DAkkS Deutsche Akkreditierungsstelle D-PL-15207-01-01

RWE Eurotest GmbH
Elektrotechnisches
Prüflaboratorium

RWE

Test certificate

No.: **12_096-1** **Version: 2/2**

Customer	:	Cellpack GmbH Electrical Products Carl-Zeiss-Straße 20 79761 Waldshut-Tiengen
Test object	:	Two-component Polyurethane based resin
Type	:	EG
Manufacturer	:	Cellpack GmbH Electrical Products
Date of receipt	:	16.07.2012
Date of test	:	18.07.2012 - 31.08.2012
Applied test regulations	:	HD 631.1 S2: 2007-12
Test carried out	:	Fingerprint and type tests (function LMP/LI and characteristic -LT/HT).)
Test result	:	The two-component Polyurethane based resin, type EG, made by Cellpack GmbH Electrical Products has passed the type test belonging to function LMP/LI according to HD 631.1 S2:2007-12. The resin also meets the demands for characteristics • curing at low temperature (LT) and • curing at low temperature (HT). For the fingerprint the values for the original lot of compound are determined.
Specialist testers	:	Ms. Allzeit, Ms. Bagusche, Mr. Hirnstein; Mr. Hommernick; Mr. Ritthaler, Mr. Schlömer, Mr. Schlüter

Dortmund, 20.02.2013

Mr. Borneburg
(Manager test laboratory)

Mr. Schlüter
(Specialist tester)

Report No. 12_096-1 contains 11 pages and 7 annexes.

RWE Eurotest Gesellschaft für Prüfung – Engineering – Consulting mbH
Unterste-Wilms-Straße 52 · D-44143 Dortmund · Tel: +49 (0)231 / 438 – 2861 · Fax: +49 (0)231 / 438 – 2634 · E-Mail: info@rweeurotest.com

Summary

RWE Eurotest GmbH performed a type test belonging to function LMP/LI on the two-component resin, type EG, made by Cellpack GmbH Electrical Products according to HD 631.1 S2:2007-12.

The two-component Polyurethane based resin, type EG, made by Cellpack GmbH Electrical Products has passed the type test belonging to function LMP/LI according to HD 631.1 S2:2007-12.

The resin also meets the demands for characteristics

- curing at low temperature (LT) and
- curing at low temperature (HT).

For the fingerprint the values for the original lot of compound are determined.

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Annex:

01: Temperature-time diagram of the 300 ml test portions and physical structure after curing under water (1 page)

02: Diagrams of tensile strength and elongation–

- Fingerprinting test –resistance to breaking and elongation at break – new resin;
- Type test –resistance to breaking and elongation at break – new resin (after aging 28d at 23 ℃ and 50% humidity)
- Type test –resistance to breaking and elongation at break – after wet aging (28 days at 70 ℃ under water) (3 pages)

03: Structure and execution of the tests of volume resistivity (1 page)

04: Structure and execution of the tests of dielectric strength (1 page)

05: Structure and execution of the tests of volume resistivity (1 page)

06: Data sheet of the manufacturer (2 pages)

07: Safety data sheet - hardener and resin (15 pages)

1. Applied test regulations

HD 631.1 S2:2007-12

Electric cables- Accessories – Material characterization –
Part 1: Fingerprinting and type tests for resinous compounds

2. Technical data of the test object

Resin type:	EG
Category:	LMP/LI -LT/HT
	Low voltage compound for mechanical protection and insulation that has the characteristics cures at low temperature (LT) and cures at high temperature (HT)
Manufacturer:	Cellpack GmbH Electrical Products
Lot No. resin:	00.637.21
Lot No. hardener:	P4DB001011
Data sheet:	Annex 06
Safety data sheet:	Annex 07

3. Test and measuring equipment

Equip.-No.	cal.	Equipment	Type	Manufacturer
ET-018	*	Pendulum impact tester	50101.100/00	Zwick
ET-019	*	Precision balance	P6	Sartorius GmbH
ET-042	*	Vacuum gauge	Thermovac TM21 / TR216	Leybold Vakuum GmbH
ET-049	*	Precision balance	L 2200 P	Sartorius GmbH
ET-060	*	Standard capacitor	CLP 30	Hartmann u. Braun
ET-066		Connection adapter	-	Tettex AG Zürich
ET-106		Impulse generator	P 12 SPEZ.	Haefely
ET-107		High voltage transformer	WOF	Fischer
ET-113		Variable transformer	LT/R	Fischer
ET-326	*	Potential transformer	VIP 12 B	Balteau
ET-349	*	Digital calliper	500-301	Mitutoyo
ET-430	*	Capacitance and tan delta bridge	470	Haefely
ET-433	*	Precision balance	BP 210 D	SARTORIUS GMBH
ET-435	*	Compression-tensile testing machine	UPM 145590/00	Zwick
ET-447	*	Environmental test chamber	KWP / 450 / 70	Weiss Umwelttechnik
ET-473		Density Balance	152/12	Kern
ET-536	*	Flashpoint apparatus	Method Cleve-land	Herzog
ET-559	*	Heating cabinet	FED 115	Binder GmbH
ET-593	*	Heating cabinet (cable)	EEDK 76	Binder GmbH
ET-622	*	TRMS multimeter	189	FLUKE
ET-626	*	Digital calliper	CD-15DC	Mitutoyo
ET-627	*	Outside micrometer	Digimatic (0 - 25 mm)	Mitutoyo
ET-632	*	Stopclock	5500	Quantum
ET-636	*	Stopclock	5500	Quantum
ET-669	*	Vacuum drying cabinet	VD 23	Binder GmbH
ET-681	*	Brookefield-viscosimeter	390-0100	Thermo Electron GmbH
ET-694	*	Stopwatch	5500	Quantum
ET-697	*	Heating cabinet (cable)	EEDK 76	BINDER GmbH

ET-701	*	Digital durometer (Shore A)	Modell HDD-1	Hildebrand Prüf-u. Meßtechnik
ET-717	*	Global-UV test equipment	UV 200 SB	Weiss Umwelttechnik
ET-741	*	600 kV AC voltage test system	Obersp.-teil/MC 2720-4/MU 18	HIGHVOLT Prüftechnik
ET-805	*	Digital Tera and Milliohmeter	Milli-TO 3	Fischer Elektronik

*) Measuring equipment is calibrated based on national and international reference standards. Calibration certificates can be inspected on request.

Table 1: Test and measuring equipment

The measurement uncertainty of the measuring instruments has been calculated and is archived by RWE Eurotest. Documents can be inspected on request.

4. Tests carried out and results

Fingerprinting test

No.	Property	Test method	Units	measuring results
Stage 1 – Individual components prior to mixing				
1	Viscosity at 23 ℃ (resin)	EN ISO 2555 (Spindle R3)	mPa·s	908
Stage 2 – Resinous compound just after mixing (curing stage)				
2	Pot life (0.3 l at 23 ℃)	HD 631.1 S2: 2007-12 clause 7.2	min	22
3	Exotherm at 23 ℃ Peak temperature Time to peak	HD 631.1 S2: 2007-12 clause 7.4.2.3	 ℃ min	 76.3 (Annex 01) 71 (Annex 01)
Stage 3 – Cured resinous compound (original)				
4	Density (filled compound)	EN ISO 1183-3	g/cm³	1,13
5	Impact strength	Only for Epoxy and Acrylic resins		
6	Shore D hardness	EN ISO 868 (6 mm thickness)		50
7	Tensile strength	EN ISO 527	MPa	11.7 (Annex 02)
8	Elongation at beak	EN ISO 527	%	68.2 (Annex 02)
9	Volume resistivity	HD 429 (explanations see Annex 04)	Ω·cm	$2 \cdot 10^{14}$
Stage 4 – Cured resinous compound after thermal ageing				
10	Weight loss	HD 631.1 S2: 2007-12 Annex C	%	0.54
11	Impact strength	Only for Epoxy and Acrylic resins		

Table 2: fingerprinting test (completed)

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Type test						
No.	**Property**	**Test method**	**Units**	**Requirements LMP/LI**	**measurement**	**result**
Stage 1 – Components of the resinous compound (prior to mixing)						
1	Flash point	EN ISO 2592	℃	> 55	> 55	passed
2	Viscosity at 5 ℃	EN ISO 2555 (spindle R6)	mPa·s	≤ 100.000	3944	passed
3	Tendency to crystallization	only epoxy resin part A				
Stage 2 – Resinous compound just after mixing (curing stage)						
5	Pot life (0.3 l at 5 ℃) Pot life (0.3 l at 40 ℃)	HD 631.1 S2: 2007-12 clause 7.2	min	< 75 for type LT ≥ 5 for type HT	53 10	passed passed
6	Exotherm at 40 ℃ Peak temperature - PUR	HD 631.1 S2: 2007-12 clause 7.4.2.3	℃	≤ 120	112 (after 21 min) (Annex 01)	passed
7	Curing under Water - Gas volume - Physical structure	no requirements				
8	Dielectric strength - max. 10 min after mixing	EN 60243-1 (explanations Annex 03)	kV/mm	≥ 0,6	12.7 (average value)	passed

Table 3: type test (continued)

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No.	Property	Test method		Units	Requirements LMP/LI	measurement	
Stage 3 – Cured resinous compound (original)							
9	Density	EN ISO 1183-1		g/cm³	Value to be recorded	1.13	-
10	Impact strength (without notch)	EN ISO 179		kJ/m²	≥ 6	no measured value because no cracks of the specimen	passed
11	Shore D hardness	EN ISO 868*	tested at the ends of the mechanical test specimens acc. to HD 631.1 S2: 2007-12 Annex E		Value to be recorded	50	-
12	Tensile strength (28d at room temperature)	EN ISO 527		MPa	Wert erfassen	11.4 (Annex 02)	-
13	Elongation (28d at room temperature)	EN ISO 527		%	Wert erfassen	75.4 (Annex 02)	-
14	Volume shrinkage	EN ISO 3521		%	≤ 6.5	1.4	passed
15	Dissipation factor - at room temperature - at 80 °C	no requirements					
16	Dielectric constant - at room temperature - at 80 °C	no requirements					
17	Volume Resistivity - at room temperature - at 80 °C	HD 429 (explanations see Annex 04)		Ω·cm Ω·cm	≥ 10^{11} ≥ 10^{9}	$2 \cdot 10^{14}$ (average value) $42 \cdot 10^{10}$ (average value)	passed passed

*) after storage for 28 days (23°C / 50 %)

Table 3: type test (continued)

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No.	Property	Test method	Units	Requirements LMP/LI	measurement	result
Stage 4 – Cured resinous compound after thermal ageing						
Dry ageing: 28 days at 120 °C (vented oven)						
18	Weight loss	HD 631.1 S2: 2007-12 Annex B	%	≤ 5	0,69	passed
19	Shore D hardness (retention/original)	EN ISO 868 tested at the ends of the mechanical test specimens acc. to HD 631.1 S2: 2007-12 Annex D.2.5	%	≥ 80	90	passed
20	Impact strength (without notch) (retention/original)	EN ISO 179	kJ/m²	≥ 4	no measured value because no cracks of the specimen	passed
21	Dielectric strength	EN 60243-1 (explanations see Annex 03)	kV/mm	≥ 2	20.5 (average value)	passed
Wet ageing: 28 days at 70 °C in water						
22	Shore D hardness (retention/original)	EN ISO 868 tested at the ends of the mechanical test specimens	%	≥ 80	124	passed
23	Tensile strength (retention/original) Elongation (retention/original)	EN ISO 527	% %	≥ 65 ≥ 65	99.9 (Annex 02) 89 (Annex 02)	passed passed
24	Dielectric strength	EN 60243-1 (explanations see Annex 03)	kV/mm	≥ 2	26.7 (average value)	passed

Table 3: type test (completed)

RWE Eurotest Gesellschaft für Prüfung – Engineering – Consulting mbH
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5. Overall result

The two-component Polyurethane based resin, type EG, made by Cellpack GmbH Electrical Products has passed the type test belonging to function LMP/LI according to HD 631.1 S2:2007-12.

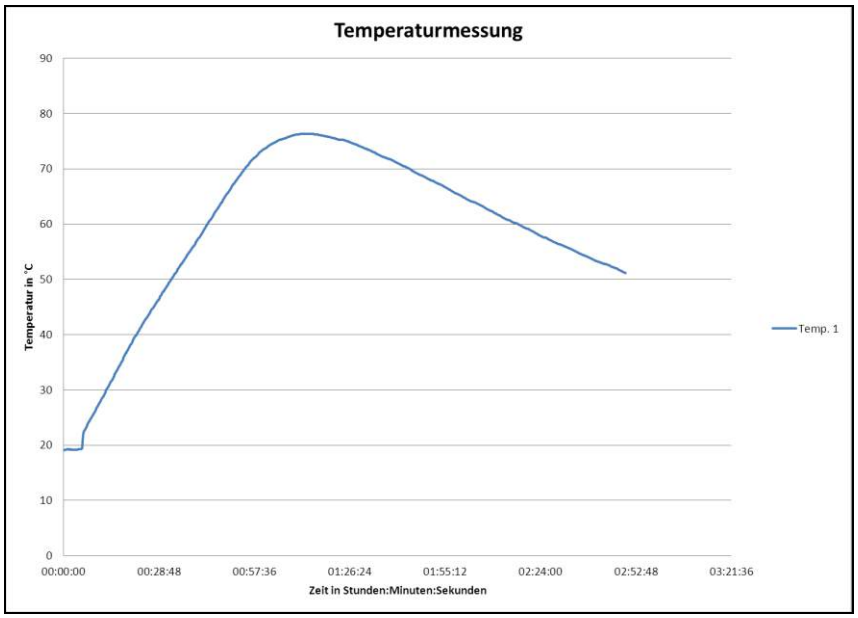
The resin also meets the demands for characteristics

- curing at low temperature (LT) and
- curing at low temperature (HT).

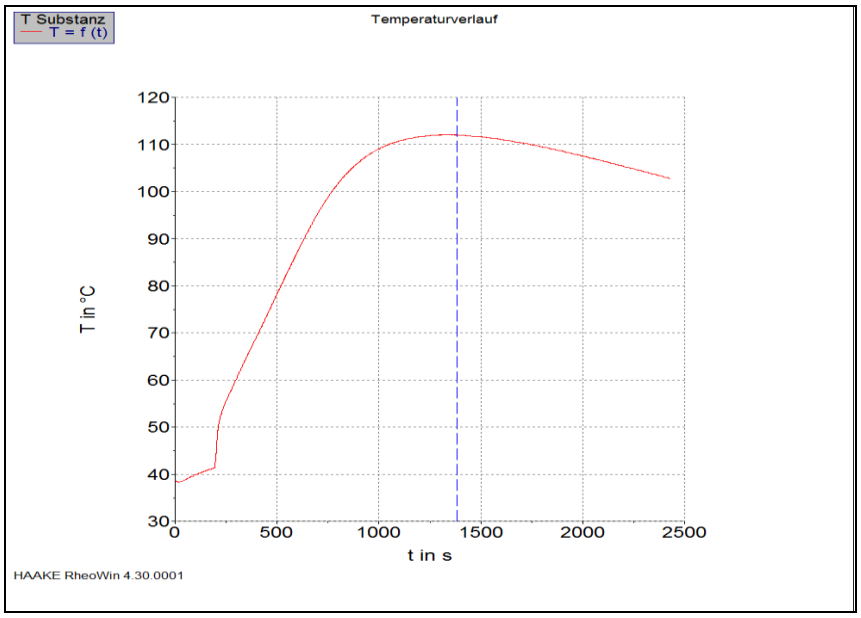
For the fingerprint the values for the original lot of compound are determined.

- End of test report -

Temperature-time diagram of the 300 ml test portions



Temperature-time diagram of the 300 ml test portions at 23 ℃ ambi ent temperature.

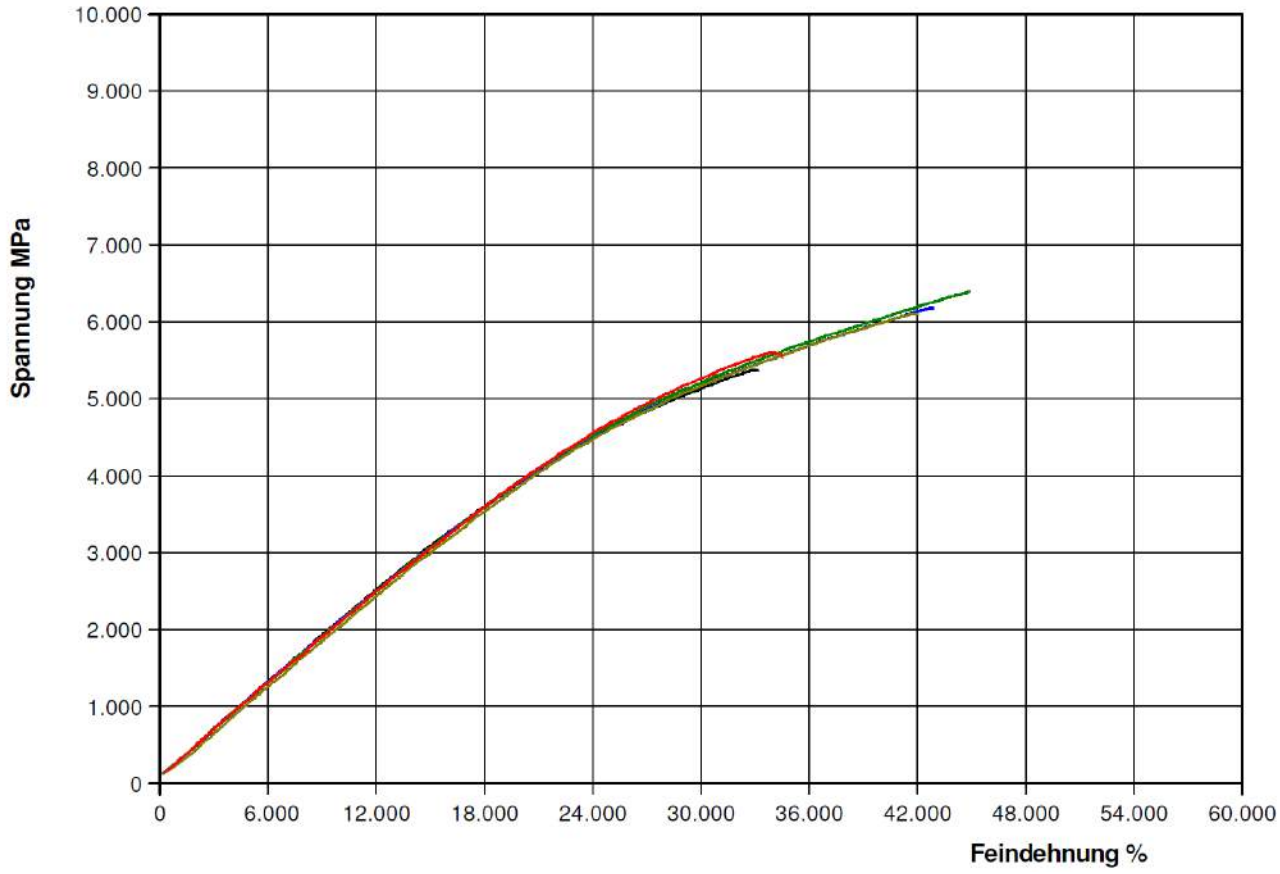


Temperature-time diagram of the 300 ml test portions at 40 ℃ ambi ent temperature.

Fingerprinting – test Diagrams of resistance to breaking and elongation at break – new resin

Nr.	Probennummer	b mm	h mm	A mm²	Sig-M MPa	Eps-B %	Bemerkung
1	Probe 1	9.80	4.25	41.650	5.37	33	Fingerprint
2	Probe 2	9.80	4.30	42.140	6.18	43	Fingerprint
3	Probe 3	9.80	4.20	41.160	6.10	42	Fingerprint
4	Probe 4	9.80	4.24	41.552	6.39	45	Fingerprint
5	Probe 5	9.80	4.28	41.944	5.60	34	Fingerprint

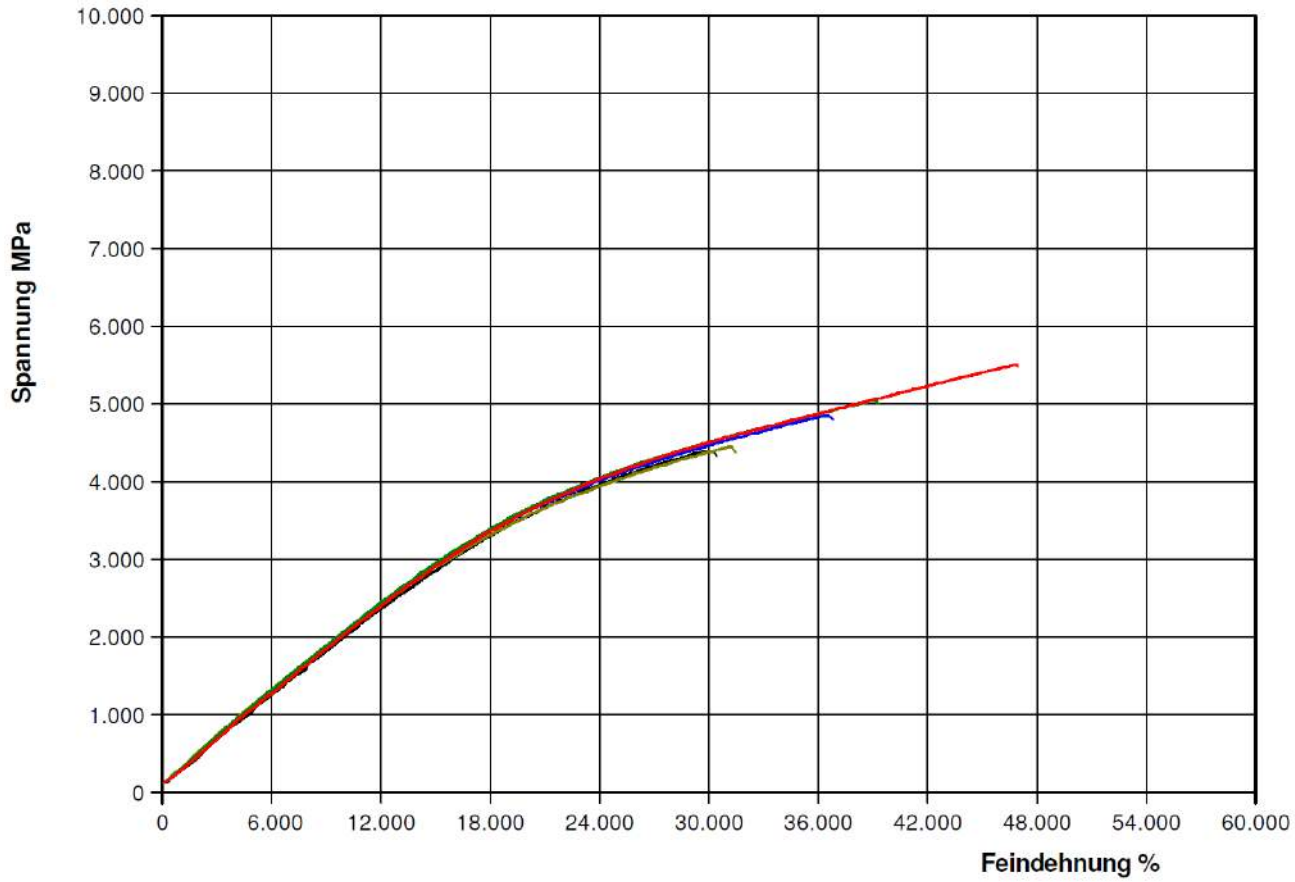
Mittelwert	5.93
Minimum	5.37
Maximum	6.39
Spanne Max-Min	1.02
Standardabweichung	0.43
Vertrauensber. 95%	5.55
	6.30



Type test – Diagrams of resistance to breaking and elongation at break – new resin (aging 28d at 23 ℃ and 50% humidity)

Nr.	Probennummer	b mm	h mm	A mm²	Sig-M MPa	Eps-B %	Bemerkung
1	Probe 1	9.80	4.40	43.120	4.39	30	
2	Probe 2	9.75	4.40	42.900	4.85	37	
3	Probe 3	9.80	4.35	42.630	4.44	31	
4	Probe 4	9.70	4.20	40.740	5.03	39	
5	Probe 5	9.70	4.30	41.710	5.50	47	

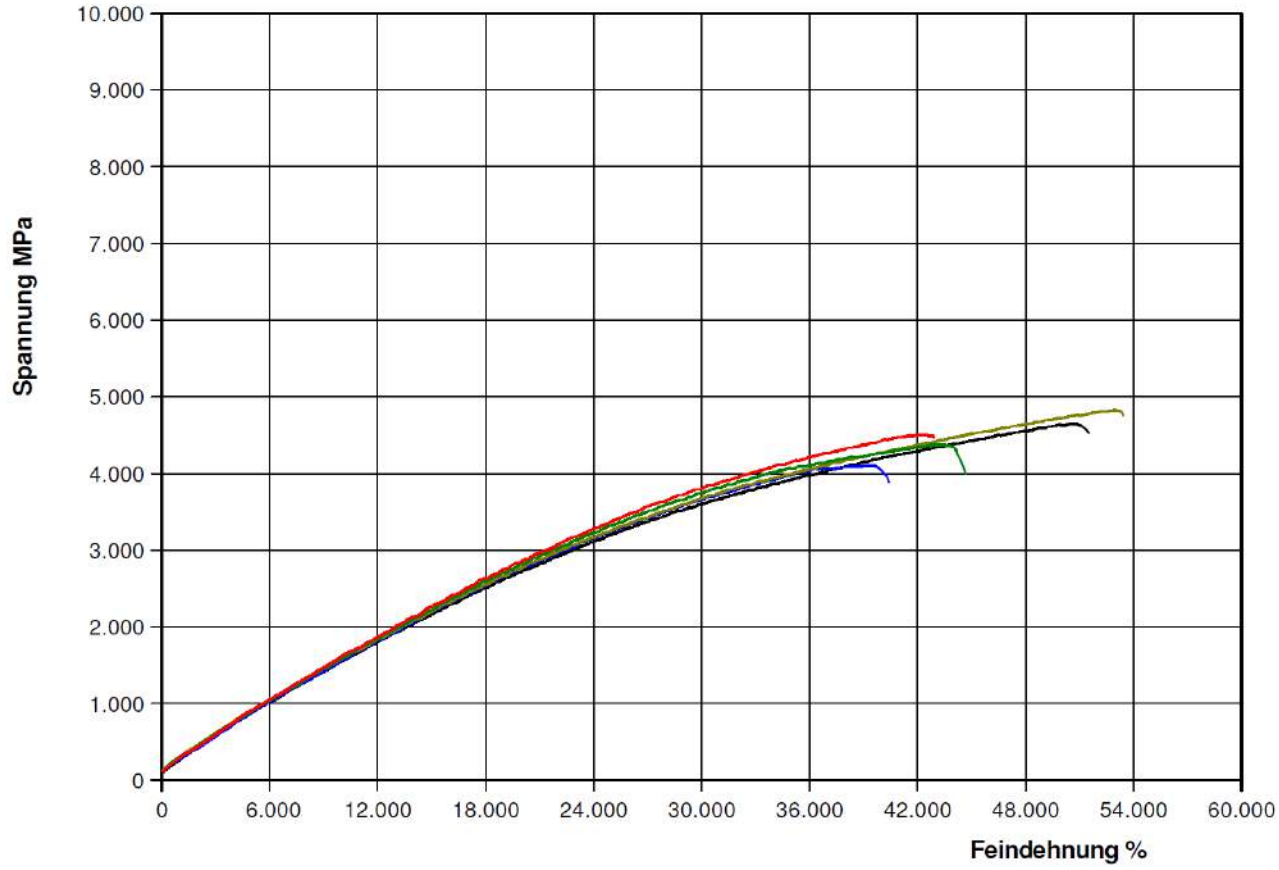
Mittelwert	4.84
Minimum	4.39
Maximum	5.50
Spanne Max-Min	1.11
Standardabweichung	0.46
Vertrauensber. 95%	4.44
	5.24



Type test – Diagrams of resistance to breaking and elongation at break – after wet aging (28 days at 70 ℃ under water)

Nr.	Probennummer	b mm	h mm	A mm²	Sig-M MPa	Eps-B %	Bemerkung
1	Probe 1	9.60	4.50	43.200	4.65	51	
2	Probe 2	9.80	4.30	42.140	4.10	40	
3	Probe 3	9.60	4.40	42.240	4.82	53	
4	Probe 4	9.80	4.36	42.728	4.37	45	
5	Probe 5	9.70	4.31	41.807	4.50	42	

Mittelwert	4.49
Minimum	4.10
Maximum	4.82
Spanne Max-Min	0.72
Standardabweichung	0.27
Vertrauensber. 95%	4.25
	4.73



Structure and execution of the tests of dielectric strength

- just after mixing (curing stage)

HD 631.1S2: 2007-12 Tabelle 3	Test
Nr.: 8	max. 10 minutes after mixing

table 1: test pretreatments according to HD 631.1S2: 2007-12

The test procedure is described in DIN EN 60243-1 (VDE 0303 Part 21):1999-03, clause 4.1.9. The diameter (*d*) of the metal spheres amounts 12.5 mm. The distance (*s*) between the electrodes amounts 1 mm. The electrode arrangement was embedded in a horizontal position and filled with the Polyurethane based resin.

The test voltage was increased with 2000 V/s.

The dimensions of the vessel amounts 40 mm x 40 mm x 200 mm.

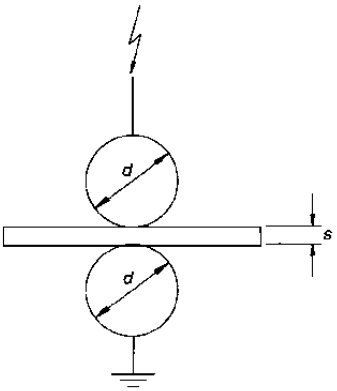
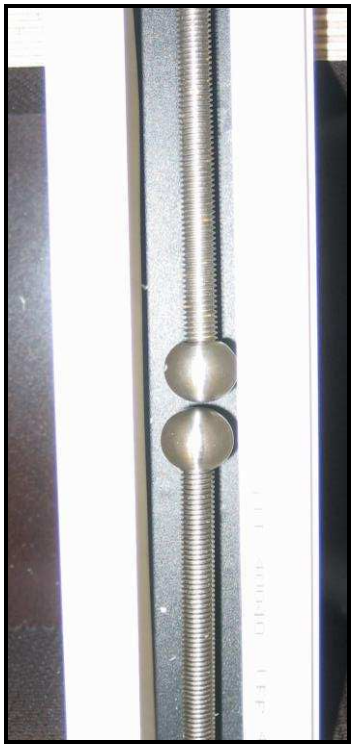


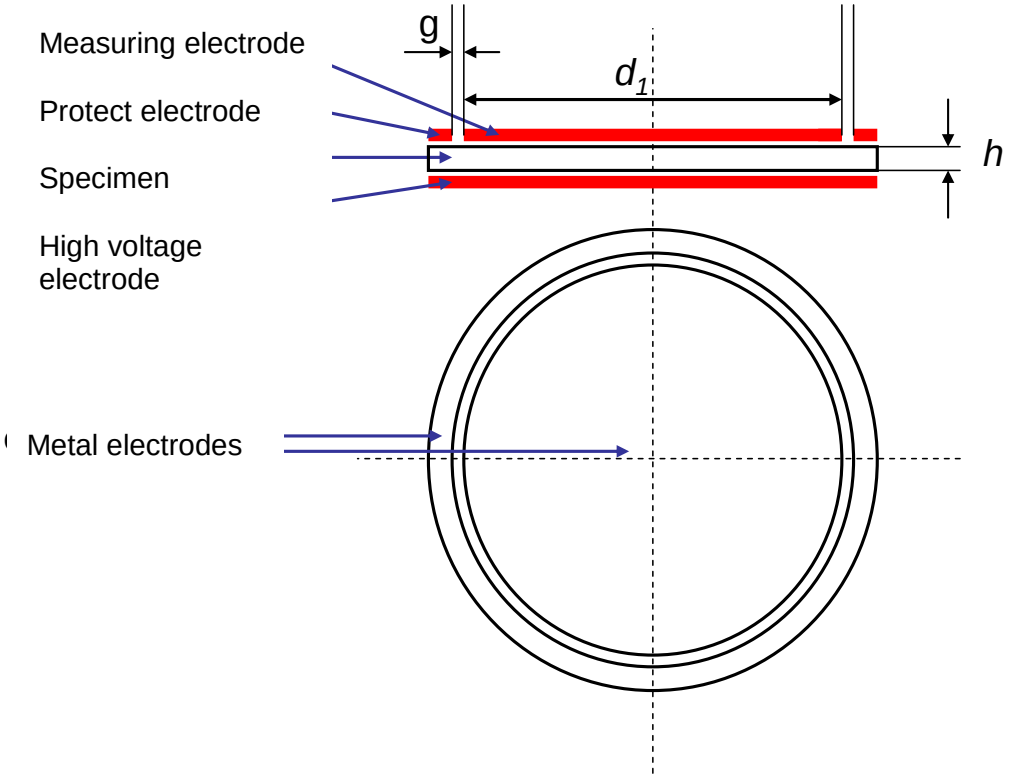
Bild 1: principal test arrangement



Picture 2: test arrangement for the liquid resins

Structure and execution of the tests of Volume resistivity

The test assembly and the dimensions were shown in picture 1. The test assemblies were square plates with a side length of 100 mm. For the electrodes material was used metal electrodes with semiconducting foam on the surface. The contact plates were fully connected with the metal electrodes. The test voltage amounts 500 V, the measuring time 1 minute. The measure series were carried out at 20 ℃ and 80 ℃. One measure series comprised three specimens.



Picture 1: *test assembly of the volume resistivity measuring*

Structure and execution of the tests of dielectric strength

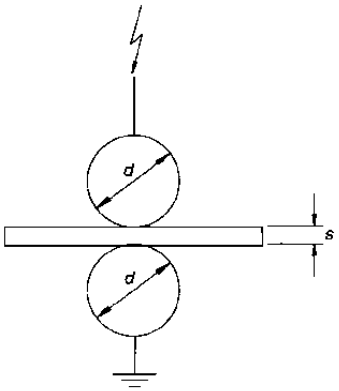
- Cured resinous compound after thermal ageing

HD 631.1S2: 2007-12 table 3	Test	Test pre-treatments
no. 21	28 days at 120 ℃	24 h at ambient temperature 24 h at 80 ℃ 24 h cool phase in exsiccator 28 days at 120 ℃ 8 h cool phase in exsiccator
no. 24	28 days in water at 70 ℃	24 h at ambient temperature 24 h at 80 ℃ 24 h cool phase in exsiccator 28 days in water at 70 ℃ 48 h drying phase at 60 ℃ under vacuum 24 h drying phase at 80 ℃ under vacuum 8 h cool phase in exsiccator

table 1: test pre-treatment's according to HD 631.1S2: 2007-12

To prepare the specimen for the tests of dielectric strength acc. to No. 21 and No. 24, the resin was cast in moulds to get boards with 2 mm thickness. The cured specimens (boards) were pre-treated according table 1. One measure series comprised five specimens. The specimens (boards) were clamped between the metal spheres (diameter d 20 mm) and submerged in a beaker glass filled with insulating oil.

The test voltage was increased with 2000 V/s.



picture 1: principal test arrangement

picture 2: test arrangement (example)

Data sheet of the manufacturer

EG
Two-component PUR cast resin

Cast-resin type EG is suitable for the following types of cables: Low-voltage plastic-insulated and paper-insulated cables rated up to 1kV. Telecommunications and signal plastic-insulated and paper-insulated cables. Suitable for mechanical protection and water-sealing on medium voltage cables.

Characteristics
- Two-component PUR cast resin
- In practical and easy-to-use two-chamber bags
- Favourable flow properties
- High hydrolytic resistance
- Resistant to alkaline earth elements
- Stabilized against UV rays
- Halogen-free
- Not harmful to the environment
- Flexibility ensures mechanical stress absorption.
- No fracturing under electrical stress
- Excellent adherence to all cable materials
- No fracturing under mechanical stress
- Low hardening temperature

Shelf life
- Shelf life: 40 months at ambient temperatures between 15°C and 35°C

Tests
- Governmental institute for material testing Darmstadt: DIN VDE 0291
- KEMA, Netherland: report on the MAK value, which lies well below the maximum value of 0.001 ppm, allowed by law

Type		Content ml	Art.-No.
Particularly for the european market			
EG	80	80	**134999**
	143	143	**124909**
	286	286	**124986**
	370	370	**124962**
	464	464	**124989**
	730	730	**124990**
	1000	1000	**124992**
	1150	1150	**124901**
	1500	1500	**124991**
	2000	2000	**132206**
Particularly for the export market			
EG	80	80	**124921**
	143	143	**124923**
	286	286	**124925**
	464	464	**124927**
	730	730	**124929**
	1000	1000	**124931**
	1150	1150	**124932**
	1500	1500	**124933**
	2000	2000	**124934**

Other drum sizes/ tins available to order.

Technical data	Value	Test
Flash point of cast-resin component (open cup) Flash point of reactant (open cup)	> 200 °C > 200 °C	DIN 16945
Processing time (potlife) of 300ml mixture at 5°C 23°C 35°C	 40 minutes 23 minutes 15 minutes	 DIN VDE 0291-2
Max. Reaction temperature	80 °C	DIN VDE 0291-2
Total volume shrinkage during curing	4.0 %	DIN 16945
Density	1.10 g/cm³	DIN 53 479
Impact strength	> 10 kJ/m²	ISO 179
Hardness	55 Shore D	DIN 53 505
Combustibility	Category 2C	DIN VDE 0304
Water absorption in warm water (42d at 50°C)		DIN 53495
Electrolytic corrosion	A 1	DIN VDE 0303-6
1 minute test voltage at 23°C 80°C	 > 20 kV > 20 kV	 DIN VDE 0304-43
Dielectric dissipation factor at 23°C and 1 kHz 23°C und 50 Hz	 0.05 0.08	 DIN VDE 0304-4
Dielectric constant at 23°C and 1 kHz 23°C und 50 Hz	 5.3 5.1	 DIN VDE 0304-4
Tracking resistance	KA 3c	DIN VDE 0304-4
Operating temperature range	-40 °C up to 105 °C	

Safety data sheet - hardener and resin

CELLPACK Electrical Products

EC safety data sheet

Trade name: Giessharz Isocyanat EG-Härter

Product no.: B2

Current version : 2.1.0, issued: 09.01.2013 **Replaced version:** 2.0.0, issued: 13.03.2012 **Region:** GB

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Trade name

Giessharz Isocyanat EG-Härter

Identification numbers

CAS no. 9016-87-9

1.2 Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses of the substance or mixture

filling compound for electrotecnical use

1.3 Details of the supplier of the safety data sheet

Address

Cellpack GmbH
Electrical Products
Carl-Zeiss-Strasse 20
79761 Waldshut-Tiengen

Telephone no. +49 (0)7741 6007-0
Fax no. +49 (0)7741 64989

Information provided by / telephone

+49 (0)7741 6007-0

Advice on Safety Data Sheet

msds@cellpack.com

1.4 Emergency telephone number

For medical advice (in German and English):
+49 (0)551 192 40 (Giftinformationszentrum Nord)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification in accordance with Regulation (EC) No 1272/2008 (CLP)

Acute Tox. 4; H332
Carc. 2; H351
Eye Irrit. 2; H319
Resp. Sens. 1; H334
Skin Irrit. 2; H315
Skin Sens. 1; H317
STOT RE 2; H373i
STOT SE 3; H335

Classification in accordance with Directive 67/548/EEC or 1999/45/EC

Carc.Cat.3; R40
R42/43
Xi; R36/37/38
Xn; R20
Xn; R48/20

Note	Specific concentration limits	M-factor
-	Resp. Sens. 1; H334: C >= 0.1% STOT SE 3; H335: C >= 5% Eye Irrit. 2; H319: C >= 5% Skin Irrit. 2; H315: C >= 5%	-

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CELLPACK Electrical Products

EC safety data sheet

Trade name: Giessharz Isocyanat EG-Härter
Product no.: B2
Current version : 2.1.0, issued: 09.01.2013 **Replaced version:** 2.0.0, issued: 13.03.2012 **Region:** GB

2.2 Label elements

Labelling according to Regulation (EC) No 1272/2008 (CLP Regulation)

Product identifier
9016-87-9 (diphenylmethanediisocyanate, isomeres and homologues)

Hazard pictograms

GHS07 GHS08

Signal word
Danger

Hazard statements

H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H335	May cause respiratory irritation.
H351	Suspected of causing cancer
H373i	May cause damage to organs through prolonged or repeated exposure if inhaled.

Precautionary statements

P260	Do not breathe dust/fume/gas/mist/vapours/spray.
P280	Wear protective gloves/eye protection/face protection.
P302+P352	IF ON SKIN: Wash with plenty of soap and water.
P304+P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308+P313	IF exposed or concerned: Get medical advice/attention.

2.3 Other hazards

The product may be a skin sensitiser. It may also be a severe skin irritant. In case of respiratory system hypersensitivity (asthma, chronic bronchitis) do not handle this product.

PBT assessment
The product is not considered to be a PBT.

vPvB assessment
The product is not considered to be a vPvB.

SECTION 3: Composition/information on ingredients

3.1 Substances

Chemical characterization
Substance name diphenylmethanediisocyanate, isomeres and homologues

Identification numbers
CAS no. 9016-87-9

3.2 Mixtures

Not applicable. The product is not a mixture.

CELLPACK Electrical Products

EC safety data sheet

Trade name: Giessharz Isocyanat EG-Härter

Product no.: B2

Current version : 2.1.0, issued: 09.01.2013 **Replaced version:** 2.0.0, issued: 13.03.2012 **Region:** GB

SECTION 4: First aid measures

4.1 Description of first aid measures

General information
In all cases of doubt, or when sickness symptoms persist, seek medical attention. Never give anything by mouth to an unconscious person. Remove soiled or soaked clothing immediately.

After inhalation
Remove to fresh air, keep patient warm and at rest. Irregular breathing/no breathing: artificial respiration. If unconscious place in recovery position and seek medical advice.

After skin contact
Wash skin thoroughly with soap and water or use recognised skin cleanser. Do NOT use solvents or thinners!

After eye contact
Remove contact lenses, irrigate copiously with clean, fresh water for at least 10 minutes, holding the eyelids apart and seek medical advice.

After ingestion
Do not induce vomiting. Summon a doctor immediately. Never give anything by mouth to an unconscious person. Keep at rest.

4.2 Most important symptoms and effects, both acute and delayed

No data available.

4.3 Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Alcohol resistant foam, CO2, powders, water spray

Unsuitable extinguishing media
Full water jet

5.2 Special hazards arising from the substance or mixture

Fire will produce dense black smoke. Exposure to decomposition products may cause a health hazard.

5.3 Advice for firefighters

Appropriate breathing apparatus may be required. Cool endangered containers with water in case of fire. DO NOT ALLOW RUN-OFF FROM FIRE FIGHTING TO ENTER DRAINS OR WATER COURSES; Fire residues must be disposed of in a proper manner.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel
Exclude sources of ignition and ventilate the area. Do not inhale vapours. Refer to protective measures listed in sections 7 and 8.

For emergency responders
No data available. Personal protective equipment (PPE) - see Section 8.

6.2 Environmental precautions

Do not allow to enter drains. If the product contaminates lakes, rivers or sewage, inform appropriate authorities in accordance with local regulations. Add the same decontaminant to the remnants and let stand for several days until no further reaction in non-sealed container. Once this stage is reached, close container and dispose according to local regulations.

6.3 Methods and material for containment and cleaning up

Contain and collect spillage with absorbent materials, e.g. sand, earth, vermiculite, diatomaceous earth and place in container for disposal according to local regulations (see section 13). Clean preferably with a detergent; avoid use of solvents. Immediately clean contaminated areas with following substances :

usable(flammable):	Water	45 Vol.%
	Ethanol or Isopropyl Alcohol	50 Vol.%
	Ammonia solution (density=0.88)	5 Vol.%

Alternative applicable to that (not flammable):

Sodium Carbonate	5 Vol.%
Water	95 Vol.%

6.4 Reference to other sections

No data available.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling

Persons with a history of asthma, allergies, chronic or recurrent respiratory disease should not be employed in any process in which this preparation is used !; The product should only be used in areas from which all naked lights and other sources of ignition have been excluded. Comply with the health and safety at work laws.

General protective and hygiene measures

Do not eat or drink during work - no smoking. Avoid product contact with skin, eyes and clothing

Advice on protection against fire and explosion

No special measures necessary.

7.2 Conditions for safe storage, including any incompatibilities

Technical measures and storage conditions

Always keep in containers of same material as the original one. See also instructions on the label. Avoid heating and direct sunlight. Keep container dry in a cool, well-ventilated place. Precautions should be taken to minimise exposure to atmospheric humidity or water: CO2 will be formed which in closed containers can result in pressurisation. DO NOT KEEP THE CONTAINERS SEALED !!; store at 15 - 30 °C.

Requirements for storage rooms and vessels

Keep container tightly closed. Never use pressure to empty: container is not a pressure vessel. No smoking. Prevent unauthorized access!; Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Advice on storage assembly

Keep away from oxidizing agents, from strongly alkaline and strongly acid materials.

7.3 Specific end use(s)

No data available.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

No parameters available for monitoring.

8.2 Exposure controls

Appropriate engineering controls

Provide adequate ventilation. Where reasonably practicable this should be achieved by the use of local exhaust ventilation and good general extraction. If these are not sufficient to maintain concentrations of particulates and solvent vapour below the OEL, suitable respiratory protection must be worn. Air-fed protective respiratory equipment must be worn by spray operator even when good ventilation is provided.

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Personal protective equipment

Respiratory protection
By spraying: air-fed respirator
By other operations than spraying: in well ventilated areas, air-fed respirators could be replaced by a combination of charcoal filter andparticulate filter mask.

Eye / face protection
Wear safety goggles to protect against solvent splashes.

Hand protection
Adhere to the professional organisation rule "Use of protective gloves".
Appropriate chemicals resistant glove tested in compliance with EN 374.
Recommendation for protection against components generally found in the products:

For short-term contact (i.e. splash protection):
Appropriate material: nitrile rubber, Neopren
Material thickness: > 0.4 mm
Breakthrough time: > 480 min

Before use, the protective glove should be tested in any case for its specific work-station suitability (i.e. mechanical resistance, product compatibility and antistatic properties).
Adhere to the manufacturer's instructions and information relating to the use, storage, care and replacement of protective gloves.
Protective gloves shall be replaced immediately when physically damaged or worn. Preventive hand protection (skin protection cream) recommended. Wash immediately contaminated skin).
Design operations thus to avoid permanent use of protective gloves.

Other
Personal should wear antistatic clothings made of natural fiber or of high temperature resistant synthetic fiber. All parts of the body should be washed after contact.

Environmental exposure controls
No data available.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Form/Colour
liquid
brown

Odour
Earthy; musty

Odour threshold
No data available

pH value
not determined

Boiling point / boiling range			
Value	>	300	°C

Melting point / melting range
No data available

Decomposition point / decomposition range
No data available

Flash point			
Value	>	250	°C
Method	DIN 51758		

CELLPACK Electrical Products

EC safety data sheet

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Product no.: B2

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Ignition temperature			
Value	>	500	°C

Auto-ignition temperature
No data available

Oxidising properties
No data available

Explosive properties
No data available

Flammability (solid, gas)
No data available

Lower flammability or explosive limits
No data available

Upper flammability or explosive limits
No data available

Vapour pressure			
Value		1	hPa
Reference temperature		20	°C
Method	92/69/EEC, A.4		
Value		12	hPa
Reference temperature		50	°C
Method	92/69/EEC, A.4		

Vapour density
No data available

Evaporation rate
No data available

Relative density
No data available

Density			
Value	appr.	1.24	g/cm³
Reference temperature		20	°C
Method	DIN 51757		

Solubility in water	
Remarks	immiscible

Solubility(ies)
No data available

Partition coefficient: n-octanol/water
No data available

Viscosity			
Value	appr.	296	mPa*s
Reference temperature		20	°C
Type	dynamic		
Method	DIN 53211		

9.2 Other information

Other information
No data available.

CELLPACK Electrical Products

EC safety data sheet

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Product no.: B2

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SECTION 10: Stability and reactivity

10.1 Reactivity
Dangerous reactions are not expecting handling the product according to its intended use.

10.2 Chemical stability
release of carbon dioxide (CO_2) starting from a polymerisation temperature of approximately 200 °C.

10.3 Possibility of hazardous reactions
Contamination with incompatible materials and other compounds which react with isocyanates may result in dangerous pressure and possible bursting of closed containers.

10.4 Conditions to avoid
Stable under recommended storage and handling conditions(See section 7).

10.5 Incompatible materials
Keep away from oxidizing agents, strongly alkaline and strongly acid materials in order to avoid exothermic reactions. The product reacts slowly with water resulting in evolution of carbon dioxide. In closed containers, pressure build up could result distortion blowing and in extreme cases bursting of the container.

10.6 Hazardous decomposition products
In a fire, hazardous decomposition products, such as smoke, carbon monoxide, carbon dioxiode, oxides of nitrogen, hydrogen cyanide, monomers of isocyanates, amines and alcohols may be produced.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute oral toxicity			
LD50	>	10000	mg/kg
Species	rat (male)		
Method	OECD 401		

Acute dermal toxicity			
LD50	>	9400	mg/kg
Species	rabbit		
Method	OECD 402		

Acute inhalational toxicity			
LC50		0.31	mg/m³
Duration of exposure		4	h
State of aggregation	Dust/mist		
Species	rats (male/female)		
Remarks	The substance was tested in a form (that is to say with a particular grain size distribution) that differs from the forms it is usually marketed and most probably used. Therefore a modified classification for acute inhalation toxicity is acceptable.		

Skin corrosion/irritation	
Species	rabbit
Method	OECD 404
Evaluation	irritant

Serious eye damage/irritation
No data available

Respiratory or skin sensitisation	
Route of exposure	Skin
Evaluation	sensitizing

CELLPACK Electrical Products

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Current version : 2.1.0, issued: 09.01.2013 **Replaced version:** 2.0.0, issued: 13.03.2012 **Region:** GB

Germ cell mutagenicity
No data available

Reproduction toxicity
No data available

Carcinogenicity
No data available

STOT-single exposure
No data available

STOT-repeated exposure
No data available

Aspiration hazard
No data available

Delayed and immediate effects as well as chronic effects from short and long-term exposure
Prolonged contact with the skin may produce tannic effects and lead to irritation. Eye contact with the product can cause severe eye irritation with redness and conjunctival swelling. Repeated or prolonged skin contact may cause allergic skin reactions in sensitive individuals which can be seen as redness.

Other information
Based on the properties of the isocyanate components and considering toxicological data on similar preparations: This preparation may cause acute irritation and/or sensitisation of the respiratory system leading to an asthmatic condition, wheeziness and a thightness of the chest. Sensitized persons may subsequently show asthmatic symptoms when exposed to atmospheric concentrations well below the OEL. Repeated exposure may lead to permanent respiratory disability.

SECTION 12: Ecological information

12.1 Toxicity

Fish toxicity			
LC50	>	1000	mg/l
Duration of exposure		96	h
Species	Brachydanio rerio		
Method	OECD 203		

Daphnia toxicity			
EC50	>	1000	mg/l
Duration of exposure		24	h
Species	Daphnia magna		
Method	OECD 202		

Algae toxicity			
ErC50	>	1640	mg/l
Duration of exposure		72	h
Species	Desmodesmus subspicatus		
Method	OECD 201		

Bacteria toxicity			
EC50	>	100	mg/l
Duration of exposure		3	h
Species	activated sludge		
Method	OECD 209		

12.2 Persistence and degradability

Biodegradability	
Value	0 %
Method	OECD 302 C
Evaluation	not readily biodegradable

Physico-chemical eliminability	
Remarks	The product reacts with water in the boundary layer forming CO 2 and a solid insoluble product with high melting point (polyurea). This reaction is accelerated by surfactants (e.g. detergents) or by watersoluble solvents. According to experience to date, polyurea is inert and is not degradable.

12.3 Bioaccumulative potential

No data available.

12.4 Mobility in soil

No data available.

12.5 Results of PBT and vPvB assessment

Results of PBT and vPvB assessment	
PBT assessment	The product is not considered to be a PBT.
vPvB assessment	The product is not considered to be a vPvB.

12.6 Other adverse effects

No data available.

12.7 Other information

Other information
The product should not be allowed to enter drains or water courses.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Allocation of a waste code number, according to the European Waste Catalogue, should be carried out in agreement with the regional waste disposal company.

Packaging

Contaminated packaging should be emptied as far as possible and after appropriate cleansing may be taken for reuse. Packaging that cannot be cleaned should be disposed of in agreement with the regional waste disposal company.

CELLPACK Electrical Products

EC safety data sheet

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SECTION 14: Transport information

14.1 Transport ADR/RID/ADN
The product is not subject to ADR/RID/ADN regulations.

14.2 Transport IMDG
The product is not subject to IMDG regulations.

14.3 Transport ICAO-TI / IATA
The product is not subject to ICAO-TI / IATA regulations.

14.4 Other information
No data available.

14.5 Environmental hazards
Information on environmental hazards, if relevant, pls. see 14.1 - 14.3.

14.6 Special precautions for user
If transported within the user's premises: To be transported always in closed, upright and safe containers. Make sure that persons handling these containers are aware of the rules of conduct in case of incident or spillage.

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not relevant

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

EU regulations

Restriction of occupation
Adhere to the national sanitary and occupational safety regulations when using this product.

15.2 Chemical safety assessment
No data available.

SECTION 16: Other information

Sources of key data used to compile the data sheet:
EC Directive 67/548/EC resp. 1999/45/EC as amended in each case.
Regulation (EC) No 1907/2006 (REACH), 1272/2008 (CLP) as amended in each case.
EC Directives 2000/39/EC, 2006/15/EC, 2009/161/EC
National Threshold Limit Values of the corresponding countries as amended in each case.
Transport regulations according to ADR, RID, IMDG, IATA as amended in each case.
The data sources used to determine physical, toxic and ecotoxic data, are indicated directly in the corresponding chapter.

Full text of the R-, H- and EUH- phrases drawn up in sections 2 and 3 (provided not already drawn up in these sections)

R20	Harmful by inhalation.
R36/37/38	Irritating to eyes, respiratory system and skin.
R40	Limited evidence of a carcinogenic effect.
R42/43	May cause sensitization by inhalation and skin contact.
R48/20	Harmful: danger of serious damage to health by prolonged exposure through inhalation.

This information is based on our present state of knowledge and experience.
The security data sheet describes products with a view to the security requirements.
However, it should not constitute a guarantee for any specific product properties and shall not establish a legally valid relationship.

Alterations/supplements:
Alterations to the previous edition are marked in the left-hand margin.

CELLPACK Electrical Products

EC safety data sheet

Trade name: Giessharz Isocyanat EG-Härter

Product no.: B2

Current version : 2.1.0, issued: 09.01.2013 **Replaced version:** 2.0.0, issued: 13.03.2012 **Region:** GB

CELLPACK
Electrical Products

EC safety data sheet

Trade name: Giessharz-Polyol EG
Product no.: A2 Version: 1.1.0 / GB Status: 27.07.2011

1.) Identification of the substance/mixture and of the company/undertaking

Trade name
Giessharz-Polyol EG

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses of the substance or mixture
filling compound for electrotecnical use

Details of the supplier of the safety data sheet

Address
Cellpack GmbH
Electrical Products
Carl-Zeiss-Strasse 20
79761 Waldshut-Tiengen
Telephone no. +49 (0)7741 6007-0
Fax no. +49 (0)7741 64989

Information provided by / telephone
+49 (0)7741 6007-0

Emergency telephone
For medical advice (in German and English):
+49 (0)551 192 40 (Giftinformationszentrum Nord)

Advice on Safety Data Sheet
msds@cellpack.com

2.) Hazards identification

Classification of the substance or mixture

Classification information
This product does not meet the classification and labelling criteria given in the Dangerous Preparations Directive (1999/45/EC; DPD)

3.) Composition / information on ingredients

Chemical characterization
Mixture (preparation)

Other information
The product does not contain hazardous substances according to EC-Directive 67/548/EWG.

4.) First aid measures

General information
In all cases of doubt, or when sickness symptoms persist, seek medical attention. Never give anything by mouth to an unconscious person. Remove soiled or soaked clothing immediately.

After inhalation
Remove to fresh air, keep patient warm and at rest. Irregular breathing/no breathing: artificial respiration. If unconscious place in recovery position and seek medical advice.

After skin contact
Wash skin thoroughly with soap and water or use recognised skin cleanser. Do NOT use solvents or thinners !

After eye contact
Remove contact lenses, irrigate copiously with clean, fresh water for at least 10 minutes, holding the eyelids apart and seek medical advice.

After ingestion
Do not induce vomiting. Summon a doctor immediately. Never give anything by mouth to an unconscious person. Keep at rest.

CELLPACK Electrical Products

EC safety data sheet

Trade name: Giessharz-Polyol EG
Product no.: A2 Version: 1.1.0 / GB Status: 27.07.2011

5.) Fire-fighting measures

Suitable extinguishing media
Alcohol resistant foam, CO2, powders, water spray

Extinguishing media that must not be used for safety reasons
Full water jet

Special exposure hazards arising from the substance or preparation itself, combustion products, resulting gases
Fire will produce dense black smoke. Exposure to decomposition products may cause a health hazard.

Special protective equipment for fire-fighters
Appropriate breathing apparatus may be required. Wear protective clothing.

Other information
Cool endangered containers with water in case of fire. DO NOT ALLOW RUN-OFF FROM FIRE FIGHTING TO ENTER DRAINS OR WATER COURSES

6.) Accidental release measures

Personal precautions
Exclude sources of ignition and ventilate the area. Do not inhale vapours. Refer to protective measures listed in sections 7 and 8.

Environmental precautions
Do not allow to enter drains. If the product contaminates lakes, rivers or sewage, inform appropriate authorities in accordance with local regulations.

Methods for cleaning up/taking up
Contain and collect spillage with non-combustible absorbent materials, e.g. sand, earth, vermiculite, diatomaceous earth and place in container for disposal according to local regulations (see chapter 13). Clean preferably with a detergent; avoid use of solvents.

7.) Handling and storage

Handling

Advice on safe handling
Comply with the health and safety at work laws.

Advice on protection against fire and explosion
No special measures necessary.

Storage

Requirements for storage rooms and vessels
Keep container tightly closed. Never use pressure to empty: container is not a pressure vessel. No smoking. Prevent unauthorized access!; Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Advice on storage assembly
Keep away from oxidizing agents, from strongly alkaline and strongly acid materials.

Further information on storage conditions
Always keep in containers of same material as the original one. See also instructions on the label. Avoid heating and direct sunlight. Keep container dry in a cool, well-ventilated place. Protect from heat and direct sunlight. store at 15 - 30 °C.

8.) Exposure controls / personal protection

Exposure limit values

NONE

Exposure controls

Occupational exposure controls
Provide adequate ventilation. Where reasonably practicable this should be achieved by the use of local exhaust ventilation and good general extraction. If these are not sufficient to maintain concentrations of particulates and solvent vapour below the OEL (=Occupational ExposureLimit), suitable respiratory protection must be worn.

CELLPACK Electrical Products

EC safety data sheet

Trade name: Giessharz-Polyol EG

Product no.: A2 Version: 1.1.0 / GB Status: 27.07.2011

Personal protective equipment

Respiratory protection
If workers are exposed to concentrations above the exposure limit they must use appropriate, certified respirators: Use half-mask model with cartridge or air-fed.

Hand protection
Use protective gloves (DIN EN 374). Please read the protective glove manufacturer's information relating to permeation rates and breakthrough times and the particular conditions at the workplace.

Eye protection
Use safety goggles.

Skin protection
Personal should wear antistatic clothings made of natural fiber or of high temperature resistant synthetic fiber. All parts of the body should be washed after contact.

General protective and hygiene measures
Do not eat or drink during work - no smoking. Wash hands before breaks and after work. Do not inhale vapours.

9.) Physical and chemical properties

General information

Form	liquid
Colour	black
Odour	characteristic

Important health, safety and environmental information

Flash point			
Value	> 150		°C
Method	ISO 2592		
Density			
Value	1,02		g/cm³
Method	ASTM D 792		
Reference temperature	23	°C	
Viscosity			
Value	850		mPa*s
Method	ISO 2555		
Reference temperature	23	°C	
Solubility in water			
Remarks	partly soluble		
Solvent content			
Value	< 0,5		%

10.) Stability and reactivity

Conditions to avoid
Stable under recommended storage and handling conditions(See section 7).

Materials to avoid
Keep away from oxidizing agents, strongly alkaline and strongly acid materials in order to avoid exothermic reactions.

Hazardous decomposition products
When exposed to high temperatures may produce hazardous decomposition products such as carbon monoxide and dioxide, smoke, oxides of nitrogen.

11.) Toxicological information

Other information
The product was classified in toxicological terms on the basis of the results of the calculation procedure outlined within General Directive on Preparations (1999/45/EC). Product specific toxicological data are not known.

CELLPACK Electrical Products

EC safety data sheet

Trade name: Giessharz-Polyol EG

Product no.: A2 Version: 1.1.0 / GB Status: 27.07.2011

12.) Ecological information

Other information

There are no data available on the preparation itself. For components which are dangerous for the environment see section 3. The product should not be allowed to enter drains or water courses.

13.) Disposal considerations

Product

Allocation of a waste code number, according to the European Waste Catalogue, should be carried out in agreement with the regional waste disposal company.

Packaging

Contaminated packaging should be emptied as far as possible and after appropriate cleansing may be taken for reuse. Packaging that cannot be cleaned should be disposed of in agreement with the regional waste disposal company.

14.) Transport information

Other information

The product is not defined under national/international road, rail, sea and air dangerous goods transport regulations as a hazardous material.

15.) Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixture

EU regulations

Restriction of occupation

Employment restrictions, according to the regulations for protection of expectant and nursing mothers and the youth health and safety regulations, serving to protect against hazardous materials, should be observed.

Council Directive 96/82/EC on the control of major-accident hazards involving dangerous substances

Remarks: Annex I, part 1 + 2: not mentioned. With regard to possibly appropriate decomposition products see Chapter 10.

16.) Other information

Sources of key data used to compile the data sheet:

EC Directive 67/548/EC resp. 99/45/EC as amended in each case.
Regulation (EC) No 1907/2006 (REACH), 1272/2008 (CLP) as amended in each case.
EC Directives 2000/39/EC, 2006/15/EC, 2009/161/EC
National Threshold Limit Values of the corresponding countries as amended in each case.
Transport regulations according to ADR, RID, IMDG, IATA as amended in each case.
The data sources used to determine physical, toxic and ecotoxic data, are indicated directly in the corresponding chapter.

This information is based on our present state of knowledge. However, it should not constitute a guarantee for any specific product properties and shall not establish a legally valid relationship.