measuring circuit

Measuring point	Measured quantity	Measuring sensor/device	Technical parameters
1	Test voltage	Ohmic divider with MU11 (TuRD) peak voltmeter	Ratio 560



E Supply
Tr Test transformer with variable transformer connected in series
Gl Rectifier
C_G Smoothing capacitor
1 Measuring point
PO Test object

Figure 1: Test and measuring circuit for the DC voltage withstand test

4.5.2 AC withstand test (tests 2 and 6)

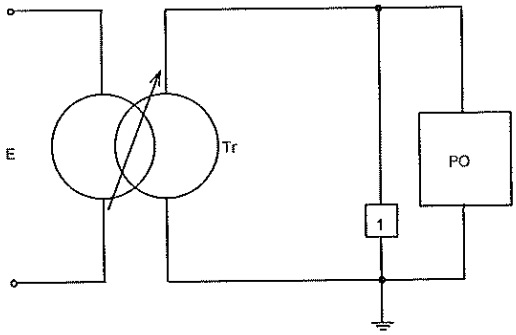
Technical data of test circuits

Three-phase AC voltage source

Test transformer:	Rated voltage	50	kV
	Rated power	4.4	kVA
	Rated frequency	50	Hz

Technical data of measuring circuit

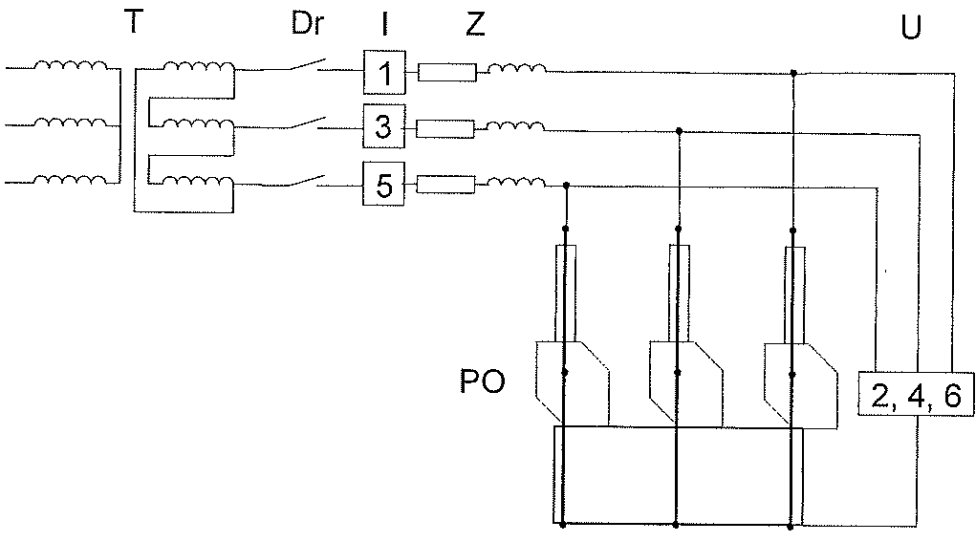
Measuring point	Measured quantity	Measuring sensor/device	Technical parameters
1, 2, 3	Test voltages L1, L2, L3	Measuring winding in test transformer and internal voltage display (TuRD)	Calibration of the display in peak/square root



E Supply
Tr Test transformer with variable transformer connected in series
1 Measuring point
PO Test object

Figure 2: Test and measuring circuit for the AC voltage withstand test (representation of a single-phase unit)

4.5.3 Thermal short-circuit test (conductor) (test 3)



T Short-circuit transformer
Z Test circuit impedance
Dr Making switch
U Measurement of voltage drop or transient voltage, resp.
I Measurement of short-circuit current
PO Test object

Figure 3: Test and measuring circuits for the three-pole short-circuit tests of the cable conductors

4.5.4 Dynamic short-circuit test (conductor) (test 4)

See Sub-clause 4.5.3

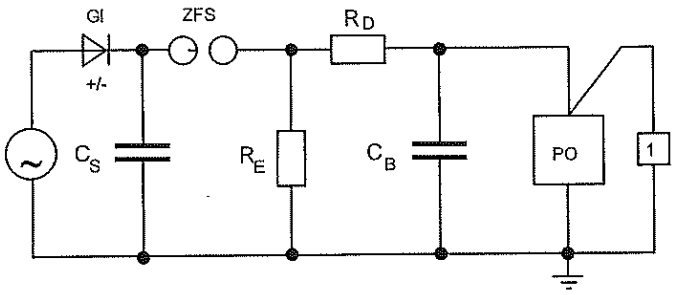
4.5.5 Impulse test (test 5)

Technical data of test circuit

Impulse circuit:	Number of stages	n	=	2	
	Impulse capacitance	C_S	=	70	nF
	Loading capacitance	C_B	=	1.5	nF
	Damping resistance	R_D	=	122	Ω
	Discharge resistance	R_E	=	1100	Ω

Technical data of measuring circuit

Measuring point	Measured quantity	Measuring sensor/device	Technical parameters
1	Test voltage	R divider of SMR 10/770 type (TuRD) with digital measuring instrument of DMI 551 type (HAEFELY) and TDS 220 digital oscilloscope (Tektronix)	Ratio 466.7



Gl	Rectifier	R_D	Damping resistance
C_S	Impulse capacitance	C_B	Loading capacitance
ZFS	Spark gap	PO	Test object
R_E	Discharge resistance	1	Measuring point

Figure 4: Test and measuring circuit for the impulse voltage test

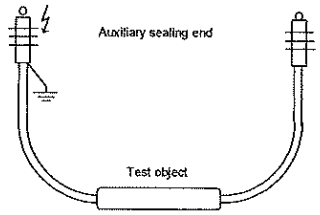
4.6 Test results

4.6.1 DC withstand test (test 1)

Polarity: Negative

Duration of test after having reached full voltage: 15 min

Test temperature: Ambient temperature 25 °C
Conductor temperature 25 °C

Test set-up			Test voltage	Result
				
No. of test object	Voltage applied to	Earthed	kV	
1	Conductor L1	L2, L3, screen	-38	No disruptive discharge
	Conductor L2	L1, L3, screen	-38	No disruptive discharge
	Conductor L3	L1, L2, screen	-38	No disruptive discharge

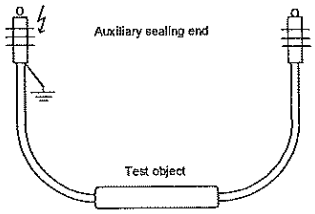
Notes: -

4.6.2 AC withstand test (test 2)

Duration of test after having reached full voltage: 5 min

Test frequency: 50 Hz

Test temperature: Ambient temperature 25 °C
Conductor temperature 25 °C

Test set-up 			Test voltage	Result
No. of test object	Voltage applied to	Earthed	kV	
5 and 6	Conductor L1	Screen	28.5	No disruptive discharge
	Conductor L2	Screen	28.5	No disruptive discharge
	Conductor L3	Screen	28.5	No disruptive discharge

Notes:
Voltage applied three-phase.

4.6.3 Thermal short-circuit test (conductor) (test 3)

Test object:	No. 1
Condition of test object before test:	Prestressed
Connection of the test object:	Cable conductor to short-circuit test circuit, 3pole
Short-circuit point:	At the end of the cable conductors
Ambient temperature:	20 °C

Test parameters:

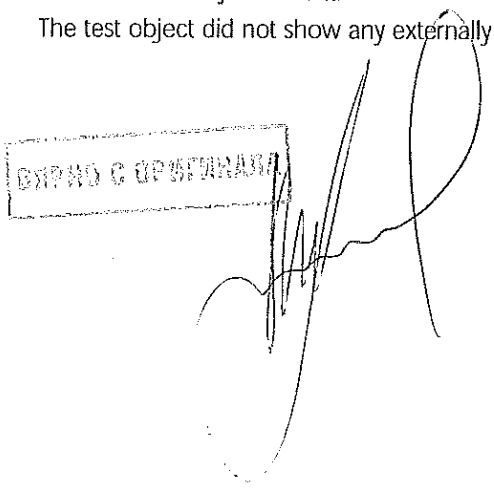
Test No.		206 3272	206 3273
Test voltage	V	721	720
Symmetrical short-circuit current	kA	26.8	26.8
Duration of short-circuit	ms	1019	1034
Joule integral 10^6	A^2s	737	748
Symmetrical short-circuit current 1 s	kA	27.1	27.3
Notes		1st thermal short-circuit test	2nd thermal short-circuit test
Evaluation		OK	OK

Notes:

OK: The test object is capable of properly carrying the short-time withstand current.

Condition of test object after test:

The test object did not show any externally visible changes or damage.



4.6.4 Dynamic short-circuit test (conductor) (test 4)

Test object:	No. 1
Condition of test object before test:	Prestressed by previous tests
Connection of the test object:	Cable conductor to short-circuit test circuit, 3pole
Short-circuit point:	At the end of the cable conductors
Ambient temperature:	20 °C

Test parameters:

Test No.			206 3274
Test voltage	V		725
Peak short-circuit current	kA	L1	52.6
		L2	58.0
		L3	68.9
Duration of short-circuit	ms		89.0
Notes			Dynamic short-circuit test
Evaluation			OK

Notes:

OK: The test object is able to carry the peak short-circuit current properly.

Condition of test object after test:

The test object did not show any externally visible changes or damage.

ВЯРНО С ОРИГИНАЛА

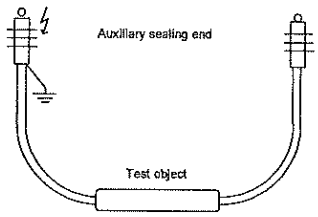
4.6.5 Impulse test (test 5)

Full wave:

Front time	T_1 = 1.42 µs
Virtual time to half value	T_2 = 57.5 µs

Test temperature:

Ambient temperature	25 °C
Conductor temperature	25 °C

Test set-up			Test voltage	Result
				
No. of test object	Voltage applied to	Earthed	kV	No. of impulses/disruptive discharges
1	Conductor L1	L2, L3, screen	+95 -95	10/0 10/0
	Conductor L2	L1, L3, screen	+95 -95	10/0 10/0
	Conductor L3	L1, L2, screen	+95 -95	10/0 10/0

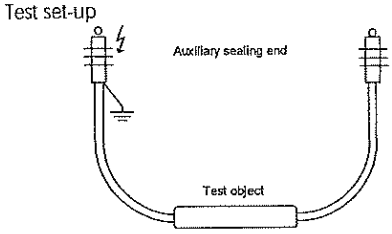
Notes: -

4.6.6 AC withstand test (test 6)

Duration of test after having reached full voltage: 15 min

Test frequency: 50 Hz

Test temperature: Ambient temperature 25 °C
Conductor temperature 25 °C

Test set-up			Test voltage	Result
				
No. of test object	Voltage applied to	Earthed	kV	
1	Conductor L1	Screen	16	No disruptive discharge
	Conductor L2	Screen	16	No disruptive discharge
	Conductor L3	Screen	16	No disruptive discharge

Notes:
Voltage applied three-phase.

4.7 Assessment of test series 2.3

• Test 1

In the DC withstand test at -38 kV/15 min, no disruptive discharge occurred on the test object.

• Test 2

In the AC withstand test at 28.5 kV/5 min, no disruptive discharge occurred on the test object.

• Test 3

In the thermal short-circuit test (conductor) with a thermally equivalent current of 27.3 kA/1 s, no visible damage was detected on the test object.

• Test 4

In the dynamic short-circuit test (conductor) with a peak current of 68.9 kA, no visible damage was detected on the test object.

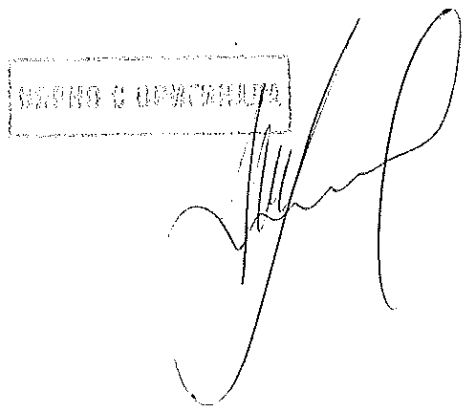
• Test 5

In the impulse test with 10 test impulses of 95-kV lightning impulse voltage 1.2/50 of each polarity, no disruptive discharge occurred on the test object.

• Test 6

In the AC withstand test at 16 kV/15 min, no disruptive discharge occurred on the test object.

The test object meets the requirements defined by IEC 60055: 2005-05, section 7.



5. Photos

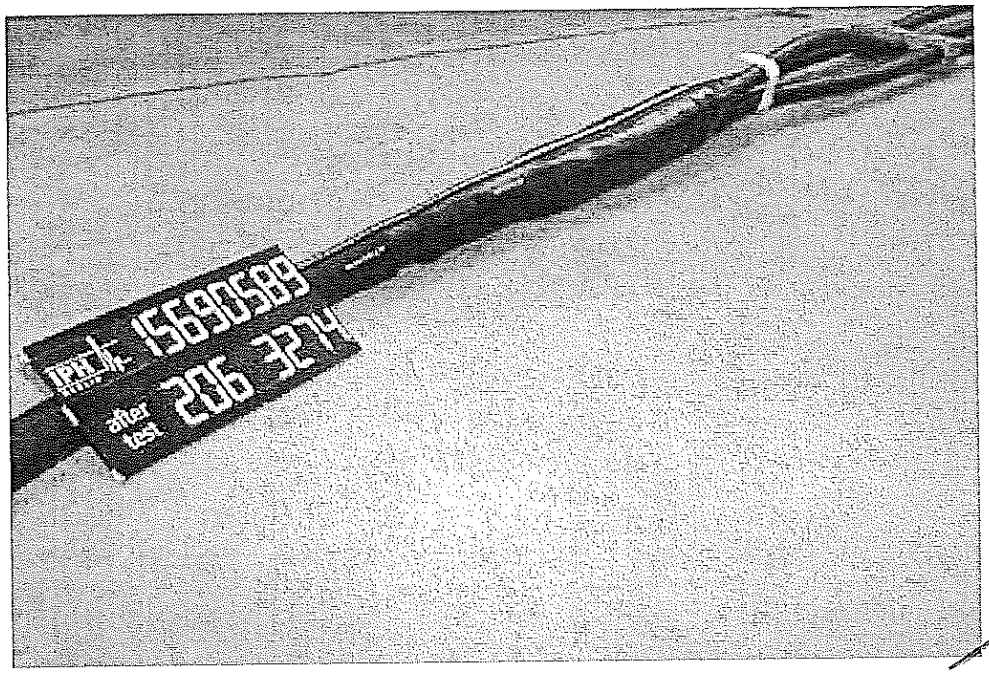


Figure 5: Test object after the of short-circuit tests on the conductor

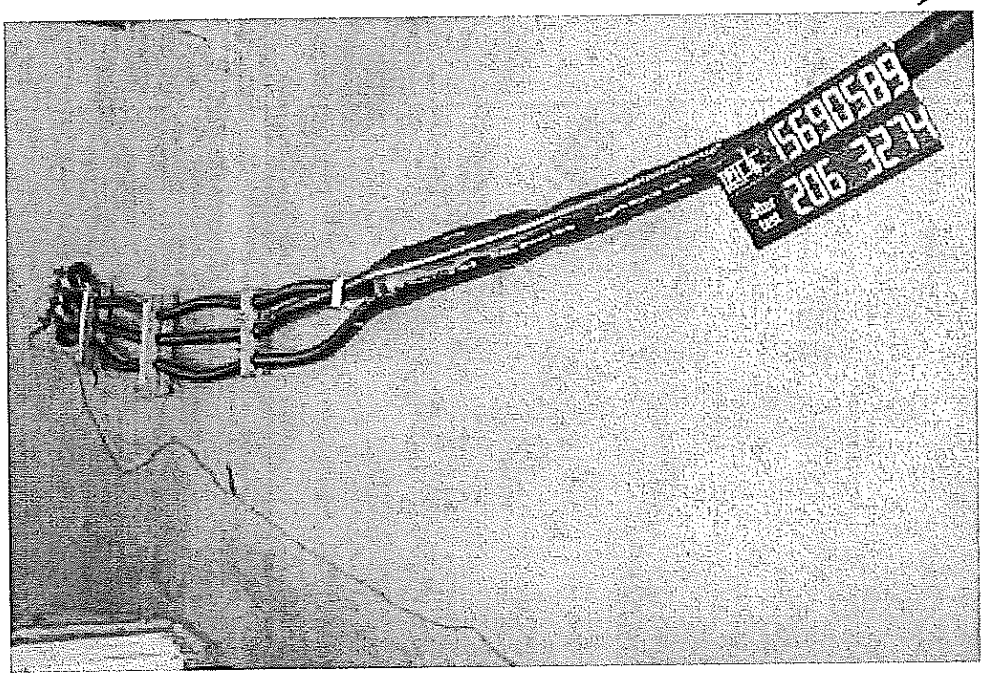
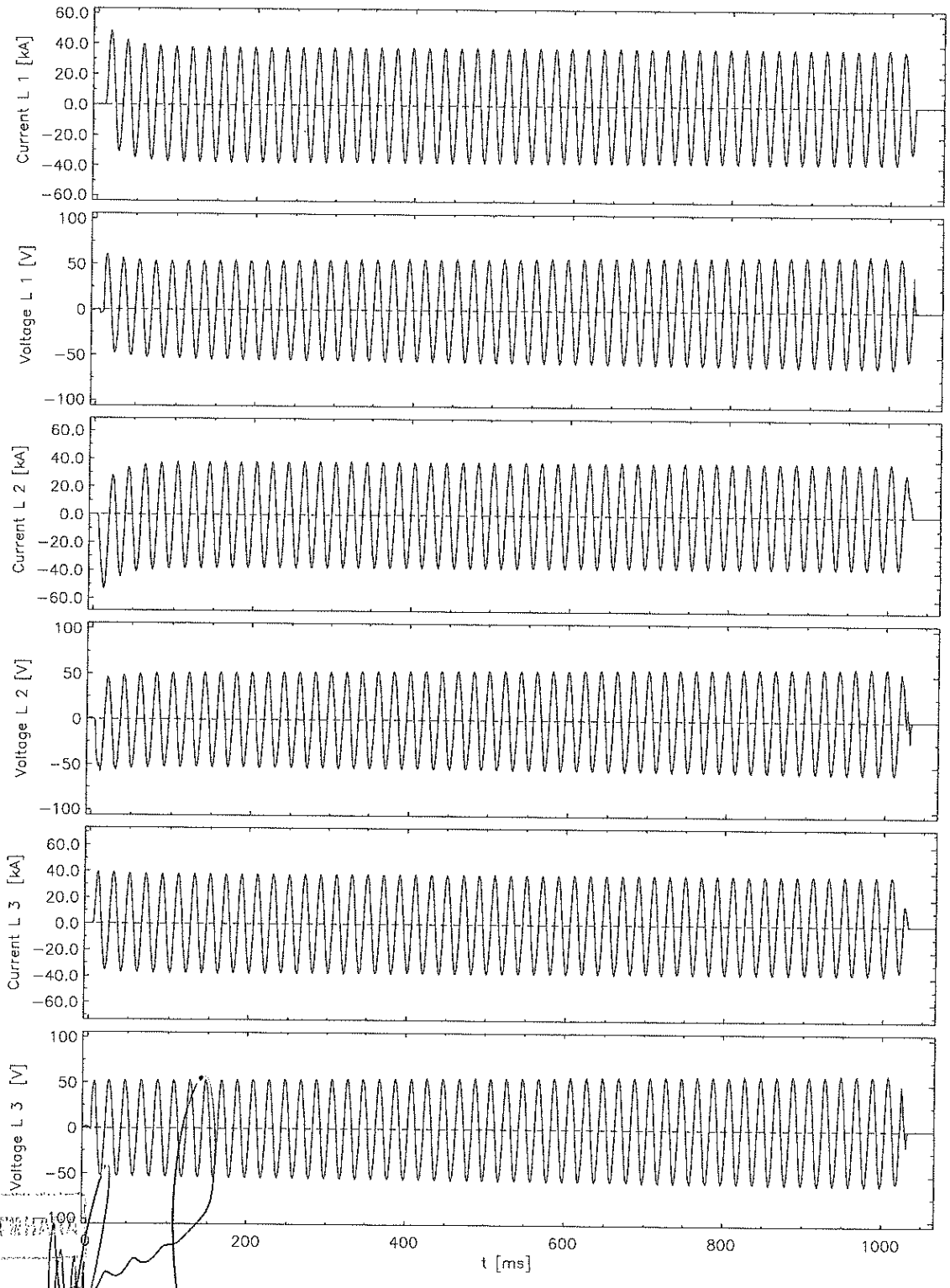


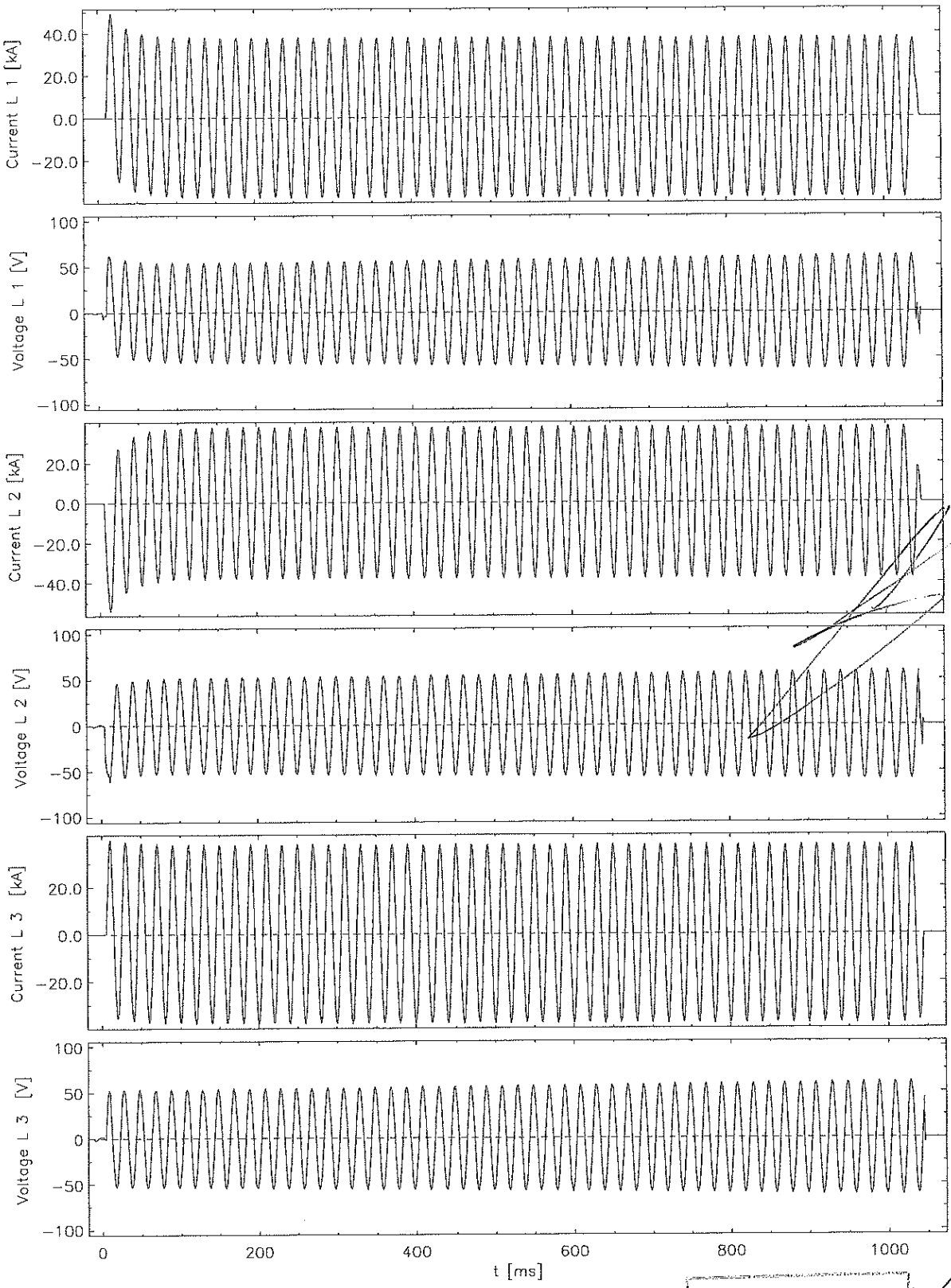
Figure 6: Test object after the of short-circuit tests on the conductor

6. Oscillograms

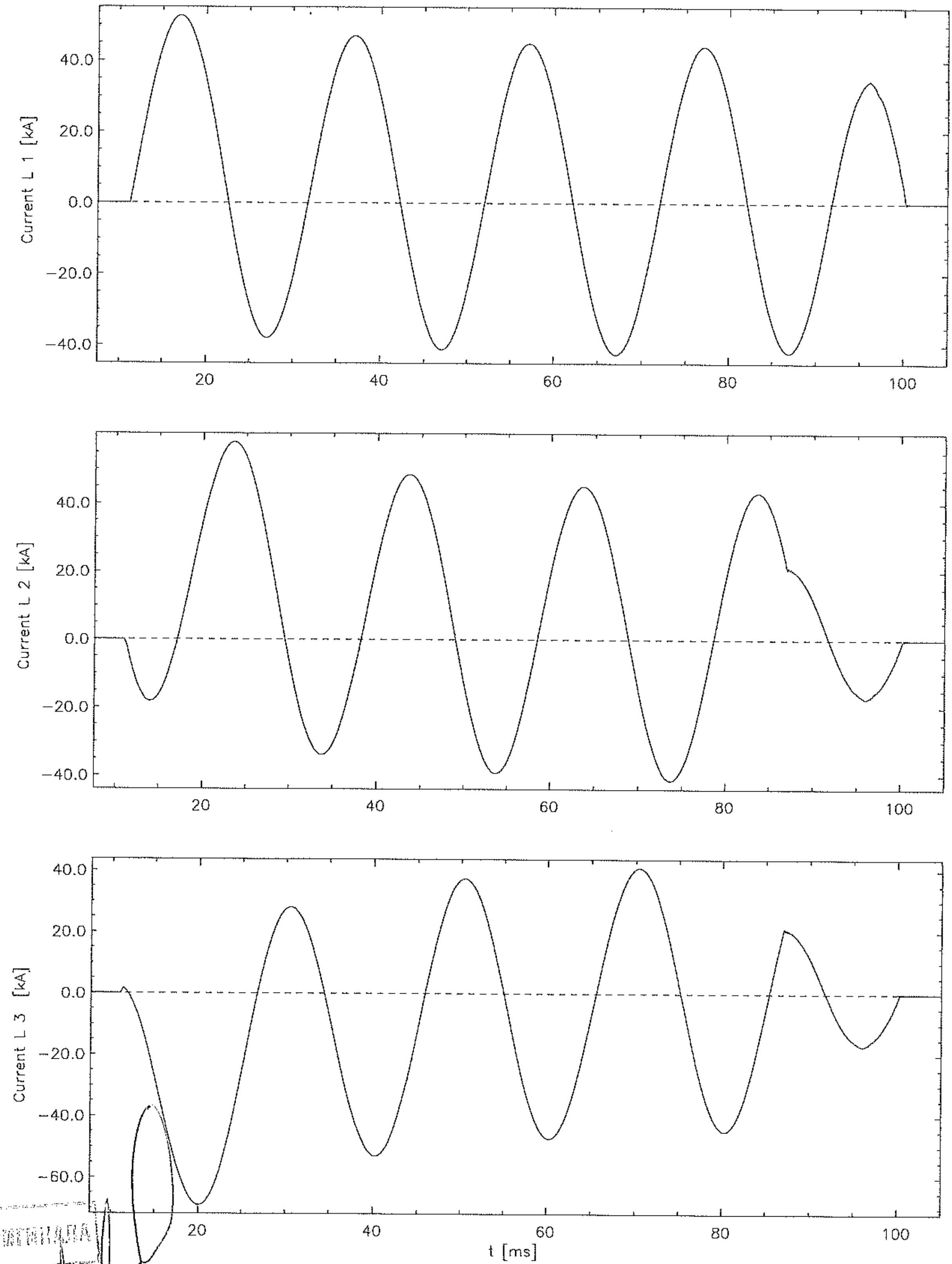
Test-No. 2063272



Test-No. 2063273



Test–No. 2063274



7. Drawings

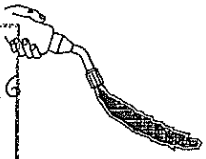
JOINTING INSTRUCTION

This product should be installed by competent personnel familiar with electrical equipment and safe operating practices. Parts contained in this kit should be visually inspected for possible damage, and installed in accordance with these instructions. These instructions are not intended as a substitute for adequate training and experience.

IPH has not checked the conformity to every detail

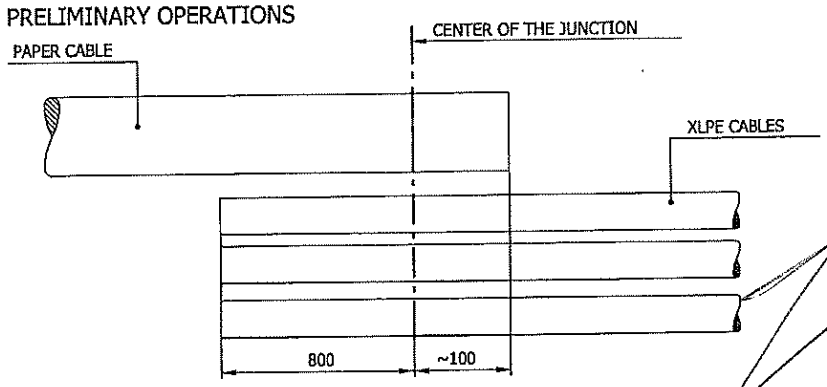
Client:
Signature:

IPH-Vorgangsnummer
1 5 6 9 0 5 8 9 G
Bearbeiter:
Datum:



Adjust torch to give a soft blue flame with yellow tip.
Heatshrink tubes uniformly avoiding wrinkles along the surface.
Keep the flame moving continously and maintain adequate distance to avoid over heating.

1. PRELIMINARY OPERATIONS



1.1 Straighten and set the cables with overlap at the joint position.

1.2 Clean the outer sheath of the cables for 1.5m.

1.3 Determine the center of the junction.

24GTM3.1....CY	THREE CORE HEATSHRINKABLE TRANSITION JOINT

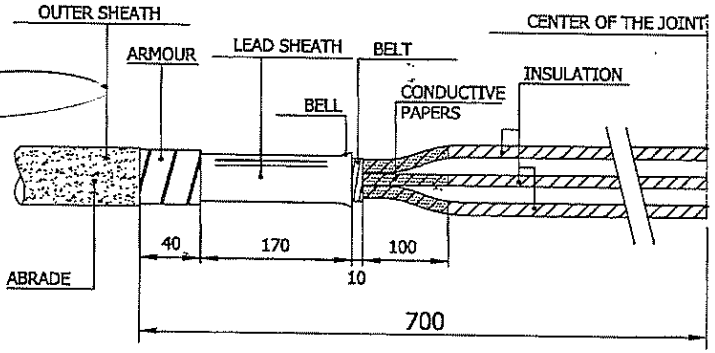
TYPE OF CABLE:	3C paper insulation, 1LEAD (Belted or screened) / STA-SWA ARMOUR 3x1C XLPE INSULATED - COPPER WIRES SCREEN, NOT ARMOURED
SECTION:	25 ÷ 400 mm² (Cu/Al)
VOLTAGE:	up to 24 kV

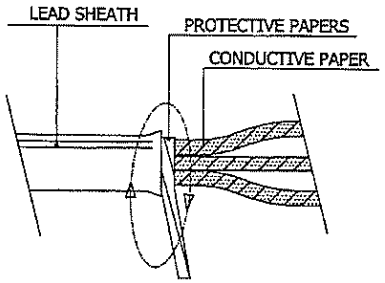
The company reserves the right to alter or modify the information in this document at any time in the light of technical or any other developments.

Nexans	Prepared by	Checked by	Approved by	IM857bi
	на основание чл. 36а, ал. 3 от			
	First issue 08.01.98	Rev. 19.04.06		Sheet 1/10

ВЯРНО С ОРИГИНАЛА

2. PREPARATION OF THE PAPER CABLE





2.1 Remove the outer sheath for a length of 700mm from the center of the junction.

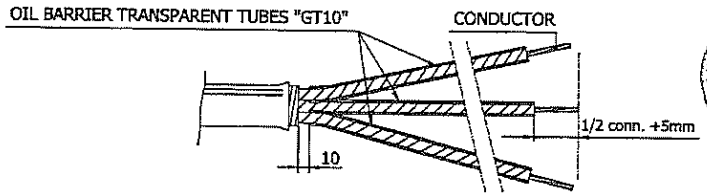
2.2 Remove the armour leaving 40mm out of the outer sheath.

2.3 Clean and degrease the lead sheath and abrade it for 180mm. Abrade the outer sheath for 250mm and clean with solvent. Remove the lead sheath leaving out 170mm from cut armour. Bell the lead sheath as shown.

2.4 Wrap for 10mm, at cut lead sheath, the protective papers. Make a knot to fix them.(See detail)

2.5 Shape the cable cores and cut to correct length (CENTER OF THE JUNCTION).

2.6 Remove the conductive paper leaving out 100mm from the belt. Remove two layers of paper insulation.



IPH has not checked the conformity in every detail

The appara... conforms to this drawing.

Client: Signature:

2.7 Position the oil barrier transparent tube "GT10" onto each core at 10mm from the belt and start heatshrinking from the crutch towards the center of the joint.

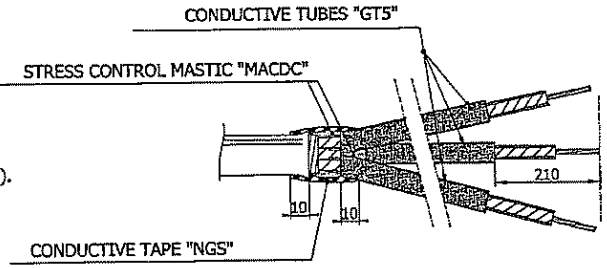
2.8 Bare the conductor for a length of half connector + 5mm. Clean the bared conductor

2.9 Position the conductive tubes "GT5" at "210mm" from the centre of the junction and start heatshrinking from the crutch towards the centre of the junction.

2.10 Make a small conical profile of stress control mastic "MACDC" and push well down into the cable crutch.

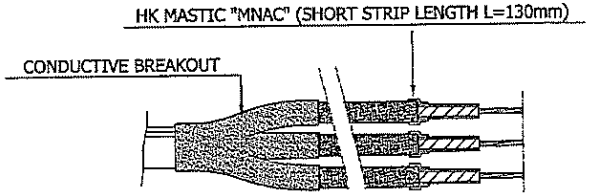
2.11 Wrap the cable belt with two layers of stress control mastic "MACDC" (50% overlap).

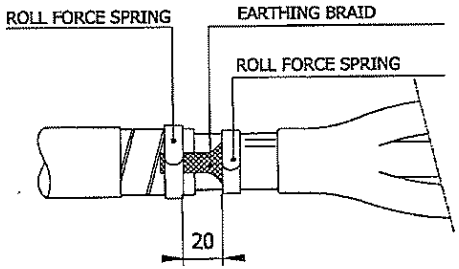
2.12 Apply two layers of conductive tape "NGS" (50% overlap) starting 10mm over the lead cover ending 10mm over the conductive tube "GT5".

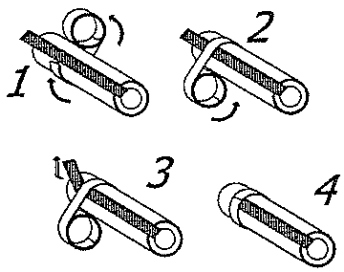


2.13 Slide the conductive breakout over the cores and pull it well down into the crutch. Start heatshrinking from the centre towards the extremities.

2.14 Apply a layer of HK mastic "MNAC" covering the conductive tube "GT5" and the oil barrier transparent tube "GT10" for 10mm.







2.15 Connect the eathing braids to the armour with the roll force spring.

- Connect the braids to the lead by the roll force spring (by flating the braids and following the steps shown in the pictures)
- Apply one turn of PVC tape around the springs.

IPH has not checked the conformity in every detail

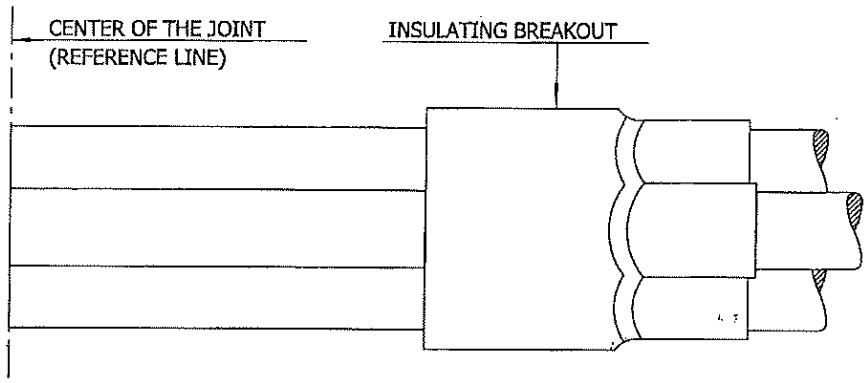
The apparatus under test conforms to this drawing.

Client:
Signature:
M. Fiuello

Nexans

IM857bI | Sheet 3/10

3. XLPE CABLES PREPARATION

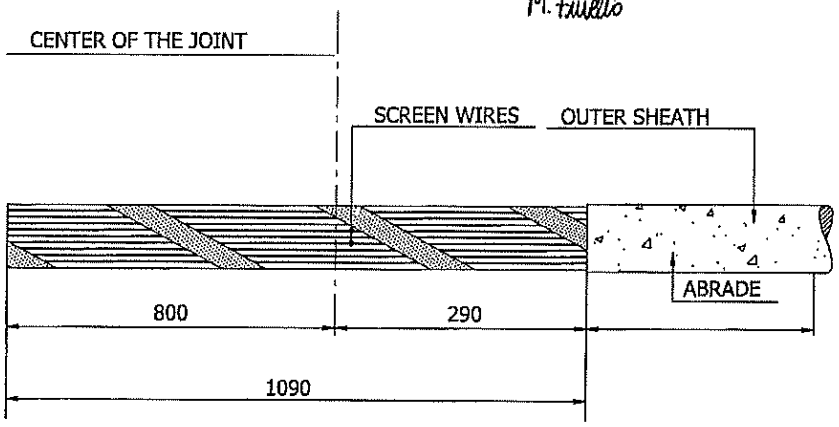


3.1 Slide the insulating breakout as shown in the picture.

IPH has not checked the conformity in every detail

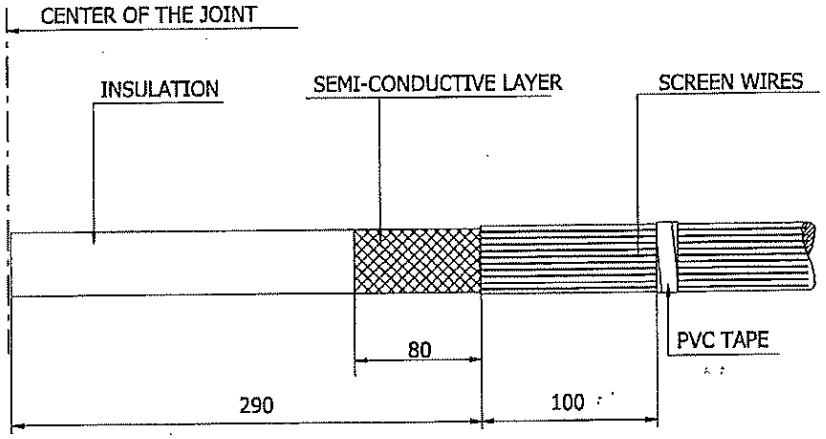
The apparatus under test conforms to this drawing.

Client:
Signature:



3.2 Remove the outer sheath for the length of 1090mm.(800mm+290mm).

3.3 Abrade the outer sheath for 300mm and clean.



3.4 Fold back the copper wires and bind temporarily with PVC tape at 100 from cut outer sheath.
(Do not cut the wires).

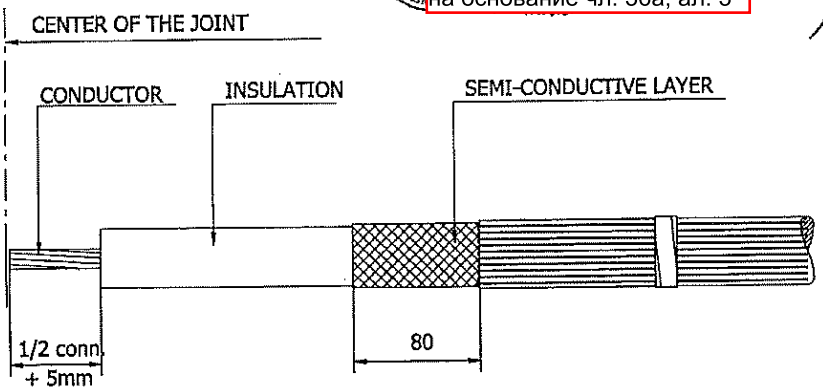
3.5 Cut the cables to the correct length (290mm)

3.6 Remove the semi-conductive layer leaving out 80mm from cut outer sheath.

IPH has not checked the conformity in every detail to this drawing.

на основание чл. 36а, ал. 3 от ЗОП

на основание чл. 36а, ал. 3



3.7 Bare the conductor for a length of half connector + 5mm.

3.8 Remove any eventual semi-conductive coating from the insulation.

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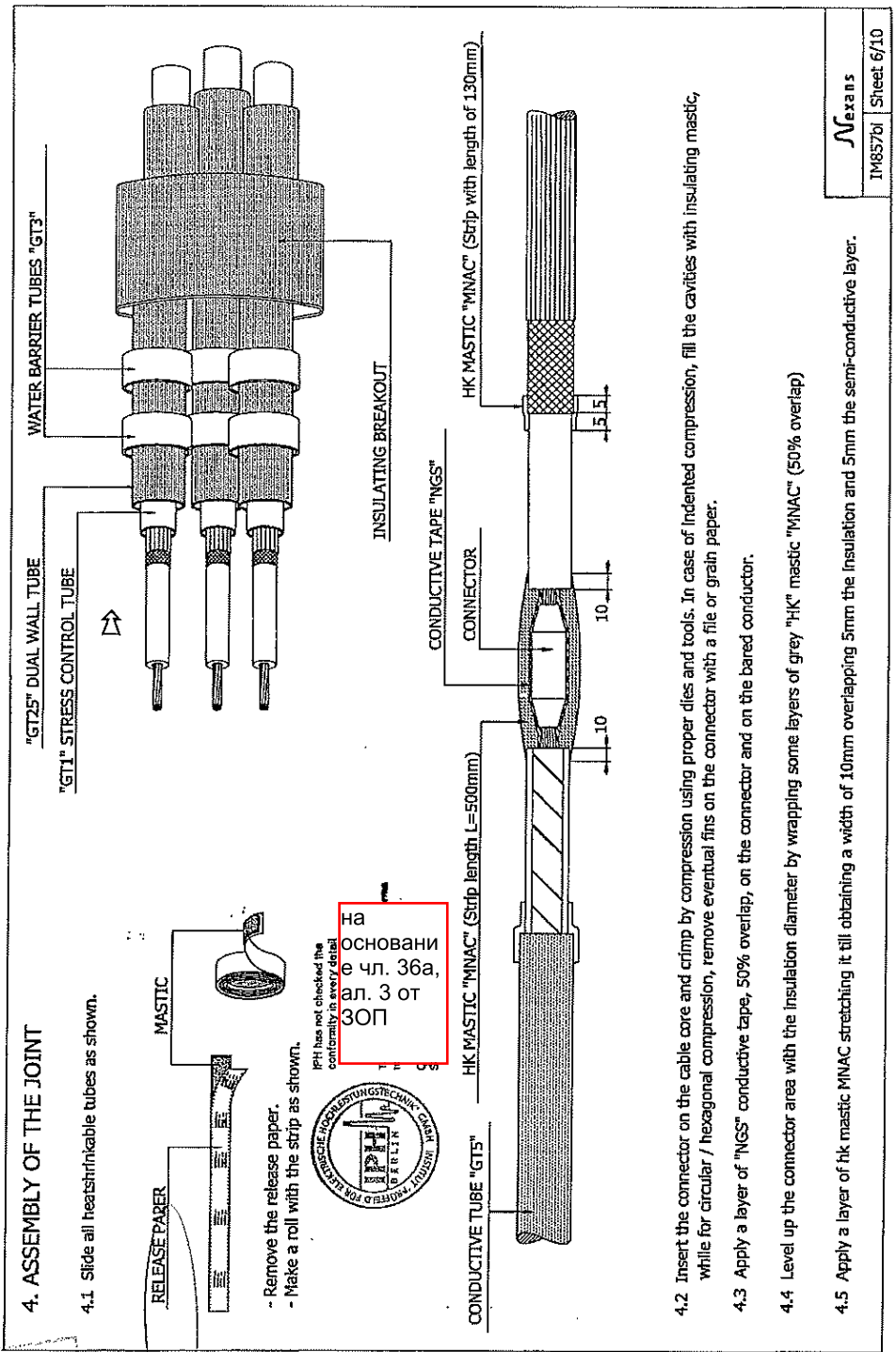
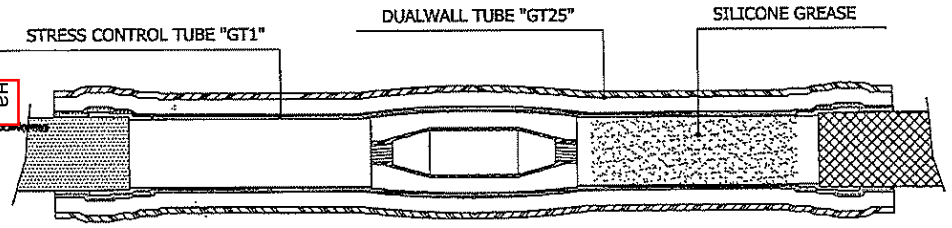
2

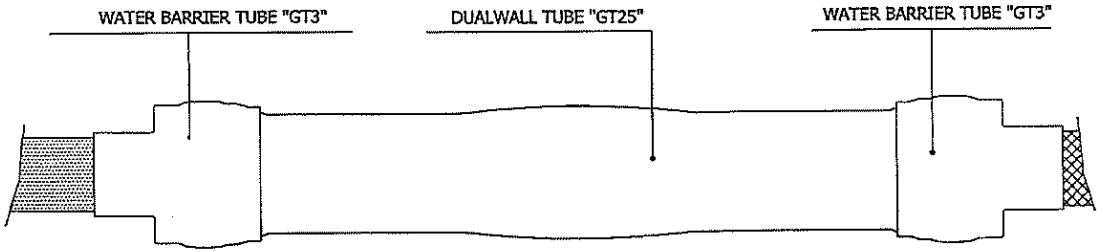
ВЯРНО С ОРИГИНАЛА





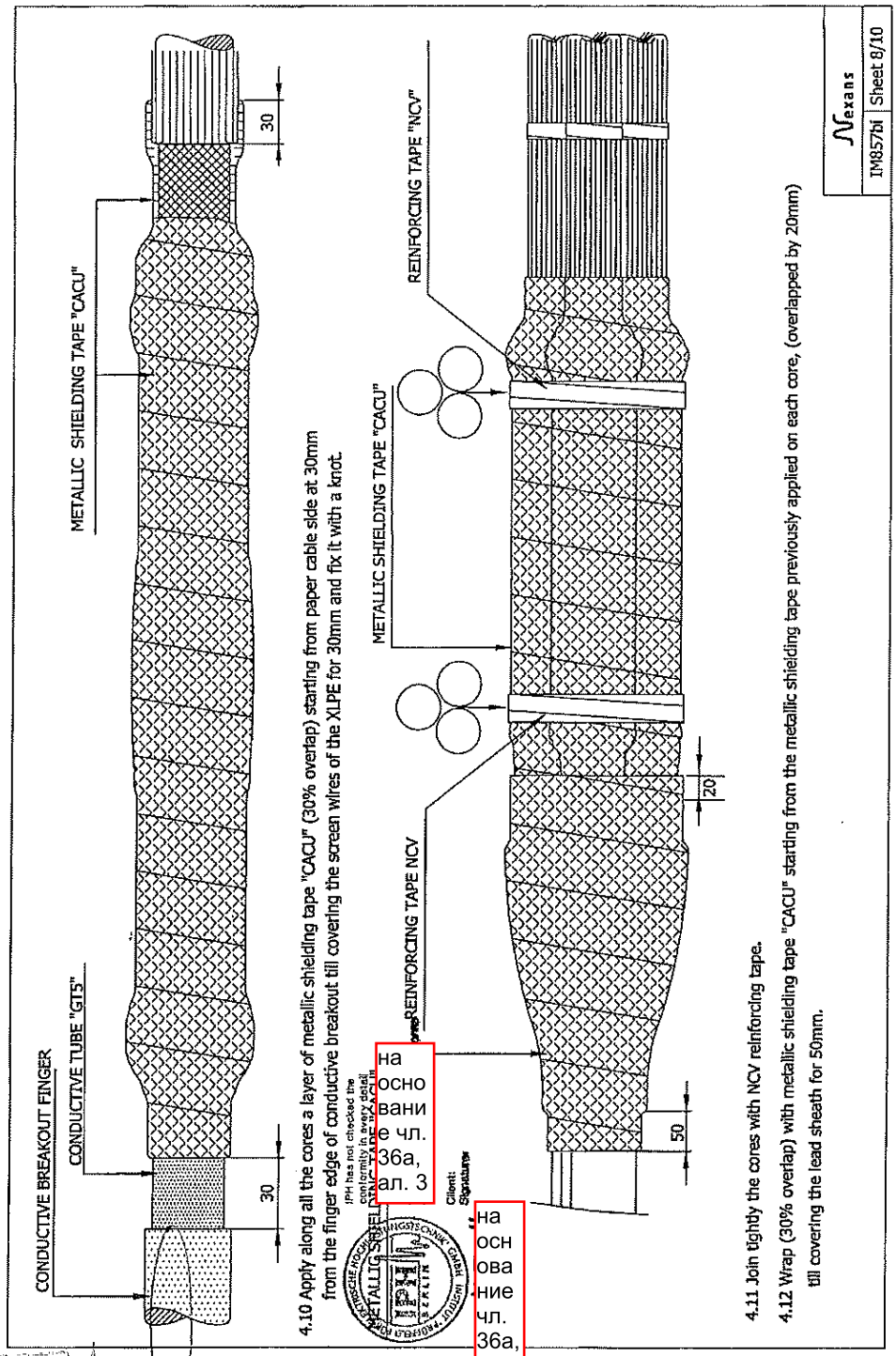
4.6 Spread some silicone grease overe the XLPE cable insulation.
Position the stress control tube "GT1" ensuring equal distance at both sides from the centre of the junction and start heatshrinking from the centre towards the extremities.

4.7 Position the dual wall tube "GT25" in the centre of the junction and start heatshrinking from the centre towards the extremities.



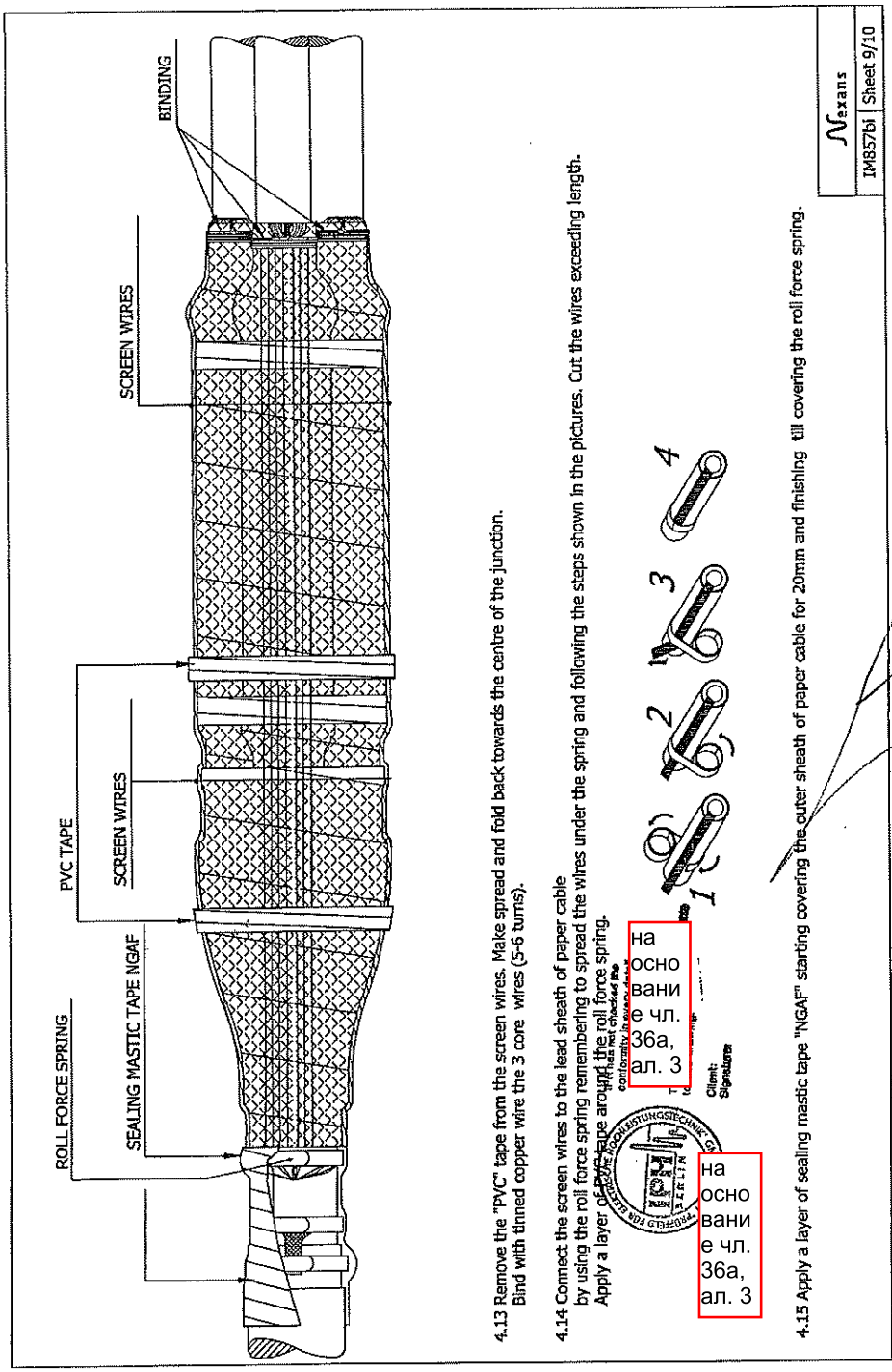
4.8 Slide the FIRST water barrier tube "GT3" into position covering the dual wall tube and the black conductive tube "GT5" for equal distance and heatshrink.

4.9 Slide the other water barrier tube "GT3" into position covering the dual wall tube and the single core cable for equal distance and heatshrink.



на основание чл. 36а, ал. 3

на основание чл. 36а,



4.13 Remove the "PVC" tape from the screen wires. Make spread and fold back towards the centre of the junction.
Bind with tinned copper wire the 3 core wires (5-6 turns).

4.14 Connect the screen wires to the lead sheath of paper cable
by using the roll force spring remembering to spread the wires under the spring and following the steps shown in the pictures. Cut the wires exceeding length.
Apply a layer of PVC tape around the roll force spring.

на основание чл. 36а, ал. 3

4.15 Apply a layer of sealing mastic tape "NGAF" starting covering the outer sheath of paper cable for 20mm and finishing till covering the roll force spring.

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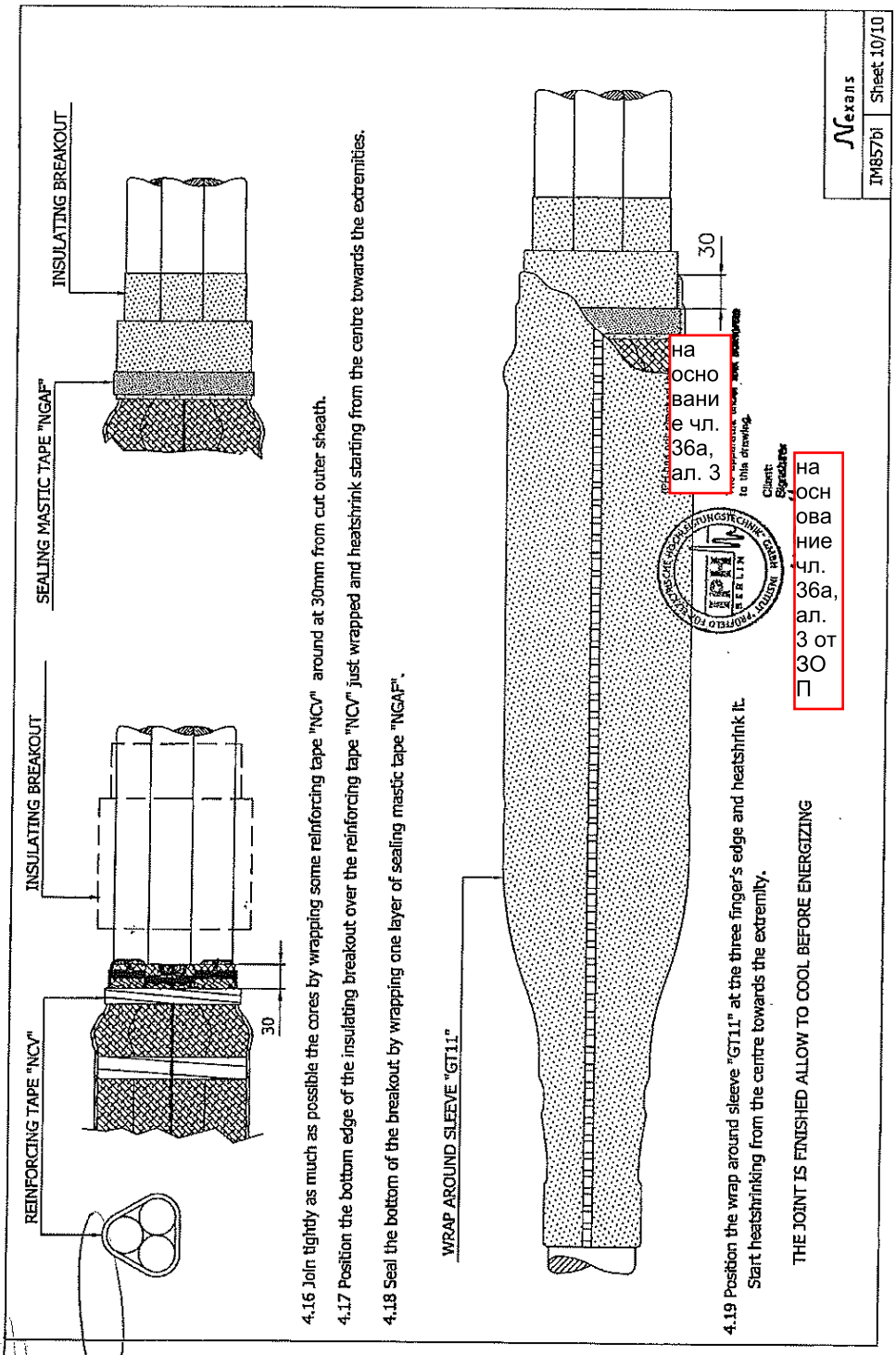
IM8576i | Sheet 9/10

на основание чл. 36а, ал. 3



4.16 Join tightly as much as possible the cores by wrapping some reinforcing tape "NCV" around at 30mm from cut outer sheath.

4.17 Position the bottom edge of the insulating breakout over the reinforcing tape "NCV" just wrapped and heatshrink starting from the centre towards the extremities.

4.18 Seal the bottom of the breakout by wrapping one layer of sealing mastic tape "NGAF".

4.19 Position the wrap around sleeve "GT11" at the three finger's edge and heatshrink it. Start heatshrinking from the centre towards the extremity.

THE JOINT IS FINISHED ALLOW TO COOL BEFORE ENERGIZING

на основание чл. 36а, ал. 3

на основание чл. 36а, ал. 3 от ЗОП

8. Identification of test cables

To CENELEC Harmonization Document 629.2 S1: 1997 Annex A
for mass-impregnated paper-insulated cable

Rated voltage U_0/U (U_m) 6.35/11 (12) kV

Cable construction	☒ Belted cable	☐ "Höchstädter" cable	
	☐ 3-lead-sheathed cable		
Number of conductors	☐ 1-core	☒ 3-core	
	☐ 4-core	☒ not individually screened	
Conductors	☐ Al	☒ Cu	
	☒ stranded	☐ solid	
	☐ round	☒ shaped	
	☐ 120 mm²	☐ 150 mm²	☒ 185 mm²
	☐ other cross-section	mm²	
	☐ cross-section branch	mm²	
Impregnation	☐ Weight	☒ non-draining compound	
Metal Enclosure	☒ lead ☒ plain ☐ corrugated	☐ aluminium	
Oversheath	☒ PVC	☐ PE (state type)	☒ Steel-tape armoured
Diameter	• conductor	14.9 x 20.9 mm	
	• Insulation including insulation screen	21.8 x 29.5 mm	
	• metal sheath		
	• oversheath	61.3 mm	

Cable marking

Electric cable 11000V BS 6480 3x185 SM, Cu, paper-insulated; made by KUNMING CABLE

ВЕРНО С ОРИГИНАЛОМ

Identification of test cables (continued)

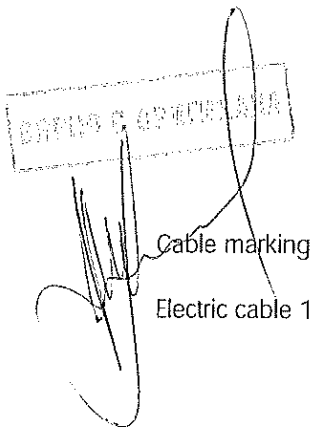
To CENELEC Harmonization Document 629.1 S1: 1996 Annex A
for cable with plastic insulation

Rated voltage U_0/U (U_m) 6.35/11 (12) kV

Cable construction	☒ 1-core	☐ screened	
	☐ 3-core	☒ individually screened	
	☐ 4-core	☐ not individually screened	
Conductors	☒ Al	☐ Cu	
	☐ stranded	☒ solid	
	☒ round	☐ shaped	
	☐ 120 mm²	☐ 150 mm²	☒ 185 mm²
	☐ other cross-section	mm²	
	☐ cross-section branch	mm²	
Cable insulation	☐ PVC	☒ XLPE	
	☐ EPR	☐ HEPR	
Insulation screen	☐ bonded	☒ strippable	
	☒ wires	☐ tapes	☐ None
Oversheath	☐ PVC	☒ PE (state type)	☐ other material
Water blocking (if any, where?)	☐ in conductor	☒ under oversheath	☐ other place

Diameter

- conductor 14.7 mm
- Insulation 23.8 mm
- insulation screen 25.2 mm
- oversheath 63.5 mm



Cable marking

Electric cable 11000V BS 7870-420 1x185 RE, Al, XLPE, made by Nexans Hellas, 2005

-852

Nexans

Power Cable Accessories

Components list n. DOM 1288i

M.V. HEAT SHRINKABLE TRANSITION JOINT

Type : 24GTM3.1.385CY

(Suitable for Three single core XLPE insulated cables 22 kV 3x1x300 Sqmm Al, copper wires screen with N. 1 Three core impregnated paper insulated cable (PILC) 11 kV 3x185 Sqmm Cu Screened.)

Q.ty	Description		Code
1	Component List		DOM1288 i
1	Jointing instructions		IM 857Bi
3	*Heat Shrink tubes Kit consisting of:*		*CFZ2093G*
1	Stress control tube	(L= 480 mm)	GT1-50
1	Dual wall tube	(L= 500 mm)	GT25-80S
1	Silicone grease	(5g)	
1	*Heat Shrink tubes Kit consisting of:*		*CFZ204Z*
3	Conductive tubes (L= 200)		GT5-35
1	*Oil barrier transparent tube kit consisting of:*		*CFZ1665A*
3	Oil barrier transparent tube	(L=450mm)	GT10-40
1	*Water barrier tube kit consisting of:*		*CFZ2086*
6	Water barrier tube	(L= 150mm)	GT3-70
1	*Kit consisting of:*		*CFZ1869*
1	Insulating Breakout		1TTI53R
1	*Kit consisting of:*		*CFZ16Z1*
1	Conductive Breakout		36TTS33
3	*Tapes & mastic kit consisting of:*		*CFZ1931*
4	HK mastic	(L= 0,5 m)	MNAC30-2
2	Sealing mastic tape	(L=0,3 m)	NGAF38
2	HK mastic	(L= 0,13 m)	MNAC30-1
1	*Tapes & mastic kit consisting of:*		*CFZ2211*
4	Conductive tape	(L=1,5 m)	NGS
1	Reinforcing tape	(L= 10 m)	NCV38
1	PVC tape	(L=5m)	NAE19
2	Stress control mastic	(L= 0,4 m)	MACDC38
3			
1	*Earthing kit consisting of:*		*CFZ2213*
4	Metallic shielding tape	(L=5 m)	CACU-60
2	Earthing braid (with water block)	(L= 0,15m - 35 mm²)	
3	Roll force spring	(D= 44-70mm)	
4	Tinned copper wire	(L= 2 m)	
3	Abrading cloth	(L= 300mm)	
1	Set of 3 Cleaning Isopropyl alcohol tissues		FAZZ-DET3
1	Wrap-around sleeve (L=1,2m)		GT11-146
3	Al ferrules (300-185sqmm)		

Drawn	Checked	Approval	First Issue	Last Revision
	AT		22.10.2002	19.04.2006

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TEST REPORT

Object tested:

- GT4 – Heat shrinkable heavy wall tube with adhesive.

Suitable as primary insulation in low voltage applications or as outer protection in low and medium voltage applications.

The results shown in this report are suitable for the following tubes, belonging to the internal insulating and external protective tubing type:
-GT3 - Heat shrinkable medium wall tube with adhesive.
-GT11 – Heat shrinkable wrap-around sleeve with glue.
-1TT – Heat shrinkable moulded gloves.
-CAPT – Heat shrinkable end caps.

The previous listed tubes are all made with the same compound material.

Test specification: **HD 631.2 S1**
Fingerprinting and type tests for heat shrinkable components for low voltage applications

Place of tests: **NEXANS ITALY S.p.A. - Electrical laboratory**
Contrada Tesino 181/b
63073 OFFIDA (AP)

Pages: **N° 24**

Data	Technical Manager	Electrical Laboratory Responsible	Chemical Laboratory Responsil
03 March 2011	E. Menghi	A. Vannicola	T.Collina

TABLE OF TESTS

Table 1 - Fingerprinting

Test	Property	Test method	Result
1	**Dimensions after full recovery** *Inner diameter (d1)* *Wall thickness (Wc)*	HD 631.2 S1:2007 Annex B	Passed
2	**Density** (measurement without sealant)	EN ISO 1183	0.98 g/cm³
3	**Differential scanning calorimetry (DSC)** *Measured without sealant* *Measured with sealant*	ISO 11357-3	
4	**Thermal gravimetric analysis (TGA)** *Polymer:* *Weight loss* *Mean temperature* *Carbon black:* *Weight loss* *Mean temperature* *Content* *Filler:* *Weight loss* *Mean temperature* *Sealant:* *Weight loss* *Mean temperature*	ISO 11358	 90% 495°C 9% 770°C 9% 100% 667°C

Table 2A – Physical ***(each test is carried out on a separate sample)***

Test	Property	Test method	Result
5	**Wall thickness eccentricity** *Expanded* *Fully recovered*	EN 60684-2	Passed
6	**Longitudinal change**	EN 60684-2	Passed
7	**Carbon black content**	EN ISO 11358	Passed
8	**Melting point**	ASTM E28-82	Passed
9	**Hardness**	EN ISO 868	Passed
10	**Water Absorption**	EN 60684-2	Passed

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n° 1474

Table 2B – Mechanical ***(After full recovery of heat shrinkable components)***

Test	Property	Test method	Result
11	**Tensile strength** *Original* *After ageing (168 h/ (150 ± 2) °C / air)* *After immersion (48 h/ (50 ± 2) °C / ASTM 2 oil)*	EN 60684-2	Passed
12	**Elongation** *Original* *After ageing (168 h/ (150 ± 2) °C / air)* *After immersion (48 h/ (50 ± 2) °C / ASTM 2 oil)*	EN 60684-2	Passed
13	**Secant modulus at 2%**	EN 60684-2	Passed
14	**Bending at –(30 ± 3) °C**	EN 60684-2	Passed
15	**Peel test** *Heat shrinkable components /Cu* *Heat shrinkable components /Al* *Heat shrinkable components /Pb* *Heat shrinkable components /PE* *Heat shrinkable components /PVC* *Heat shrinkable components /EPR*	EN 1465	Passed

Table 2C – Electrical

Test	Property	Test requirements	Result
16	**Dielectric strength**	EN 60684-2	Passed
17	**Volume resistivity at ambient temperature**	EN 60684-2	Passed

1. DIMENSIONS AFTER FULL RECOVERY

Specimens:

Code	Lot n°
GT8-50	E/1492-656

Standard:
HD 631.2 S1 ANNEX B

Condition of test:
Preparation

Temperature in air circulating oven	Time
(200 ±5) °C	**(20 + 5) min**

Conditioning

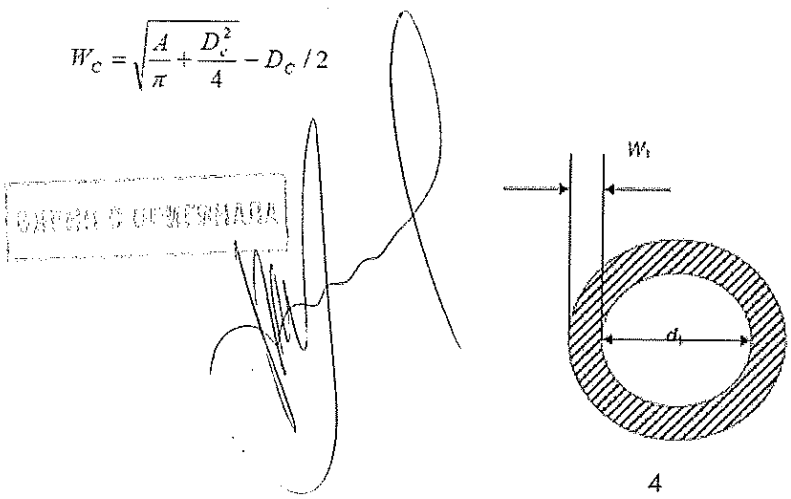
Ambient Temperature	Humidity
22 °C	**50%**

Value measured:

Specimen	Inner diameter (d1) mm	Wall thickness (w1) mm	Cross-section area (A) mm^2	Wc (Dc=16mm) mm
1	15.23	2.78	157.21	2.68
2	15.62	2.93	170.66	2.88
3	15.34	2.80	159.49	2.71

$$A = \pi(d_1 + w_1)w_1$$

$$W_C = \sqrt{\frac{A}{\pi} + \frac{D_c^2}{4}} - D_c/2$$



2. DETERMINATION OF DENSITY

Method A - Immersion

Specimens:

Code	Lot n°
GT4-90 (90/25)	**B050621206**

Standard:
ISO 1183

Condition of test:

Ambient temperature	Humidity
22°C	**50%**

Value measured:

Weight in air **(A)** g.	Weight in alcohol **(B)** g.	Liquid density **(ρt)** g/ml
2.94	**2.55**	**0.85**

Density
0.98 g/cm³

Pictures:

Test equipment

3. DIFFERENTIAL SCANNING CALORIMETRY (DSC)

Specimens:

Code	Lot n°
GT4-90	S/1489/2034

Stardard:
EN ISO 11357-3

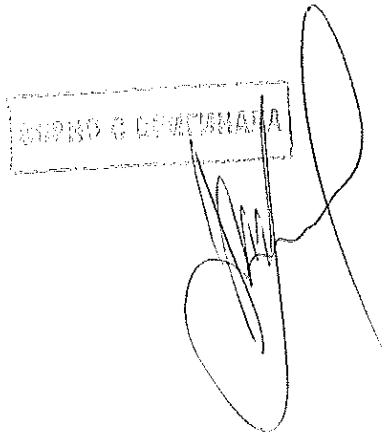
Weight specimen: 11.6 mg
Weight specimen sealant: 20.2 mg

Pre-conditioning parameters :

Temperature	Relative Humidity
(23 ± 2) °C	**(50 ± 5) %**

Type thermobalance: DSC 7 Perkin elmer
Specimen holder size & material construction: Aluminium
Type of temperature sensor & position: platinum resistance thermometers
Atm & gas-flow rate: 20ml/min
Rate of temperature increase: 20°C/min

		Deviation
Measured without sealant		
Temperature T_0	119 °C	± 5K
Temperature Tp	131 °C	± 5K
Measured witht sealant		
Temperature T_0	87 °C	± 5K
Temperature Tp	98 °C	± 5K



4. THERMAL GRAVIMETRIC ANALYSIS (TGA)

Specimens:

Code	Lot n°
GT4-90	S/1489/2034

Stardard:
EN ISO 11358

Weight specimen: 18.2 mg
Weight specimen sealant: 22.3 mg

Pre-conditioning parameters :

Temperature	Relative Humidity
(23 ± 2) °C	**(50 ± 5) %**

Type thermobalance: TGA 7 Perkin elmer
Specimen holder size & material construction: platinum
Type of temperature sensor & position: chromel-alumel thermocouple outside the specimen holder
Atm & gas-flow rate: 20ml/min
Rate of temperature increase: 20°C/min

		Deviation	Comments
Polymer			Measured without sealant
Weight loss	90 %	± 10%	
Mean temperature	495 °C	± 15K	
Carbon black			Measured without sealant
Weight loss	9 %	± 10%	
Mean temperature	770 °C	± 15K	
Content	9 %	≥ 2.5	
Filler			Measured without sealant
Weight loss	/	± 10%	
Mean temperature	/	± 15K	
Sealant			
Weight loss	100 %	± 10%	
Mean temperature	667 °C	± 15K	

ВЯРНО С ОРИГИНАЛА

5. WALL THICKNESS ECCENTRICITY

Specimens:

Code	Lot n°
GT4-90	S/1489/2034

Standard:
EN 60684-2

EXPANDED

Conditioning

Ambient Temperature	Humidity
22 °C	**50%**

Wall thickness eccentricity measured:

	specimen 1	specimen 2	specimen 3
Minimum wall thickness	**0.715 mm**	**0.765 mm**	**0.750 mm**
Maximum wall thickness	**1.050 mm**	**1.100 mm**	**0.980 mm**
Eccentricity	**18.98 %**	**17.96 %**	**13.29 %**

Mean value
16.75 %

FULLY RECOVERED

Preparation

Temperature in air circulating oven	Time
(175 ±3) °C	**5 min**

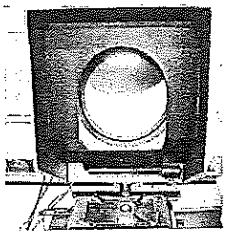
Conditioning

Ambient Temperature	Humidity
22 °C	**50%**

Wall thickness eccentricity measured:

	specimen 1	specimen 2	specimen 3
Minimum wall thickness	**4.350 mm**	**4.30 mm**	**4.425 mm**
Maximum wall thickness	**4.890 mm**	**4.710 mm**	**4.750 mm**
Eccentricity	**5.84 %**	**4.55 %**	**3.54 %**

Mean value
4.65 %



optical profile projector

6. LONGITUDINAL CHANGE

Specimens:

Code	Lot n°
GT4-90	S/1489/2034

Standard:
EN 60684-2

Preparation

Temperature in air circulating oven	Time
(175 ±3) °C	**5 min**

Conditioning

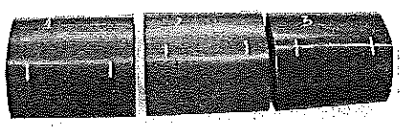
Ambient Temperature	Humidity
22 °C	**50%**

Longitudinal change value measured:

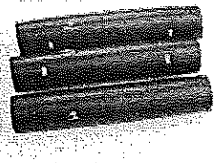
	specimen 1	specimen 2	specimen 3
L1	**100.30 mm**	**100.11mm**	**99.93 mm**
L2	**90.77 mm**	**90.97 mm**	**89.37 m**
LC	**-9.50 %**	**-9.13 %**	**-9.65 %**

Mean value
-9.43%

Picture:



Before shrinkage



After shrinkage

7. CARBON BLACK CONTENT

Specimens:

Code	Lot n°
GT4-90	S/1489/2034

Standard:
EN ISO 11358

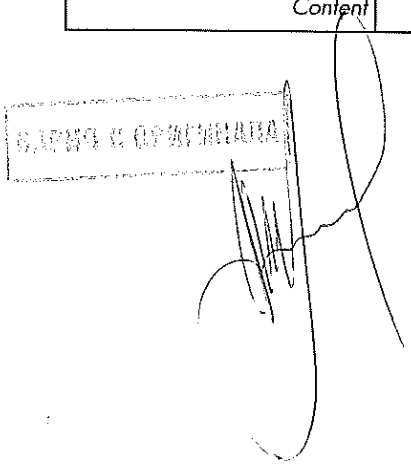
Weight specimen: 18.2 mg

Pre-conditioning parameters :

Temperature	Relative Humidity
(23 ± 2) °C	**(50 ± 5) %**

Type thermobalance: TGA 7 Perkin elmer
Specimen holder size & material construction: platinum
Type of temperature sensor & position: chromel-alumel thermocouple outside the specimen holder
Atm & gas-flow rate: 20ml/min
Rate of temperature increase: 20°C/min

		Deviation	Comments
Carbon black			Measured without sealant
Weight loss	9 %	± 10%	
Mean temperature	770 °C	± 15K	
Content	9 %	≥ 2.5	



8. MELTING POINT

Specimens:

	Cod n°
Hot melt sealant	GT-MP-C01

Standard:
ASTM E28

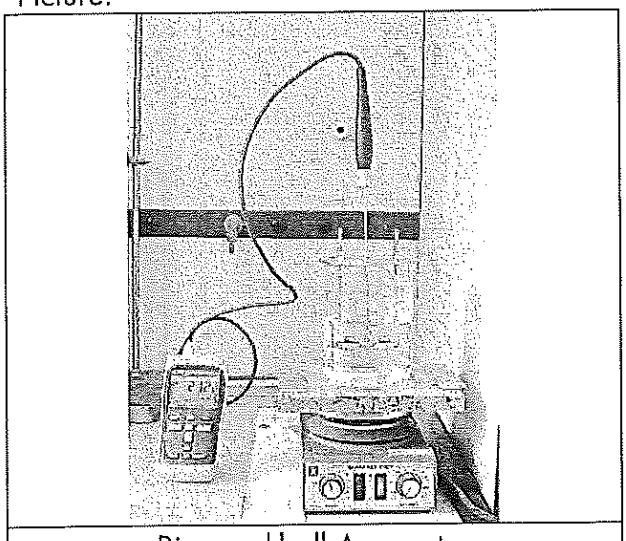
Bath Liquids: Silicone Oil
Temperature measuring device: Electronic Temp. measuring device Thermocouple

Softening point value measured:

	Softening point temperature
Ball 1	**114.2 °C**
Ball 2	**114.8 °C**

Mean value
114.5 °C

Picture:



Ring-and-ball Apparatus

ВЗРНО С ОРИГИНАЛА

9. HARDNESS

Specimens:

Code	Lot n°
GT4-90	S/1489/2034

Standard:
EN ISO 868 Shore D

Conditioning

Ambient Temperature	Humidity
22 °C	**50%**

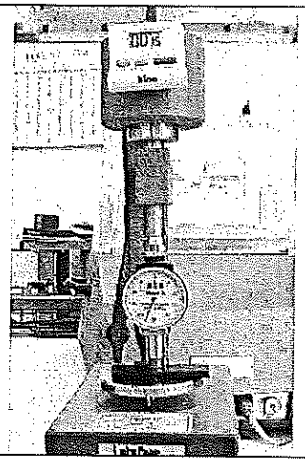
Thickness specimen: 4.52mm
Interval between two reading : 60sec

Hardness value measured:

	test 1	test 2	test 3	test 4	test 5
Shore hardness D	**55**	**55**	**56**	**55**	**56**

Mean value
55.4

Picture:



Test equipment

Nexans

n° 1474

10. WATER ABSORPTION

Specimens:

Code	Lot n°
GT4-90	S/1489/2034

Dimensions measured:

	specimen 1	specimen 2	specimen 3
Inner diameter (Ø)	**15.38**	**15.22**	**15.43**
Outer diameter (Ø)	**26.50**	**26.69**	**26.32**
Thickness (mm)	**5.82**	**5.56**	**5.63**
Length (mm)	**50.30**	**50.12**	**50.27**

Pre-conditioning parameters :

Temperature	Time
(50 ± 2) °C	**(24 ± 1) hour**

Weight (g) after pre-conditioning and cooling:

specimen 1	specimen 2	specimen 3
19.6060	**19.7903**	**19.7578**

Parameters test (distilled water):

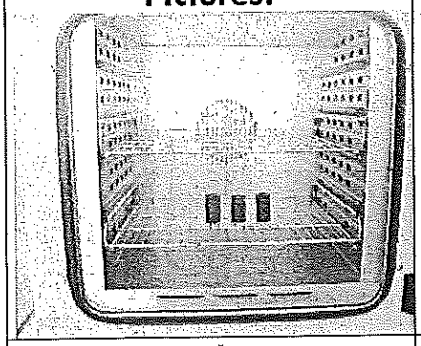
Conditioning temperature	Conditioning time
23 °C	**24 hour**

Weight (g) measured after immersion:

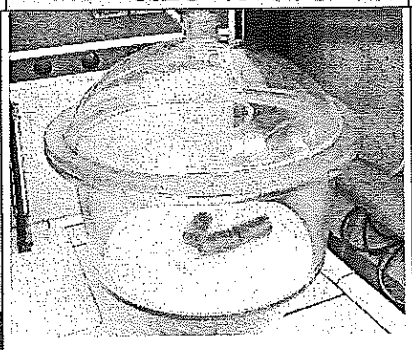
specimen 1	specimen 2	specimen 3
19.6520	**19.8333**	**19.8065**

Mean value water absorbed	
0.23 %	**Passed**

Pictures:



Pre-Conditioning



Conditioning

Immersion test

11. TENSILE STRENGTH

Specimens:

Code	Lot n°
GT4-90	S/1489/2034

Standard:
EN 60684 Determination of tensile stress-strain properties

ORIGINAL

Condition of test:

Test temperature	Conditioning time	Dumb-bell	Thickness samples	Machine speed
22°C	**16h**	**Type 2 ISO 37**	**2.00mm**	**100mm/min.**

Tensile strength value measured:

specimen 1	specimen 2	specimen 3	specimen 4	specimen 5
38.9 N/mm²	**36.6 N/mm²**	**35.9 N/mm²**	**39.2 N/mm²**	**36.7 N/mm²**

Mean value
37.5 N/mm²

AFTER AGEING (168 h/ (150 ± 2) °C / air)

Condition of test:

Test temperature	Conditioning time	Dumb-bell	Thickness samples	Machine speed
150°C	**168 h**	**Type 2 ISO 37**	**2mm**	**100mm/min.**

Tensile strength value measured:

specimen 1	specimen 2	specimen 3	specimen 4	specimen 5
25.9 N/mm²	**23.4 N/mm²**	**26.7 N/mm²**	**22.9 N/mm²**	**25.0 N/mm²**

Mean value
24.8 N/mm²

AFTER IMMERSION (48 h/ (50 ± 2) °C / ASTM 2 oil)

Condition of test:

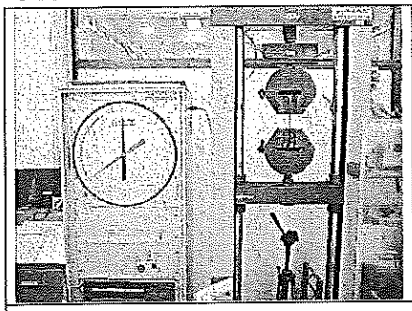
Test temperature	Conditioning time	Dumb-bell	Thickness samples	Machine speed
22°C	**18h**	**Type 2**	**2mm**	**25mm/min.**

Tensile strength value measured:

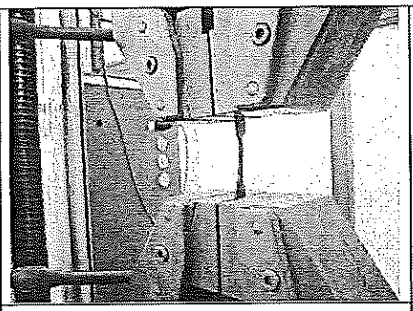
specimen 1	specimen 2	specimen 3	specimen 4	specimen 5
27.8 N/mm²	**26.3 N/mm²**	**27.1 N/mm²**	**29.5 N/mm²**	**26.0 N/mm²**

Mean value
27.3 N/mm²

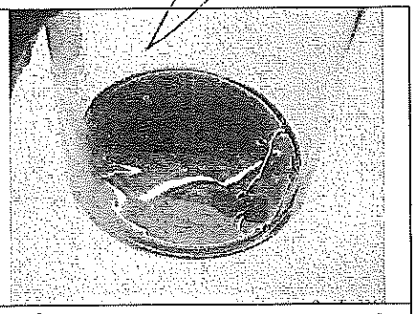
Pictures:



Test equipment



Tensile strength test



After immersion ASTM 2 oil

12. ELONGATION

Specimens:

Code	Lot n°
GT4-90	S/1489/2034

Standard:
EN 60684 Determination of tensile stress-strain properties

ORIGINAL

Condition of test:

Test temperature	Conditioning time	Dumb-bell	Thickness samples	Machine speed
22°C	**16h**	**Type 2 ISO 37**	**2.00mm**	**100mm/min.**

Elongation at break value measured:

specimen 1	specimen 2	specimen 3	specimen 4	specimen 5
690%	**730%**	**690%**	**670%**	**750%**

Mean value
706 %

AFTER AGEING (168 h/ (150 ± 2) °C / air)

Condition of test:

Test temperature	Conditioning time	Dumb-bell	Thickness samples	Machine speed
150°C	**168 h**	**Type 2 ISO 37**	**2mm**	**100mm/min.**

Elongation at break value measured:

specimen 1	specimen 2	specimen 3	specimen 4	specimen 5
520 %	**573 %**	**490 %**	**603 %**	**548 %**

Mean value
547 %

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AFTER IMMERSION (48 h/ (50 ± 2) °C / ASTM 2 oil)

Condition of test:

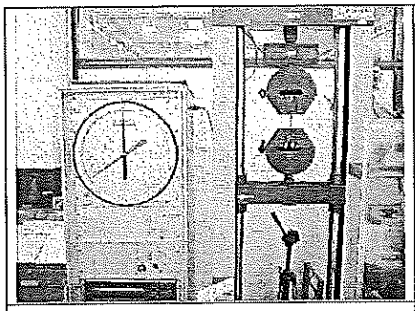
Test temperature	Conditioning time	Dumb-bell	Thickness samples	Machine speed
22°C	**18h**	**Type 2**	**2mm**	**25mm/min.**

Elongation at break value measured:

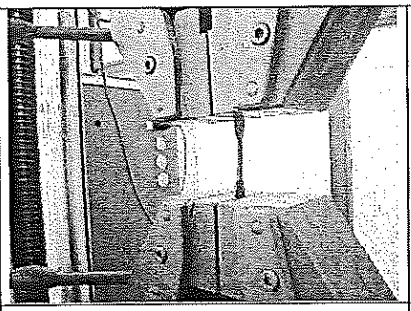
specimen 1	specimen 2	specimen 3	specimen 4	specimen 5
489 %	**532 %**	**590 %**	**517 %**	**546 %**

Mean value
535 %

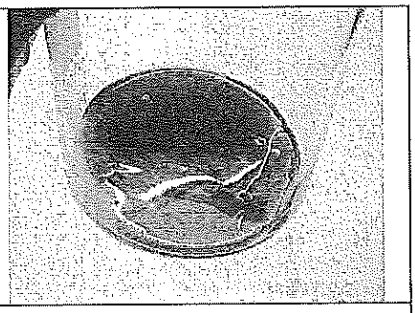
Pictures:



Test equipment



Tensile strength test



After immersion ASTM 2 oil

13. SECANT MODULUS AT 2%

Specimens:

Code	Lot n°
GT8-140	E/1493-68

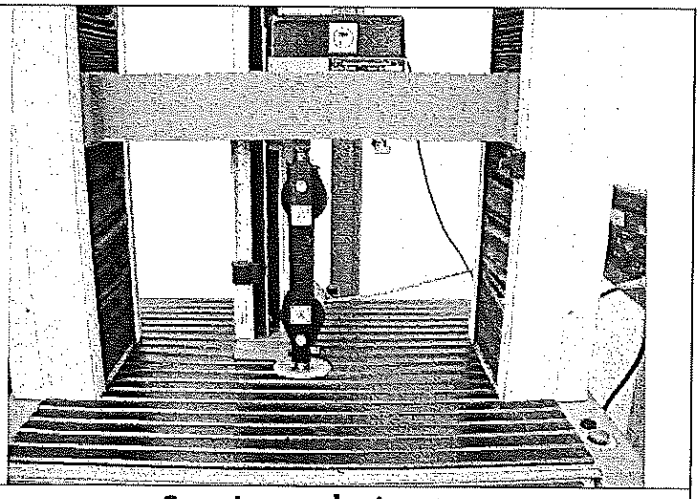
Test condition:

Amb. Temp.	R. Humidity
21 °C	**45 %**

Value measured:

Specimen	Dimension width / thickness	Area (mm^2)	Rate (A)	Distance (B)	Secant modulus at 2% elongation	Result
1	32/4.0	128	10mm/min.	102	214 MPa	Passed
2	32/4.0	128	10mm/min.	102	203 MPa	Passed
3	32/4.0	128	10mm/min.	102	207 MPa	Passed
4	32/4.0	128	10mm/min.	102	215 MPa	Passed
5	32/4.0	128	10mm/min.	102	222 MPa	Passed
Mean value	32/4.0	128	10mm/min.	102	212 MPa	Passed

Pictures:



Specimen during test

14. BENDING AT –(30 ± 3) °C

Specimens:

Code	Lot n°
GT4-90	S/1489/2034

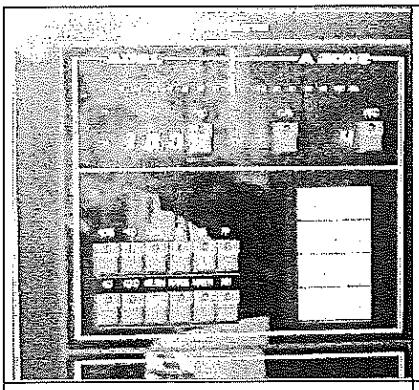
Test condition:

Temperature Conditioning	Time Conditioning	Ø mandrel
-(30 ± 30) °C	**4 h ± 10 min**	**10.00 mm**

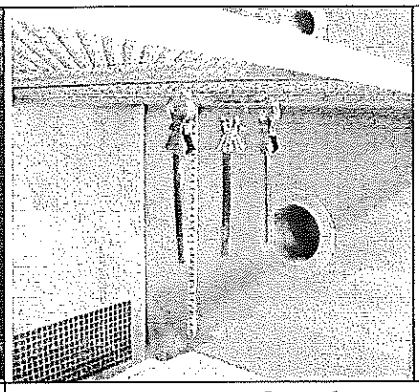
Specimen	Dimension thickness
1	6.01 mm
2	6.03 mm
3	5.98 mm

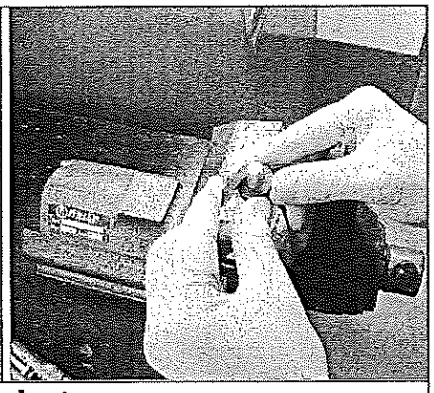
Result. The specimen is free of cracks and delaminations

Pictures:



Test equipment





Specimen during test

15. PEEL TEST

Specimens:

Code	Lot n°
GT3-40	S/1490/1722

Test Pre-condition & Condition:

Temp Pre-Conditioning	Time Pre-Conditioning	Temp Conditioning	Time Conditioning
150 °C	**20 min**	**22 °C**	**24 h**

Heat shrinkable components/ Cu

Specimen	Dimension thickness	Ø Mandrel	Strain speed	N/mm
1	25.12 mm	30.00 mm	100 mm/min	5.47
2	25.20 mm	30.00 mm	100 mm/min	3.33
3	25.09 mm	30.00 mm	100 mm/min	4.05
4	24.82 mm	30.00 mm	100 mm/min	3.80
5	25.19 mm	30.00 mm	100 mm/min	5.00

Mean value	
4.33 N/mm	**Passed**

Heat shrinkable components/ Al

Specimen	Dimension thickness	Ø Mandrel	Strain speed	N/mm
1	24.89 mm	32.00 mm	100 mm/min	4.00
2	25.02 mm	32.00 mm	100 mm/min	3.59
3	25.14 mm	32.00 mm	100 mm/min	3.80
4	24.97 mm	32.00 mm	100 mm/min	4.09
5	25.13 mm	32.00 mm	100 mm/min	4.23

Mean value	
3.94 N/mm	**Passed**

nexans

n° 1474

Heat shrinkable components/ Pb

Specimen	Dimension thickness	Ø Mandrel	Strain speed	N/mm
1	25.60	32.00 mm	100 mm/min	3.50
2	25.13	32.00 mm	100 mm/min	2.43
3	24.97	32.00 mm	100 mm/min	2.10
4	25.06	32.00 mm	100 mm/min	2.22
5	25.17	32.00 mm	100 mm/min	3.07

Mean value	
2.67 N/mm	**Passed**

Heat shrinkable components/ PE

Specimen	Dimension thickness	Ø Mandrel	Strain speed	N/mm
1	25.20	23.50 mm	70 mm/min	7.06
2	25.16	23.50 mm	70 mm/min	10.20
3	25.03	23.50 mm	70 mm/min	7.84
4	25.22	23.50 mm	70 mm/min	11.38
5	25.09	23.50 mm	70 mm/min	13.73

Mean value	
10.04 N/mm	**Passed**

Heat shrinkable components/ PVC

Specimen	Dimension thickness	Ø Mandrel	Strain speed	N/mm
1	25.19 mm	36.30 mm	100 mm/min	2.85
2	24.99 mm	36.30 mm	100 mm/min	2.66
3	25.00 mm	36.30 mm	100 mm/min	2.95
4	25.11mm	36.30 mm	100 mm/min	2.14
5	25.06 mm	36.30 mm	100 mm/min	1.96

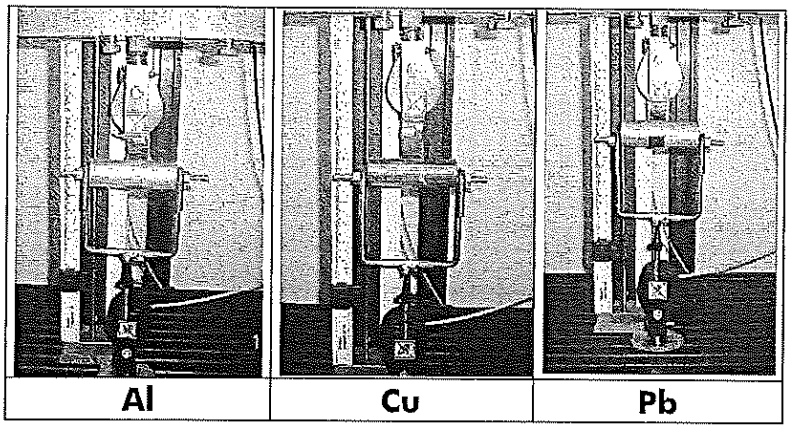
Mean value	
2.51 N/mm	**Passed**

Heat shrinkable components/ EPR

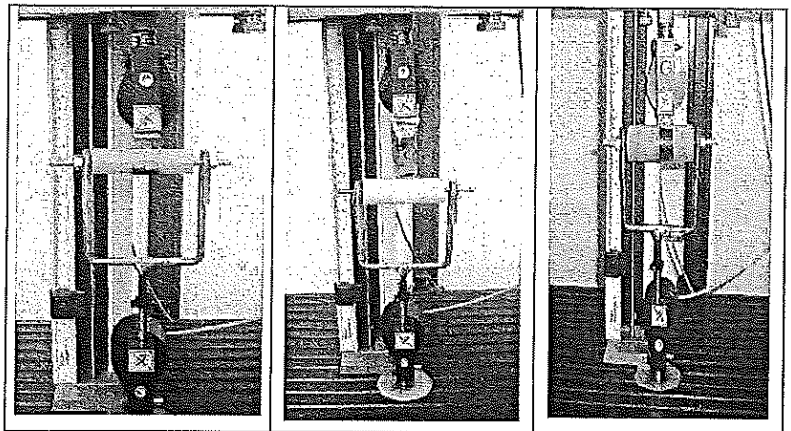
Specimen	Dimension thickness	Ø Mandrel	Strain speed	N/mm
1	25.15 mm	29.00 mm	100 mm/min	5.45
2	25.02 mm	29.00 mm	100 mm/min	4.73
3	24.96 mm	29.00 mm	100 mm/min	4.90
4	25.13 mm	29.00 mm	100 mm/min	8.36
5	25.17 mm	29.00 mm	100 mm/min	6.21

Mean value	
5.93 N/mm	**Passed**

Pictures:



Al	Cu	Pb



PE	EPR	PVC

16. VOLUME RESISTIVITY

Specimens:

Code	Lot n°
GT3-40	S/1490/1722

Standard :

- EN 60684-2

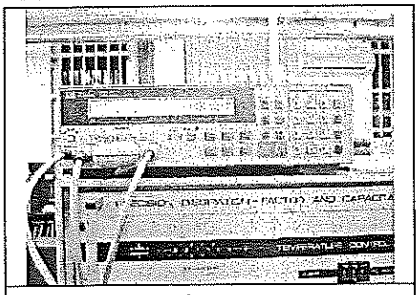
Condition of Specimen:

Conditioning	Temp.	Humidity
24 h	**22 °C**	**50 %**

Measure @ room temperature:

Thickness samples	Volume resistivity
1.6mm	**3.85 x 10^{13} Ω cm**

Pictures:



Equipment

17. DIELECTRIC STRENGTH

Specimen:

Codice	Lotto n°
GT3-40	S/1490/1722

Standard :

- EN 60684-2

Condition of Specimen:

Conditioning	Temp.	Humidity
24 h	**22 °C**	**50 %**

Test condition:

Amb. Temp.	R. Humidity
22 °C	**50 %**

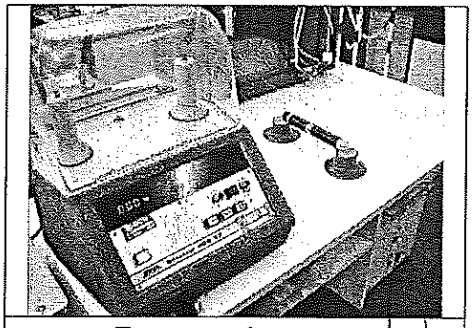
Value measured:

Specimen n°	1	2	3	4	5	Mean value
Discharge voltage in kV	**37.12**	**34.09**	**33.65**	**35.74**	**36.22**	**35.36**
thickness in mm	**1.38**	**1.40**	**1.36**	**1.37**	**1.40**	**1.38**

Test result :

Mean calculated value
25.63 KV/mm

Pictures:



Test equipment

ПРИЛОЖЕНИЕ № 2.12

СПИСЪК НА ОТДЕЛНИТЕ ИЗПИТВАНИЯ НА ТЕРМОСВИВАЕМА ПРЕХОДНА МУФА 24GTM3.1.385CY, ВКЛЮЧВАЩА ТОПЛОСВИВАЕМ РЕМОНТЕН РЪКАВ С ЦИП GT 11.... ЗА КАБЕЛИ С PVC/PE ЗАЩИТНА ОБВИВКА ТИП

1. Изпитване за устойчивост на постоянен ток
2. Изпитване за устойчивост на променлив ток
3. Изпитване на термично късо съединение
4. Динамичен тест за късо съединение
5. Импулсен тест
6. Изпитване за устойчивост на променлив ток

СПИСЪК НА ОТДЕЛНИТЕ ИЗПИТВАНИЯ НА ТОПЛОСВИВАЕМ РЕМОНТЕН РЪКАВ С ЦИП GT 11.... ЗА КАБЕЛИ С PVC/PE ЗАЩИТНА ОБВИВКА ТИП

1. Размери след пълно свиване
2. Плътност
3. Диференциална сканираща калоритметия (DSC)
4. Топлинен гравиметричен анализ (TGA)
5. Ексцентричност на дебелината на стената
6. Промяна на дължината
7. Съдържание на сажди
8. Точка на топене
9. Твърдост
10. Абсорбация на вода
11. Издръжливост на опън
12. Удължаване
13. Секущ модул на 2%
14. Огъване на – (30±3) ^{0}C
15. Диелектрична якост
16. Съпротивление при температура на околната среда

ПРИЛОЖЕНИЕ № 2.13

DAkkS
Deutsche
Akkreditierungsstelle

Deutsche Akkreditierungsstelle GmbH

Entrusted according to Section 8 subsection1 AkkStelleG in connection with Section 1 subsection 1 AkkStelleGBV
Signatory to the Multilateral Agreements of
EA, ILAC and IAF for Mutual Recognition

Accreditation

The Deutsche Akkreditierungsstelle GmbH attests that the testing laboratory

IPH Institut "Prüffeld für elektrische Hochleistungstechnik" GmbH
Landsberger Allee 378 A, 12681 Berlin

is competent under the terms of DIN EN ISO/IEC 17025:2005 to carry out tests in the following fields:

High-voltage equipment and components
Low-voltage equipment and components
Installation, switching, control and protective equipment
High-voltage, medium-voltage and low-voltage cables and their accessories

The accreditation certificate shall only apply in connection with the notice of accreditation of 2015-11-11 with the accreditation number D-PL-12107-01 and is valid until 2020-11-10. It comprises the cover sheet, the reverse side of the cover sheet and the following annex with a total of 42 pages.

Registration number of the certificate: **D-PL-12107-01-00**

на основание чл. 36а, ал. 3
от ЗОП

Frankfurt, 2015-11-11

Dipl.-Ing. (FH) Ralf Egner
Head of Division

This document is a translation. The definitive version is the original German accreditation certificate.

See notes overleaf.

DAkkS Deutsche Akkreditierungsstelle

Немски Орган за Акредитация ООД

Възложено според раздел и подраздел 1 от Закон за акредитиращите (AkkStelleG) и във връзка с раздел 1 и подраздел 1 от Закон за регулиране на акредитиращите Подписали многостранните споразумения на
EA, ILAC и IAF за взаимно признаване

АКРЕДИТАЦИЯ

Немският Орган за Акредитация ООД удостоверява, че изпитателната лаборатория

IPH Institut " Prüffeld für elektrische Hochleistungstechnik " GmbH
Landsberger Alee 378 A, 12681 Berlin

е компетентен според условията на DIN EN ISO/IEC 17025:2005 да провежда изпитания в следните области:

Уреди и съоръжения високо напрежение
Уреди и съоръжение ниско напрежение
Инсталации, комутации, контролна и защитна екипировка
Кабели високо, средно и ниско напрежениеи аксесоари за тях

Сертификатът за акредитация е валиден само с известието за акредитация от 11.11.2015 г. с акредитационен номер D-PL-12107-01 и е валиден до 10.11.2020 г. Той съдържа заглавната страница, гърба на заглавната страница и следващото приложение от общо 42 страници.

Регистрационен номер на сертификата: **D-PL-12107-01-00**

Франкфурт на Майн, 11.11.2015

Дипл. Инж. Ралф Егнер
Ръководител направление
подпис

Този документ е превод. Дефинитивен вариант на немската версия на акредитационния сертификат.

ПРИЛОЖЕНИЕ № 2.14

ДЕКЛАРАЦИЯ

От Ганчо Желев Ганев ЕГН 6204087645
Управител на фирма "МАКРИС – ГПХ" ООД,
със седалище в гр. София, ул. "Арх. Франк Лойд Райт" №1Б
БУЛСТАТ 113030261

ДЕКЛАРИРАМ, че:

ОФЕРТИРАНИТЕ ОТ ФИРМА МАКРИС-ГПХ ООД РЕМОНТНИ РЪКАВИ С ЦИП, ЗА КАБЕЛИ ДО 240 ММ^2, С PVC/PE ЗАЩИТНА ОБВИВКА, ТОПЛОСВИВАЕМИ СЪОТВЕТСТВАТ НА ИЗИСКВАНИЯТА НА ПАРАГРАФИ "ХАРАКТЕРИСТИКА НА МАТЕРИАЛА" И "СЪОТВЕТСТВИЕ НА ПРЕДЛОЖЕНОТО ИЗПЪЛНЕНИЕ С НОРМАТИВНО-ТЕХНИЧЕСКИТЕ ДОКУМЕНТИ" ОТ ДОКУМЕНТАЦИЯТА ЗА УЧАСТИЕ.

Настоящата декларация подавам във връзка с участие в „открита" по вид процедура за сключване на рамково споразумение с предмет:

ДОСТАВКА НА АРМАТУРА ЗА КАБЕЛИ И ПРОВОДНИЦИ
РЕФ. № PPD 19-009

- **организирана от "ЧЕЗ РАЗПРЕДЕЛЕНИЕ БЪЛГАРИЯ" АД.**

20.05.2019 год.
Гр. София

на основание чл. 36а, ал. 3 от ЗОП

Декларатор:
(инж. Ганчо Ганев
Управител)

ПРИЛОЖЕНИЕ № 2.15

ИНСТРУКЦИЯ ЗА МОНТАЖ НА ТЕРМОСВИВАЕМИ РЕМОНТНИ МАНШЕТИ СЪС СТОМАНЕН ЦИП GT 11

Термосвиваеми маншети от полиолефин с адхезионно нанесен слой термотопимо лепило и "цип" за затваряне от неръждаема стомана с лесен монтаж при ремонт и отлично възстановяване на изолационните и защитни свойства на външната обвивка на кабели НН.

Общи бележки:

1. Винаги да се спазват следващите монтажни процедури. Неизпълнението им може да доведе до сериозни или фатални щети.

2. Да се избере от каталога на производителя подходящия тип маншет, размер и препоръчвана дължина за конкретното приложение.

Операции с горелката:

1. Винаги да се използват стандартни и проверени горелки, ръкохватки, маркучи и газови бутилки.

2. Винаги да се осигурява добра вентилация на работното помещение.

3. Винаги да се прави инструктаж по безопасност преди да се започне работата с горелката.

4. Винаги да се използва открит пламък с дължина 7.5 - 10 см при контакта с термосвиваемия продукт.

5. Винаги движението на пламъка да бъде със спокоен, плавен ход кръгово и по дължина на маншета.

6. Винаги свиването да се започва от средата на маншета към краищата му.

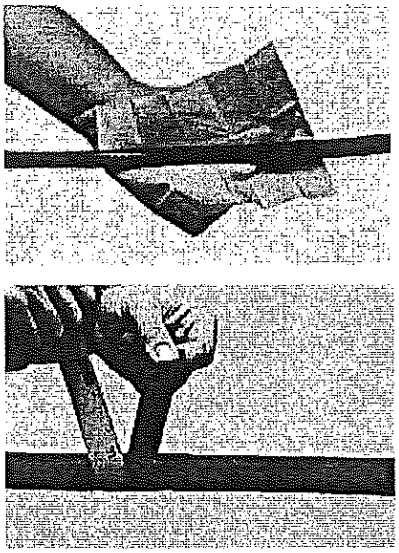
7. Ако маншета не се е свил равномерно, видно от неедноквата дебелина на стената или образувалите се трапчинки, отново да се нагрее, за да се осигури пълно свиване.

8. Да не се пипа с ръка маншета след свиването, докато не изстине напълно.

Монтажни инструкции:

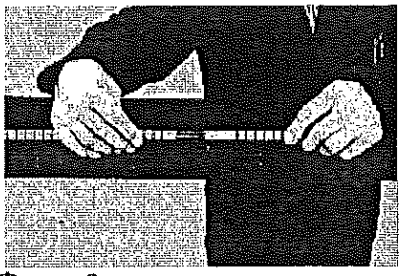
1. Да се избере подходящ размер GT11 - маншет, отговарящ на диаметъра и необходимата дължина. Минимум 75 mm от всеки край трябва да се припокрие.

2. Да се почисти мястото за покриване от масло и мръсотии. Със синьо-жълт (мек) пламък се обгаря леко външната обвивка на кабела в мястото на покриване (виж фиг. 1).



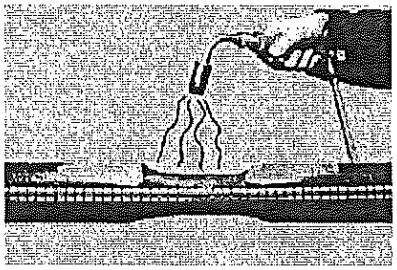
Фигура 1

3. Увиване хлабаво на маншета около кабела в мястото на покриване, оформяйки тръба, така че лепилния слой да е отвътре. Поставяне на неръждаемия цип (виж фиг. 2).



Фигура 2

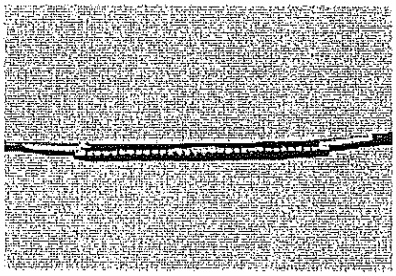
4. Използвайки жълт пламък (ДА НЕ СЕ ИЗПОЛЗВА КОНЦЕНТРИРАН (СИН) ПЛАМЪК) се започва свиването на маншета еднакво по цялата дължина, от средата към единия край.



Фигура 3

5. Продължава се със свиването на маншета, прилагайки загряване по дължина и с кръгово движение около маншета. Когато маншета се свие правилно част от лепилото изтича от краищата и херметизира концентрично съединението между маншета и кабела.

6. Повтаря се същата процедура, свиване от центъра към другия край, докато маншета напълно се свие (фиг. 4).



Фигура 4

7. Не се допуска механично натоварване, докато маншета не изстине до температурата на околната среда. Инсталацията е завършена.

МАКРИС-ГПХ ООД

София,1336
Ул. "Ген. Константин Константинов" 5
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тел.: 02 925 08 68
e-mail: office@makris-gph.com
http://www.gph.net/bul

ПРИЛОЖЕНИЕ № 2.16

ИНСТРУКЦИЯ ЗА СЪХРАНЕНИЕ И ТРАНСПОРТИРАНЕ НА ТЕРМОСВИВАЕМИ РЕМОНТНИ МАНШЕТИ С ЦИП

3. **Съхранение:**
   Термосвиваемите ремонтни маншети с цип се съхраняват в сухи и закрити помещения в стандартната им опаковка.

4. **Транспортиране:**
   Термосвиваемите ремонтни маншети с цип се транспортират в стандартната им опаковка.

МАКРИС-ГПХ ООД

ПРИЛОЖЕНИЕ № 3

КЪМ ТЕХНИЧЕСКО ПРЕДЛОЖЕНИЕ

ЗА ОБОСОБЕНА ПОЗИЦИЯ 1

СРОКОВЕ ЗА ДОСТАВКА

Приложение 3 към Техническо предложение

За Обособена позиция 1

СРОКОВЕ ЗА ДОСТАВКА

№	Наименование	Мярка	Количество със срок на доставка до 7 кал. дни	Количество със срок на доставка до 30 кал. дни
1	2	3	4	5
1	Съед. муфа НН, 16 mm², топлосвиваема	бр.	1	4
2	Съед. муфа НН, 25 mm², топлосвиваема	бр.	1	4
3	Съед. муфа НН, 35 mm², топлосвиваема	бр.	2	8
4	Съед. муфа НН, 50 mm², топлосвиваема	бр.	1	4
5	Съед. муфа НН, 70 mm², топлосвиваема	бр.	1	4
6	Съед. муфа НН, 95 mm², топлосвиваема	бр.	1	6
7	Съед. муфа НН, 120 mm², топлосвиваема	бр.	1	4
8	Съед. муфа НН, 150 mm², топлосвиваема	бр.	1	4
9	Съед. муфа НН, 185 mm², топлосвиваема	бр.	5	21
10	Съед. муфа НН, 240 mm², топлосвиваема	бр.	1	2
11	Рем. ръкав с цип за НН, 4x16 mm², топлосвиваем	бр.	1	2
12	Рем. ръкав с цип за НН, 4x25 mm², топлосвиваем	бр.	1	2
13	Рем. ръкав с цип за НН, 4x35 mm², топлосвиваем	бр.	1	4
14	Рем. ръкав с цип за НН, 4x50 mm², топлосвиваем	бр.	1	2
15	Рем. ръкав с цип за НН, 4x70 mm², топлосвиваем	бр.	1	2
16	Рем. ръкав с цип за НН, 4x95 mm², топлосвиваем	бр.	1	5
17	Рем. ръкав с цип за НН, 4x120 mm², топлосвиваем	бр.	1	2
18	Рем. ръкав с цип за НН, 4x150 mm², топлосвиваем	бр.	1	2
19	Рем. ръкав с цип за НН, 4x185 mm², топлосвиваем	бр.	7	27
20	Рем. ръкав с цип за НН, 4x240 mm², топлосвиваем	бр.	1	2
21	Рем. ръкав с цип за 6/10 kV, 1x95 mm², топлосвиваем	бр.	1	2
22	Рем. ръкав с цип за 6/10 kV, 1x185 mm², топлосвиваем	бр.	2	8
23	Рем. ръкав с цип за 12/20 kV, 1x95 mm², топлосвиваем	бр.	1	2
24	Рем. ръкав с цип за 12/20 kV, 1x185 mm², топлосвиваем	бр.	3	10

Забележки:

1/ Срокът на доставките започва да тече от датата на изпращане на поръчката.
2/ Количествата в колона 4, със срок на доставка до 7 /седем/ календарни дни, се доставят след SAP поръчка до посочените в обявлението складове на Възложителя за покриване на спешни нужди на Възложителя.
Възложителят може до поръчва посоченото спешно количество веднъж месечно.
3/ В случай, че крайният срок на доставката съвпада с празничен или неработен ден, то доставката се извършва не по-късно от първия работен ден след изтичането на срока.
4/ При поръчки на Възложителя на количества в рамките на потвърдените от Изпълнителя и недоставени в посочените срокове, ще бъдат налагани неустойки, съгласно условията на договора.
5/ Възложителят може да поръча количества по-малки от посочените в колони 4 и 5.
6/ Възложителят може да поръчва количества по-високи от посочените в колони 4 и 5, като това обстоятелство ще бъде посочено текстово в съответната поръчка изпратена към Изпълнителя. С потвърждението на поръчката, Изпълнителят вписва в същата очаквана дата за доставка на количествата надвишаващи посочените в колони 4 и 5.
7/ Възложителят може да поръчва количества до 10 пъти по-високи от посочените в колона 5. Срокът за доставка на надвишените количества не може да бъде по-дълъг от 180 дни от датата на изпращане на поръчката. При доставка на поръчаните по-високи количества след този срок, Изпълнителят дължи неустойка съгласно условията на договора.
8/ Количествата за доставка в колони 4 и 5 са отделни и независими едно от друго.

9/ Количествата за доставка в колона 5 не включват в себе си количествата за доставка в колона 4.
10/ Възложителят има право да направи едновременно поръчки за доставка на количества от колони 4 и 5.
11/ Възложителят има право да анулира направена поръчка, ако тя е в закъснение с повече от 180 дни от очакваната дата за доставка. Анулирането на поръчка не спира налагането на неустойки към Изпълнителя съгласно условията на договора.

на основание чл. 36а, ал. 3 от ЗОП

Дата 20.05.2019 г.

ПОДПИС и ПЕЧАТ: Ганчо Ганев

Управител