

European Technical Assessment

ETA 18/0571

Version 01

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UBAtc Assessment Operator:
Belgian Construction Certification Association
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**Technical Assessment Body issuing the European Technical Assessment: UBAtc.
UBAtc has been designated according to Article 29 of Regulation (EU) No 305/2011
and is member of EOTA (European Organisation for Technical Assessment)**

Trade name of the construction product:

DOWSIL™ 994 Ultra-Fast Bonding Sealant

Product family to which the construction product belongs:

Sealant used in bonding sealant glazing systems to bond glass onto metal

Manufacturer:

DOW Europe GmbH
Bachtobelstrasse 3
D-8810 Horgen
Switzerland

Manufacturing plants:

Dow Silicones Belgium S.P.R.L.
Parc Industriel Zone C, B 7180 SENEFFE
Dow Silicones Deutschland GmbH, Rheingaustrasse D –
65201 Wiesbaden

Website:

<http://www.consumer.dow.com>

This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of:

European Assessment Document (EAD): ETAG 002, edition 1999 amended in 2012, used as European Assessment Document (EAD)

This European Technical Assessment contains:

7 pages, without annexes



European Organisation for Technical Assessment

Legal bases and general conditions

- 1 This European Technical Assessment is issued by UBAtc (Union belge pour l'Agrément technique de la construction, i.e. Belgian Union for technical Approval in construction), in accordance with:
 - Regulation (EU) N° 305/2011¹ of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC
 - Commission Implementing Regulation (EU) N° 1062/2013² of 30 October 2013 on the format of the European Technical Assessment for construction products
 - Guideline for European technical approval 002 (ETAG), used as European Assessment Document (EAD)
- 2 Under the provisions of Regulation (EU) No 305/2011, UBAtc is not authorized to check whether the provisions of this European Technical Assessment are met once the ETA has been issued.
- 3 The responsibility for the conformity of the performances of the products with this European Technical Assessment and the suitability of the products for the intended use remains with the holder of the European Technical Assessment.
- 4 Depending on the applicable Assessment and verification of constancy of performance (AVCP) system, (a) notified body(ies) may carry out third-party tasks in the process of assessment and verification of constancy of performance under this Regulation once the European Technical Assessment has been issued.
- 5 This European Technical Assessment allows the manufacturer of the construction product covered by this ETA to draw up a declaration of performance for the construction product.
- 6 CE marking should be affixed to all construction products for which the manufacturer has drawn up a declaration of performance.
- 7 This European Technical Assessment is not to be transferred to other manufacturers, agents of manufacturers, or manufacturing plants other than those indicated on page 1 of this European Technical Assessment.
- 8 The European Technical Assessment holder confirms to guarantee that the product(-s) to which this assessment relates, is/are produced and marketed in accordance with and comply with all applicable legal and regulatory provisions, including, without limitation, national and European legislation on the safety of products and services. The ETA-holder shall notify the UBAtc immediately in writing of any circumstance affecting the aforementioned guarantee. This assessment is issued under the condition that the aforementioned guarantee by the ETA-holder will be continuously observed.
- 9 According to Article 11(6) of Regulation (EU) N° 305/2011, when making a construction product available on the market, the manufacturer shall ensure that the product is accompanied by instructions and safety information in a language determined by the Member State concerned which can be easily understood by users. These instructions and safety information should fully correspond with the technical information about the product and its intended use, which the manufacturer has submitted to the responsible Technical Assessment Body for the issuing of the European Technical Assessment.
- 10 Pursuant to Article 11(3) of Regulation (EU) N° 305/2011, manufacturers shall adequately take into account changes in the product-type and in the applicable harmonised technical specifications. Therefore, when the contents of the issued European Technical Assessment do not any longer correspond to the product-type, the manufacturer should refrain from using this European Technical Assessment as the basis for their declaration of performance.
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- 13 Subject to the application introduced, this European Technical Assessment is issued in English and may be issued by the UBAtc in its official languages. The translations correspond fully to the English reference version circulated in EOTA.
- 14 This European Technical Assessment, ETA 18/0571, was first issued on 7 December 2018.

¹ OJEU, L 88 of 2011/04/04

² OJEU, L 289 of 2013/10/31

Technical Provisions

1 Technical description of the product

1.1 Characteristics of the products

1.1.1 General

This ETA is being issued for the products specified on the cover page on the basis of agreed data/information, deposited with the UBAtc, which identifies the products that have been assessed and judged. Changes to the product/production process, which could result in the deposited data/information being incorrect, should be notified to the UBAtc before the changes are introduced. The UBAtc will decide whether such changes affect the ETA.

1.1.2 Bonding sealant DOWSIL™ 994 Ultra-Fast Bonding Sealant

The characteristics of the product are the following:

- Design stress in tension: $\sigma_{des} = 0,14$ MPa
- Design stress in static shear: $\tau_{\infty} = 0,011$ MPa
- Design stress in dynamic shear: $\tau_{des} = 0,11$ MPa
- Secant elastic modulus between 0 and 12.5% $E_{sec\ 0-12,5\%} = 1,8$ MPa
- Secant elastic modulus in shear $G_{sec\ 0-12,5\%} = 0,6$ MPa
- Snap time (at 25°C, 50% R.H.): 3-10 minutes
- Tack-free time (at 25°C, 50% R.H.): 15 to 20 minutes
- Time before transport of the bonded frame: transportation on work site is allowed if the following two conditions are respected (see ETAG 002, Table 10 checks during production): The tested H-samples give the result: Rupture 100% cohesive and breaking stress $\geq 0,7$ MPa.

Table 1 –DOWSIL™ 994: Bonding Sealant – identification characteristics

Test	ETAG ref.	Result
Specific mass		
Mixing ratio at 100(base)/14 catalyst	5.2.1.1	1,31 ± 0,02
Hardness A	5.2.1.2	45 ± 2
Thermogravimetric analysis	5.2.1.3	Curve kept in the ETA technical file
Colour	5.2.1.4	Black colour

1.1.3 Ancillary products for bonding seal adhesion surface preparation

Cleaning product:

- DOWSIL™ R40
- Organic cleaner (isopropanol / acetone)

Primer:

- DOWSIL™ 1200 OS UV Traceable primer
- Silane solution in an organic solvent

2 Specification of the intended use(s) in accordance with the applicable EAD

2.1 General

Bonding sealant DOWSIL™ 994 is a silicone-based sealant intended to be used in structural (bonding) sealant glazing system (SSGS) to bond glazing products on metallic bonding seal support frames. Suitable substrates are defined for each sealant in this ETA, clause 4.2.2.3.

The bi-component sealant DOWSIL™ 994 may be used in structural (bonding) glazing systems types I, II, III, IV as per ETAG 002, Table 1.

The essential requirements ER2 Safety in case of fire, ER3 Hygiene, health and environment, ER4 Safety in use, ER6 Energy economy and heat retention shall be fulfilled. Failure of the bond might cause risk to human life and/or have considerable economic consequences.

The provisions made in this European Technical Assessment are based on the assumed working life of the SSGS of 25 years³.

2.2 Provisions related to manufacturing, packaging and storage

The base of the bonding sealant DOWSIL™ 994 is produced and packaged by Dow Silicones Belgium S.P.R.L. in Seneffe, Belgium

The catalyst is produced and packaged by Dow Silicones Deutschland GmbH, Wiesbaden Germany

The maximum storage duration of the sealant is 14 months for the base and 12 months for the catalyst after fabrication date in their original unopened packaging, when stored below 30°C.

2.3 Provisions related to the design and use of the product

2.3.1 Design rules

2.3.1.1 Structural (bonding) seal design

See method of calculation in ETAG 002

2.3.1.2 Suitable substrates for bonding adhesion surface

The generic types of suitable adhesion substrates are being specified as a function of the bonding sealant only as indication.

Except for the float glass, the combination of a particular substrate of the generic types of substrates given in the table 1 and a bonding sealant shall be assessed in the framework SSGS ETA by passing the following set of tests by reference to the ETAG 002, clauses 5.1.4.1.1, 5.1.4.2.1, 5.1.4.2.2, 5.1.4.2.3, 5.1.4.2.4 and 5.1.4.2.5.

³ The indications given as to the working life of the products cannot be interpreted as a guarantee given by the ETA-holder or the assessment body. It should only be regarded as a means for specifiers to choose the appropriate criteria for this product in relation to the expected, economically reasonable working life of the works.

In addition, this particular substrate for bonding seal adhesion surface has to be identified and assessed as per the relevant clauses of ETAG 002, chapters 5 and 6.

Table 2 – Bonding Sealants – Generic type of substrates

Generic types of substrates	DOWSIL™ 994
Glass	Suitable
Coated glass	Suitable
Stainless steel	Not covered by this ETA
Anodised aluminium	Suitable

2.3.1.3 Drainage and ventilation

Water stagnation is not allowed in the vicinity of the bonding seal. Therefore, the SSGS shall be designed with an efficient water tightness, assisted by drainage and ventilation or by the absence of any void or cavity close to the IG seal.

2.3.1.4 Transfer of the infill loading on the building structure via the bonding sealant

DOWSIL™ 994 is suitable to be used in SSGS type I to IV as defined in ETAG 002. This means that the SSGS may or may not be equipped with mechanical self-weight devices.

2.3.1.5 Resistance to tearing

DOWSIL™ 994 sealant is a category 2 sealant in accordance with ETAG 002, clause 6.1.4.6.4 and inserts in the sealant joint are not allowed.

2.3.2 Application of the sealant

2.3.2.1 Description of the bonding sealant application

European Technical Assessments for bonding sealant glazing kits shall specify the sealant application; in particular, the ETA shall specify the cleaning product to be used as well as the primer, if required, and the method of application.

2.3.2.2 General technical conditions

DOWSIL™ 994 sealant shall be applied between 5 and 35°C in a dust free location. The seal shall be tooled before the skin-over time has been reached, preferably within 10 minutes after the extrusion. It is important to realise that the skin-over time may vary with temperature and relative humidity.

DOWSIL™ 994 shall be mixed at a ratio base/catalyst by weight of 100/14 (min. 100/10 and max. 100/20).

The sealant shall be applied between 5 and 35°C in a dust free location. The joint shall be tooled before the snap time has been reached, preferably within 10 minutes after the extrusion. It is important to realise that the snap time may vary with temperature and relative humidity.

After the snap time has been reached, there should be no relative movement induced anymore between the glass and the metal frame.

In all cases, it should be checked that there is no condensation on the substrates prior to the sealant application.

2.3.3 Recommendation for façade cleaning

It is recommended to use the following product for façade cleaning: Palmolive soap dilution 1%.

Nevertheless, the assessment of the façade cleaning product shall be done in the framework of the ETA for the bonding sealant glazing kit in order to check that those cleaning agents do not affect other kit products (gaskets, weather sealant,)

2.3.4 Chemical compatibility

The chemical compatibility shall be assessed in the framework of the ETA for the bonding sealant glazing kit as required by ETAG 002, clause 5.1.4.2.5.

2.3.5 Responsibility of the manufacturer

It is the responsibility of the ETA-holder to ensure that the information on the sealant characteristics and on the sealant extrusion is given to the person(s) concerned. This information may be provided by reproduction of the relevant parts of this European Technical Assessment.

3 Performance of the product and references to the methods used for its assessment

The assessment of the bonding sealant for the intended use in relation to the requirements for safety in case of fire; safety in use; hygiene health and environment; energy economy and heat retention; in the sense of the Essential Requirements 2, 3, 4 and 6, has been made in accordance with ETAG 002.

Where the guideline allows for classifications and/or choice, the selection specified below has been made.

ER2 Safety in case of fire

The behaviour in case of fire shall be assessed in the framework of the ETA for the bonding sealant glazing kit

ER3 Hygiene, health and environment

The sealant manufacturer made a declaration of conformity with the Council Directive 76/769/EEC published in "Official Journal of the European Communities" of 27/07/1976 and its amendments.

ER4 Safety in use

The product has been successfully subjected to the following tests, which are relevant for sealant: ETAG 002, clauses 5.1.4.1.1, 5.1.4.1.2, 5.1.4.2.1, 5.1.4.2.2, 5.1.4.2.3, 5.1.4.2.4, 5.1.4.2.5, 5.1.4.6.1, 5.1.4.6.2, 5.1.4.6.3, 5.1.4.6.4, 5.1.4.6.5, 5.1.4.6.7, 5.2.1.1, 5.2.1.2, 5.2.1.3 and 5.2.1.4.

ER6 Energy economy and heat retention

Determination of thermal insulation and susceptibility to condensation - Calculation method

As a function of the design and the glazing chosen for the SSGS kits, thermal modelling may be undertaken with various computer software packages. To use the results of these programmes, it is necessary to ensure that they are at least two-dimensional and cover all the required parameters.

The generally accepted value of the thermal conductivity (λ -value) of the bonding sealant to be used in thermal modelling for assessment of the thermal performance is 0,35 W/m K (EN ISO 10456).

Durability

The durability of the fitness for use of the bonding sealants has been demonstrated as follows:

All the specific aspects of durability have been covered under the headings above, more particularly ER4 Safety in use.

4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

In accordance with Regulation (EU) N° 305/2011, Article 65, Directive 89/106/EEC is repealed, but references to the repealed Directive shall be construed as references to the Regulation.

The systems of attestation of conformity specified by the European Commission detailed in EC Decision 96/582/EC⁴ are as follows:

- System 1 (without audit testing of samples) for SSG kits Type II and IV;
- System 2+ (first possibility, including certification of the factory production control (FPC) by an approved body on the basis of its continuous surveillance, assessment and assessment) for SSG kits Type I and III

The system(s) of assessment and verification of constancy of performance are shown in the following Table.

Table 3 – System(s) of assessment and verification of constancy of performance

Structural (bonding) sealant glazing kits type II and IV	External walls and roofs	none	1
Structural (bonding) sealant glazing kits type I and III		none	2+
* See Annex V to Regulation (EU) N° 305/2011			

The bonding sealant being a component put on the market as such, it is impossible to determine in advance the Type of the kits in which the sealant is to be used. As a consequence, only system 1 applies.

⁴ Commission decision of 24/06/96, published in the EC Official Journal L254 of 08/10/96

5 Technical details necessary for the implementation of the AVCP system

5.1 Tasks for the ETA-holder

5.1.1 Factory production control (FPC)

5.1.1.1 General

The manufacturer shall establish, document and maintain a FPC system to ensure that the products placed on the market conform to the specified performances. The FPC system shall consist of procedures, regular inspections and tests and/or assessments and the use of the results to control raw and other incoming materials or components, equipment, the production process and the product.

A FPC system conforming with the requirements of EN ISO 9001, and made specific to the requirements of this ETA, is considered to satisfy the above requirements.

The results of inspections, tests or assessments requiring action shall be recorded, as shall any action taken. The action to be taken when control values or criteria are not met shall be recorded.

5.1.1.2 Equipment

All weighing, measuring and testing equipment shall be calibrated and regularly inspected according to documented procedures, frequencies and criteria.

5.1.1.3 Raw materials and components

The specifications of all incoming raw materials and components shall be documented, as shall the inspection scheme for ensuring their conformity.

5.1.1.4 Non-conforming products

In the event of any non-conformity of any product, that product shall be placed into quarantine and action taken to rectify the cause of the non-conformity. Products may not subsequently be dispatched until the problem has been resolved.

5.1.1.5 Tests and frequencies

All the elements, requirements and provisions adopted by the manufacturer are documented in a systematic manner in the form of written policies and procedures. This production control system ensures that the product is in conformity with the ETA.

The FPC involves the following tests: Appearance, flow, specific gravity, application rate, curing, hardness, elongation at break, tensile at break, modulus at 50% and 100% elongation, peel adhesion and cohesive failure.

In the context of (bonding) structural sealants, it is necessary for the manufacturer to undertake adhesion/cohesion tests to rupture after thermal conditioning as described in ETAG 002, clause 8.3.2.4, checks on incoming material (i) and on each batch of sealant. The testing of "H" pieces, peel tests, as part of FPC provides the necessary evidence.

5.2 Tasks for the Technical Assessment Body

5.2.1 Initial Type Testing

Assessment tests on the sealant have been conducted under the responsibility by the Technical Assessment Body (UBAtc) in accordance with ETAG 002, Chapter 5. UBAtc assessed the results of these tests in accordance with ETAG 002, Chapter 6, as part of the ETA issuing procedure. These tests should be used for the purposes of Initial Type Testing. See Regulation (EU) N° 305/2011, Annex V, 1.6.

As required by the System 1, this work should be validated by the notified body for Certification purposes.

5.2.2 Assessment of the factory production control - Initial inspection and continuous surveillance

Assessment of the FPC is the responsibility of a Notified Body

An assessment shall be carried out on the required manufacturing steps of each manufacturing plant to demonstrate that the factory production control is in conformity with the ETA and any subsidiary information. This assessment is based on an initial inspection of the factory.

Subsequently continuous surveillance of factory production control is necessary to ensure continuing conformity with the ETA. This continuous surveillance is performed as per this ETA, clause 5.1.1.

It is recommended that surveillance inspections should be conducted at least twice a year.

6 Bibliography

ETAG 002 Structural sealant glazing kits Edition November 1999
1st Amendment: October 2001- 2nd Amendment: November 2005 - 3rd amendment: May 2012.

EN ISO 10456 Building materials and products - Hygrothermal properties -Tabulated design values and procedures for determining declared and design thermal values

UBAtc asbl is a non-profit organization according to Belgian law. It is a Technical Assessment Body notified by the Belgian notifying authority, the Federal Public Services Economy, SMEs, Self-Employed and Energy, on 17 July 2013 in the framework of Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC and is member of the European Organisation for Technical Assessment, EOTA (www.eota.eu).

This European Technical Assessment has been issued, in Sint-Stevens-Woluwe, by UBAtc asbl on the basis of the technical work carried out by the Assessment Operator, BCCA.

On behalf of UBAtc asbl,

On behalf of the Assessment Operator, BCCA, responsible for
the technical content of the ETA,



Peter Wouters,
Director



Benny De Blaere,
Director general

The most recent version of this European Technical Assessment may be consulted on the UBAtc website (www.ubatc.be).