

Test report no.: 220740/21-VII

Customer: Sika Deutschland GmbH
Stuttgarter Straße 117
72574 Bad Urach
GERMANY

Order: Testing of the booster accelerated joint sealant **Sikaflex®-423 PowerCure** in accordance with EN 15651-1 Sealants for non-structural use in joints in buildings and pedestrian walkways - Part 1: Sealants for facade elements

Letter of: 2021-11-11 **Ref:** Mr. Ralf Heinzmann

Sample receipt: 2021-11-24 and 2021-12-01 (Primer)

Test period: 2021-12-08 to 2022-03-23

The test report comprises 10 pages and 2 annexes.

Würzburg, 13 April 2022
Fs/km

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Die auszugsweise Wiedergabe, Vervielfältigung und Übersetzung dieses Berichtes bedarf der schriftlichen Genehmigung der SKZ-Testing GmbH. Die Ergebnisse beziehen sich auf die geprüften Produkte. Der Akkreditierungsumfang kann im Internet unter www.skz.de eingesehen werden.

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1. Order

The Company Sika Deutschland GmbH, Stuttgarter Straße 117, 72574 Bad Urach, GERMANY, instructed SKZ - Testing GmbH by letter of 11 November 2021 to test the performance of a booster accelerated joint sealant **Sikaflex®-423 PowerCure** in accordance with EN 15651-1:2012-09 Sealants for non-structural use in joints in buildings and pedestrian walkways - Part 1: Sealants for facade elements. At time of testing, the standard EN 15651-1:2012-09 was superseded by EN 15651-1:2017-07. The testing was carried out according to EN 15651-1:2012-09 in accordance with the requirements of the Construction Products Regulation (Regulation No. 305/2011) to enable the CE conformity marking for sealants. For further information see website and the Official Journal of the European Commission.

2. Test material

The SKZ - Testing GmbH received the following samples for testing (description is based on inspection of the samples at SKZ - Testing GmbH and on the manufacturer's data):

6 cartridges booster accelerated sealant

Designation:	Sikaflex®-423 PowerCure
Type (chemical family):	Polyurethane
Colour:	Concrete-grey
Batch number:	3005424469
Sample receipt:	2021-11-24

250 ml one-component primer for absorbent surfaces (concrete)

Designation:	Sika® Primer 115
Batch number:	3005641873
Sample receipt:	2021-12-01

3. Test procedure

The test of the performance of the booster accelerated joint sealant **Sikaflex®-423 PowerCure** for non-structural use was performed in accordance with EN 15651-1:2012-09, Part 1: Sealants for facade elements, class 25HM.

The testing scope includes a product type determination according to EN 15651-1.

SKZ - Testing GmbH is a notified body approved according to the Construction Products Regulation for the product standard EN 15651-1 (code no.: NB 1213).

Unless indicated otherwise, preconditioning and test procedure was performed at standard conditioning atmosphere 23/50, class 1 according to DIN EN ISO 291:2008-08.

Usually we carry out tests according to standards for which we have an accreditation. The list of all standards for which we are accredited is shown on the homepage at www.skz.de. In case of non-accredited procedures they are marked with *. If it is only a matter of deviating test conditions of an accredited standard, this is marked with #.

Production and pre-treatment of test specimens

For the test specimens with the joint dimensions 12 x 12 x 50 mm were produced according to ISO 8340:2005-06.

For the determination of all tensile properties and adhesion/cohesion properties substrate according to the following table was used and prepared:

Substrate according to ISO 13640:1999-12	Primer	Drying time of the primer up to the application of the sealant in the joints
Mortar M1	Sika® Primer 115	90 min

The test specimens Mortar (M1) were blown off with compressed air.

The preconditioning of the test specimens was carried out according to DIN EN ISO 8340:2005-09, method B.

Method A: Standard conditioning atmosphere 23/50, class 1 according to DIN EN ISO 291:2008-08

Method B: The test specimens shall be conditioned according to method A and shall then be submitted three times to the following storage cycle:

- a) 3 days in the oven at $(70 \pm 2) ^\circ\text{C}$;
- b) 1 day in distilled water at $(23 \pm 2) ^\circ\text{C}$;
- c) 2 days in the oven at $(70 \pm 2) ^\circ\text{C}$;
- d) 1 day in distilled water at $(23 \pm 2) ^\circ\text{C}$

3.1 Performance requirements for non-structural sealants for facade elements

3.1.1 Elastic recovery

The test was carried out according to DIN EN ISO 7389:2004-04 with test specimens made of anodised aluminium with a 100 % extension, in relation to the initial joint width.

Requirement:

The elastic recovery shall be at least 70 %.

3.1.2 Resistance to flow

The test was carried out according to DIN EN ISO 7390:2004-04.

Requirement:

According to method A at 5 °C and 50 °C the slump (flow) of the joint sealant must not exceed 3 mm.

3.1.3 Change in volume

The test was carried out according to DIN EN ISO 10563:2017-09 in a forced ventilated oven with open flap.

Requirement:

The change in volume must be ≤ 10 %.

3.1.4 Tensile properties (secant tensile modulus)

The test was carried out according to ISO 8339:2005-06. The secant tensile modulus was determined on test specimens, which were extended by 100 % of the original width at temperatures of 23 °C and -20 °C.

Requirement:

Secant tensile modulus at 23 °C: > 0.4 MPa
or
at -20 °C: > 0.6 MPa

3.1.5 Tensile properties at maintained extension

The test was carried out according to DIN EN ISO 8340:2005-09 with an extension of 100 % at temperatures of 23 °C and -20 °C.

Requirement:

After 24 h neither an adhesive nor a cohesive failure shall occur on the test specimens which are extended by 100 %.

3.1.6 Determination of adhesion/cohesion properties at variable temperatures

The test was carried out according to ISO 9047:2016-02. The amplitude of extension/compression was ± 25 % of the initial joint width.

Requirement:

The joint sealant must not separate from the contact material nor shall the joint sealant display any signs of crack formation.

3.1.7 Adhesion/cohesion properties at maintained extension after immersion in water

The test was carried out according to DIN EN ISO 10590:2005-10 with an extension of 100 %.

Requirement:

After 24 h neither an adhesive nor a cohesive failure shall occur on the test specimens which are extended by 100 %.

3.2 Essential characteristics

3.2.1 Reaction to fire

The test was performed according to DIN EN ISO 11925-2:2011-02 for classification of the sealant according to DIN EN 13501-1:2010-02. As substrate calcium silicate panels in accordance with EN 13238:2010-02 were used. 6 samples were tested with edge flaming according to EN 15651:2012-09.

The test was not carried out at SKZ - Testing GmbH, but within the scope of a sub-contract at a testing institute accredited according to DIN EN ISO 17025:2005-08 for the test.

Requirement:

Classification in fire behaviour class between A1 and F

3.2.2 Durability

No extra test of durability had been carried out.

Requirement:

In accordance to EN 15651-1:2012-09, the durability can be assessed by the properties of ISO 8339:2005-06 or ISO 8340:2005-06 and the properties of ISO 9046:2002-05, ISO 9047:2001-12, ISO 10590:2005-07 or ISO 10591:2005-07.

3.2.3 Release of chemicals dangerous to environment and health

No extra test of the release of chemicals dangerous to environment and health had been carried out.

3.3 Additional requirements for the use in cold climates

3.3.1 Tensile properties (secant tensile modulus) at -30 °C

The test was carried out according to DIN EN ISO 8339:2005-09. The secant tensile modulus was determined on test specimens which were extended by 100 % of the original width at a temperature of -30 °C.

Requirement:

None

3.3.2 Tensile properties at maintained extension at -30 °C

The test was carried out according to DIN EN ISO 8340:2005-09 with an extension of 100 % at a temperature of -30 °C.

Requirement:

After 24 h neither an adhesive nor a cohesive failure shall occur on the test specimens which are extended by 100 %.

3.4 Identification requirements

3.4.1 Thermogravimetric test

The test was performed in accordance with DIN EN ISO 11358-1:2014-10, between 35 °C and 900 °C, temperature slope 10 °C/min, non-oxidative condition (nitrogen).

3.4.2 Specific gravity

The test was performed in accordance with DIN EN ISO 1183-1:2013-04 procedure B with a metal pycnometer.

3.4.3 Shore hardness

The test was performed in accordance with DIN EN ISO 868:2003-10 after preconditioning at standard climate 23/50, class 1, for 28 days.

The test was conducted using a Shore durometer type A. The test specimens were 6 mm thick and 60 mm in diameter.

Readings were taken 1 and 15 seconds after the fixed contact of the pressure foot with the test specimen had been effected.

Three samples were tested and five measurements were taken per sample.

4. Test results - Sikaflex®-423 PowerCure

4.1 Performance requirements for non-structural sealants for facade elements						
4.1.1	Elastic recovery (DIN EN ISO 7389)	%	≥ 70			88
4.1.2	Resistance to flow (DIN EN ISO 7390)	mm	A vertical 5 °C	≤ 3	0	
			A vertical 50 °C	≤ 3	0	
4.1.3	Change in volume (DIN EN ISO 10563)	%	≤ 10			-0.9
4.1.4	Secant tensile modulus (DIN EN ISO 8339)	MPa	at 23 °C, 100 % extension	> 0.4 or	0.6	
			at -20 °C, 100 % extension	> 0.6	1.0	
4.1.5	Tensile properties at maintained extension (DIN EN ISO 8340)	---	No failure (NF) at 23 °C and -20 °C			NF ¹
4.1.6	Adhesion/cohesion properties at variable temperatures (DIN EN ISO 9047)	---	No failure (NF)			NF ¹
4.1.7	Adhesion/cohesion properties at maintained extension after immersion in water (DIN EN ISO 10590)	---	No failure (NF)			NF ¹
4.2 Essential characteristics						
4.2.1	Reaction to fire (DIN EN ISO 11925-2)					Class E ²
4.2.2	Durability (EN 15651)					Pass ³
4.2.3	Release of chemicals dangerous to environment and health (EN 15651)					NPD ⁴
4.3 Additional performance requirements for the use in cold climates						
	<i>Property</i>	<i>Unit</i>	<i>Requirement</i>		<i>Result</i>	
4.3.1	Secant tensile modulus at -30 °C (DIN EN ISO 8339)	MPa	None		1.0	
4.3.2	Tensile properties at maintained extension at -30 °C (DIN EN ISO 8340)	---	No failure (NF)		NF ¹	
4.4 Identification requirements						
4.4.1.1	Ash content (DIN EN ISO 11358)	%	---	---	---	24.6 ⁵
4.4.1.2	Ash content (Booster) (DIN EN ISO 11358)	%	---	---	---	20.6 ⁶
4.4.2.1	Specific gravity (DIN EN ISO 1183-1)	g/cm ³	1.17	1.17	1.18	1.17
4.4.2.2	Specific gravity (Booster) (DIN EN ISO 1183-1)	g/cm ³	1.29	1.28	1.28	1.28
4.4.3	Shore hardness (DIN EN ISO 868) after 1 and 15 s	Shore A	1 s: 33	1 s: 35	1 s: 33	1 s: 34
			15 s: 29	15 s: 29	15 s: 30	15 s: 29

¹ Neither adhesive nor cohesive failure occurred.

² The test was not carried out at SKZ - Testing GmbH, but within the scope of a subcontract at a testing institute accredited for the test. The test report and classification report are present at the SKZ - Testing GmbH.

³ Durability had been shown by positive results according to ISO 8339, ISO 8340, ISO 9047 and ISO 10590.

⁴ NPD: No performance determined.

⁵ The results of the thermogravimetric test are indicated in annex 1.

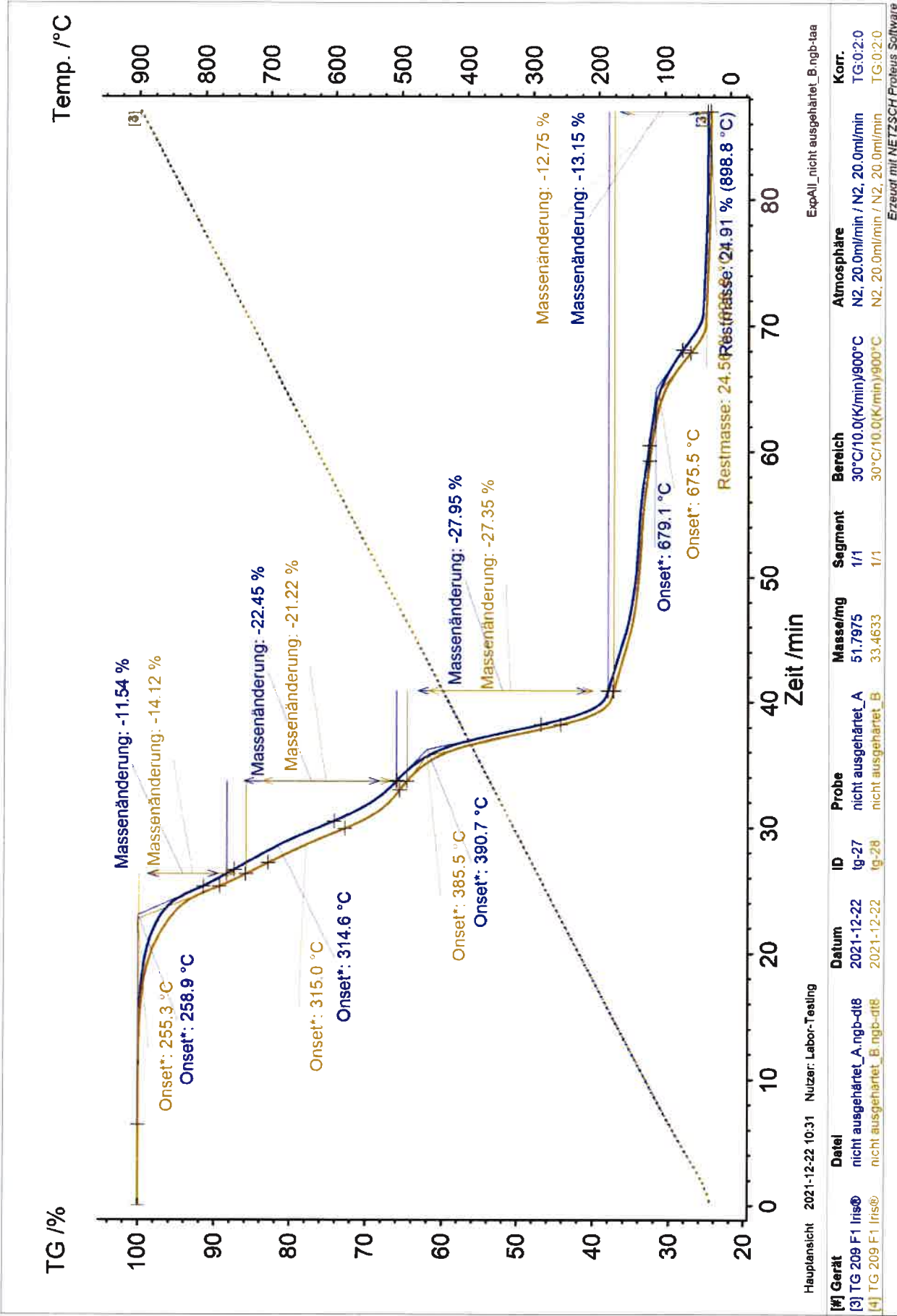
⁶ The results of the thermogravimetric test are indicated in annex 2.

5. Assessment of the test results and product type determination

The booster accelerated joint sealant **Sikaflex®-423 PowerCure** for non-structural use in conjunction with substrate mortar M1 (with Primer **Sika® Primer 115**) meets the requirements according to EN 15651-1:2012-09, class 25HM.

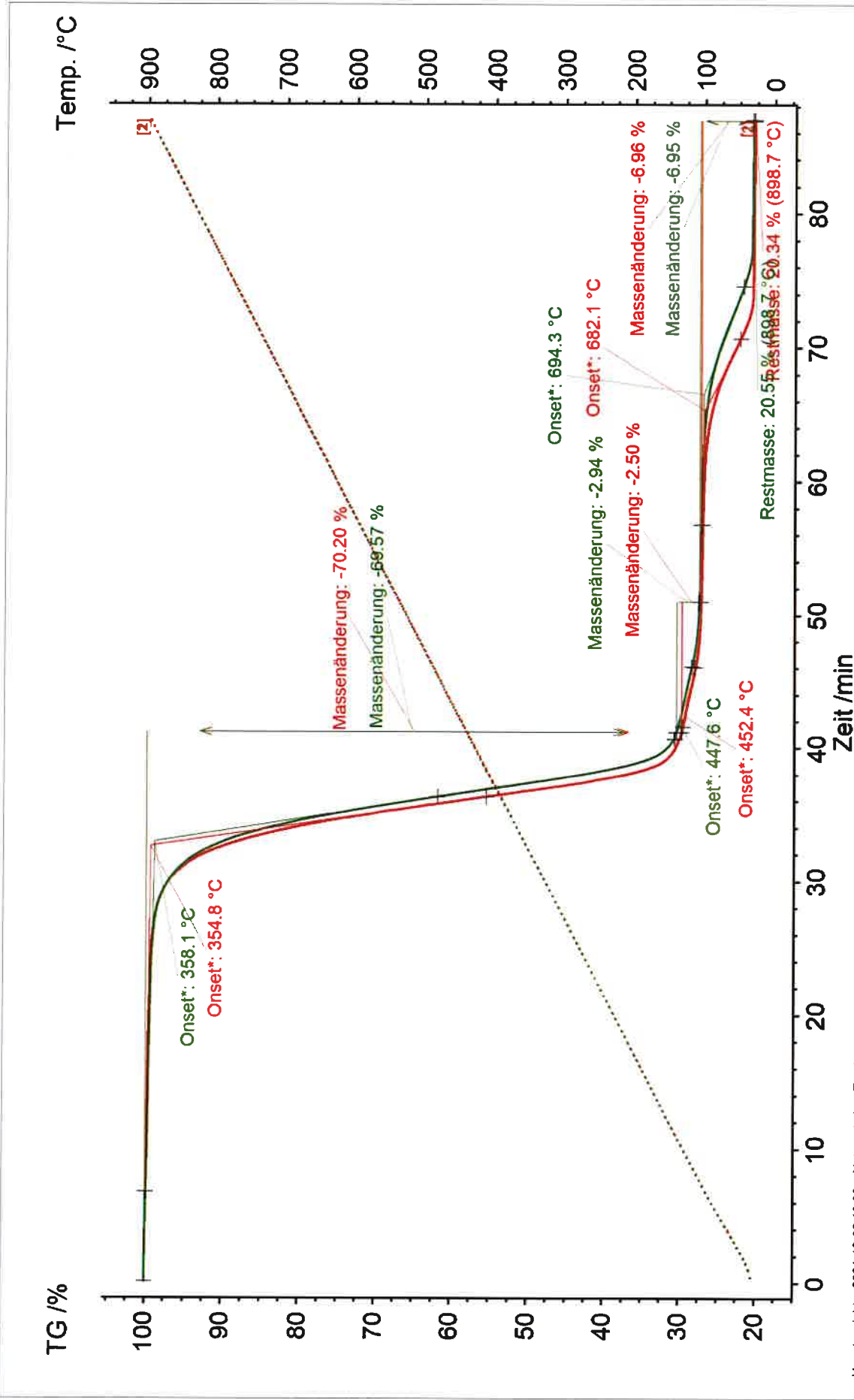
This comprises the additional requirements for outdoor applications and for the use in cold climates.

Designation	
Type:	Non-structural sealant type F (facade elements)
Intended Use:	EXT-INT (external and internal use)
Further designation:	CC (cold climate)
Substrate:	Mortar M1 (with primer)
Pre-conditioning:	Method B (according to DIN EN ISO 8340)
Class:	25HM



Hauptansicht		2021-12-22 10:31		Nutzer: Labor-Teating		ExpAll_nicht ausgehärtet_B.ngb-1aa			
[#] Gerät	Datet	Datum	ID	Probe	Mass/mg	Segment	Bereich	Atmosphäre	Korr.
[3] TG 209 F1 Iris®	nicht ausgehärtet_A.ngb-d18	2021-12-22	tg-27	nicht ausgehärtet_A	51.7975	1/1	30°C/10.0(K/min)/900°C	N2, 20.0ml/min / N2, 20.0ml/min	TG:0:2.0
[4] TG 209 F1 Iris®	nicht ausgehärtet_B.ngb-d18	2021-12-22	tg-28	nicht ausgehärtet_B	33.4633	1/1	30°C/10.0(K/min)/900°C	N2, 20.0ml/min / N2, 20.0ml/min	TG:0:2.0

Erzeugt mit NETZSCH Proteus Software



Hauptansicht 2021-12-22 10:32 Nutzer: Labor-Testing

[#] Gerät	Datum	ID	Probe	Masse/mg	Segment	Bereich	Atmosphäre	Korr.
[1] TG 209 F1 Iris®	2021-12-21	tg-25	Härter_A	53.3140	1/1	30°C/10.0(K/min)/900°C	N2, 20.0ml/min / N2, 20.0ml/min	TG:0:2:0
[2] TG 209 F1 Iris®	2021-12-21	tg-26	Härter_B	17.4297	1/1	30°C/10.0(K/min)/900°C	N2, 20.0ml/min / N2, 20.0ml/min	TG:0:2:0

Erzeugt mit NETZSCH Proteus Software