SIST

SLOVENSKI STANDARD
SIST HD 307.3.4 S1:1998

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Specification for solventless polymerisable resinous compounds used for electrical insulation - Part 3: Specifications for individual materials - Sheet 4: Filled polyurethane compounds (IEC 60455-3-4:1984)

Specification for solventless polymerisable resinous compounds used for electrical insulation -- Part 3: Specifications for individual materials -- Sheet 4: Filled polyurethane compounds

Bestimmungen für Reaktionsharzmassen und -formstoffe in der Elektrotechnik -- Teil 3: Bestimmungen für besondere Stoffe -- Blatt 4: Gefüllte Polyurethanharzmassen und -formstoffe

Spécification relative aux composés résineux polymérisables sans solvant utilisés comme isolants électriques -- Partie 3: Spécifications pour les matériaux particuliers -- Feuille 4: Composés résineux de polyuréthane chargés

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SPECIFICATION FOR SOLVENTLESS POLYMERISABLE RESINOUS COMPOUNDS USED FOR ELECTRICAL INSULATION PART 3: SPECIFICATIONS FOR INDIVIDUAL MATERIALS SHEET 4: FILLED POLYURETHANE COMPOUNDS

Spécification relative aux composés résineux polymérisables sans solvant utilisés comme isolants électriques Troisième partie: Spécifications pour les matériaux particuliers Feuille 4: Composés résineux de polyuréthanne chargés

Bestimmung für lösemittelfreie härtbare Reaktionsharzmassen für die Elektroisolierung Teil 3: Anforderungen an einzelne Werkstoffe Blatt 4: Gefüllte Polyurethanharzwerkstoffe

BODY OF THE HD

The Harmonization Document consists of:

- IEC 455-3-4 (1984) ed 1; IEC/SC 15C, not appended

This Harmonization Document was approved by CENELEC on 5 March 1987.

The English and French versions of this Harmonization Document are provided by the text of the IEC publication and the German version is the official translation of the IEC text.

According to the CENELEC Internal Regulations the CENELEC member National Committees are bound:

to announce the existence of this Harmonization Document at national level by or before 1987-09-01

to publish their new harmonized national standard by or before 1988-03-01

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Spécification relative aux composés résineux polymérisables sans solvant utilisés comme isolants électriques

Troisième partie : Spécifications pour les matériaux particuliers

Feuille 4 : Composés résineux de polyuréthanne chargés

Specification for solventless polymerisable resinous compounds used for electrical insulation

Part 3 : Specifications for individual materials

Sheet 4 : Filled polyurethane compounds

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

SPECIFICATION FOR SOLVENTLESS POLYMERISABLE RESINOUS COMPOUNDS USED IN ELECTRICAL INSULATION

Part 3: Specifications for individual materials

Sheet 4: Filled polyurethane compounds

FOREWORD

1) The formal decisions or agreements of the I E C on technical matters, prepared by Technical Committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.
2) They have the form of recommendations for international use and they are accepted by the National Committees in that sense.
3) In order to promote international unification, the I E C expresses the wish that all National Committees should adopt the text of the I E C recommendation for their national rules in so far as national conditions will permit. Any divergence between the I E C recommendation and the corresponding national rules should, as far as possible, be clearly indicated in the latter.

PREFACE

This standard has been prepared by Sub-Committee 15C: Specifications, of I E C Technical Committee No. 15: Insulating Materials.

The text of this standard is based upon the following documents:

Six Months' Rule	Report on Voting
15C(CO)158	15C(CO)172

Further information can be found in the Report on Voting indicated in the table above.

The following I E C publications are quoted in this standard:

Publications Nos. 93 (1980): Methods of Test for Volume Resistivity and Surface Resistivity of Solid Electrical Insulating Materials.
296 (1982): Specification for Unused Mineral Insulating Oils for Transformers and Switchgear.
455-2 (1977): Specification for Solventless Polymerisable Resinous Compounds Used for Electrical Insulation. Part 2: Methods of Test.

SPECIFICATION FOR SOLVENTLESS POLYMERISABLE RESINOUS COMPOUNDS USED IN ELECTRICAL INSULATION

Part 3: Specifications for individual materials
Sheet 4: Filled polyurethane compounds

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1. Scope

This sheet 4 of Part 3 of the standard contains the requirements for filled polyurethane resinous compounds in the cured form for classes PUR-F-4 to PUR-F-8.

2. Requirements

The requirements for filled polyurethane resinous compounds in the cured form containing quartz filler are given in Table I.

Note. — Materials for use in low temperature conditions may require additional tests not specified in this sheet to establish their suitability.

3. List of properties in the uncured form which are not specified in this sheet but should be stated in the purchase order

	Test method according to Part 2 Clause
Density	3
Viscosity after mixing	4
Volatile content	11
Shelf life for resin components	14
Gel time	16
Exothermic peak temperature	17

TABLE I

Requirements for filled polyurethane compounds in the cured form

(Before testing, the test pieces shall be conditioned in accordance with Clause 22 of I E C Publication 455-2: Specification for Solventless Polymerisable Resinous Compounds Used for Electrical Insulation, Part 2: Methods of test.)

Properties	Method of test according to Part 2 (Clause or Sub-clause)	Units		Requirements for compound type:				
				PUR-F-4	PUR-F-5	PUR-F-6	PUR-F-7	PUR-F-8
Density	3	g/cm³	—	1.2-1.7	1.2-1.7	1.2-1.7	1.2-1.7	1.2-1.7
Fluxural strength	24	MPa	min.	100	80	60	40	Not applicable
Tensile strength	25	MPa	min.	50	50	40	15	10
Elongation at break	25	%	—	≥ 1	≥ 1	8-12	15-20	60-90
Impact strength	26	kJ/m²	min.	10	10	Not applicable	Not applicable	Not applicable
Deflection temperature under load	32	°C	min.	> 100	> 75	> 45	Not applicable	Not applicable
Glass transition temperature				Under consideration				
Water absorption	34	mg	max.	60	60	60	100	180
Volume resistivity [1]	36	Ω · cm	min.	10^{13}	10^{13}	10^{12}	10^{12}	10^{12}
Dissipation factor (48 Hz to 62 Hz) [1] At 23 °C At 90 °C	37	— —	max. max.	Losses at 90 °C { high 0.2 low 0.03	0.01 0.03	0.01 0.04	0.03 0.08	0.06 0.10
Permittivity (48 Hz to 62 Hz) [1] At 23 °C At 90 °C	37	— —	— —	4-5 5-7	4.5-5.5 5-7	5-6 5-7	5-6 5-7	5-6 5-7
Electric strength [2]	38	kV/mm	min.	20	20	20	15	15
Tracking resistance	40.1	CTI	—	600	600	600	600	600

1) The conditioning of the specimen should be approached from the dry side.

2) The specimen should be 3 mm in thickness, large enough in area to prevent flashover and to be tested under oil (I E C Publication 296: Specification for Unused Mineral Insulating Oils for Transformers and Switchgear) in accordance with Clause 38 of I E C Publication 455-2. Silver paint electrodes may be used in accordance with I E C Publication 93: Methods of Test for Volume Resistivity and Surface Resistivity of Solid Electrical Insulating Materials.

General note:

a) Values given in the table above are for compounds containing quartz filler. When other fillers are used, different values may be needed to be agreed upon.

b) *Post-curing conditions:* in accordance with Clause 22 of I E C Publication 455-2 but for a minimum of 16 h, post-curing at 80 °C for 24 h unless otherwise specified.