

European Technical Assessment

ETA 01/0005

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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:	DC 993 - DC 993N - DC 895
Product family to which the construction product belongs:	Sealant used in structural sealant glazing systems to bond glass onto metal
Manufacturer:	DOW CORNING Parc Industriel Zone C, B 7180 SENEFFE
Manufacturing plants:	DOW CORNING Parc Industriel Zone C, B 7180 SENEFFE DOW CORNING GmbH, Dow Corning GmbH Rheingautstrasse D – 65201 Wiesbaden D WIESBADEN Dow Corning Korea – 690-1 Gwanghyewon-Ri Gwanghyewon-Myeon Jincheon-Gun Chungcheongbuk-Do 365-830
Website:	www.dowcorning.com
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of:	ETAG 002, edition 1999 amended in 2012, used as European Assessment Document (EAD)
This version replaces:	ETA 01/0005 issued on 27 June 2011
This European Technical Assessment contains:	8 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.

11 All rights of exploitation in any form and by any means of this European Technical Assessment is reserved for UBAtc and the ETA-holder, subject to the provisions of the applicable UBAtc regulations.

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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 01/0005, was first issued on 28 October 2014 and replaces European Technical Approval, ETA 01/0005, issued on 27 June 2011.

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 or not such changes affect the ETA and consequently the validity of the CE marking on the basis of the ETA and if so whether further assessment/alterations to the ETA, shall be necessary.

1.1.2 Structural sealant DC 895

The characteristics of the product are the following:

- Design stress in tension: $\sigma_{des} = 0,14$ MPa
- Design stress in dynamic shear: $\tau_{des} = 0,14$ MPa
- Elastic modulus in tension or compression tangential to the origin: $E_0 = 0,9$ MPa
- Elastic modulus in shear tangential to the origin $G_0 = 0,3$ MPa
- Working time (at 25°C, 50% R.H.): 15 minutes
- Skin over time (at 25°C, 50% R.H.): 15 minutes
- Tack-free time (at 25°C, 50% R.H.): 30 to 50 minutes
- Time before transport of the bonded frame: The minimum time before transport is normally 21 days. Nevertheless, earlier transportation on work site is allowed if the following two conditions are respected (see ETAG Table 10 checks during production): The tested H-samples give the result: Rupture 100% cohesive and breaking stress $\geq 0,7$ MPa.

Table 1 – DC 895: Structural Sealant - identification characteristics

Test	ETAG ref.	Result
Specific mass	5.2.1.1	Vmean = 1,45 (1,4 to 1,55)
Hardness A	5.2.1.2	Mean of 33 (minimum of 32)
Thermogravimetric analysis	5.2.1.3	Curve kept in the ETA technical file
Colour	5.2.1.4	Black colour

1.1.3 Structural sealant DC 993 / DC 993N

The characteristics of the product are the following:

- Design stress in tension black : $\sigma_{des} = 0,14$ MPa
- Design stress in dynamic shear : $\tau_{des} = 0,11$ MPa
- Design stress in static shear : $\tau_{so} = 0,011$ MPa
- Elastic modulus in tension or compression tangential to the origin: $E_0 = 1,4$ MPa
- Elastic modulus in shear tangential to the origin $G_0 = 0,47$ MPa
- Working time (at 25°C, 50% R.H.) : 10 to 30 minutes
- Skin over time (at 25°C, 50% R.H.) : bi-component - not applicable
- Tack-free time (at 25°C, 50% R.H.) : 80 to 100 minutes
- Time before transport: Transportation on work site is allowed if the following two conditions are respected (see ETAG Table 10 checks during production): The tested H-samples give the following result: Rupture 100% cohesive and breaking stress $\geq 0,7$ MPa.

Table 2 – DC 993 DC 993N: Structural Sealant - identification characteristics

Test	ETAG ref.	Result
Specific mass (mixed at 10/1 ratio)	5.2.1.1	Vmean = 1,33 ($\pm 0,023$)
Hardness A	5.2.1.2	40 \pm 10
Thermogravimetric analysis	5.2.1.3	Curve kept in ETA technical file
Colour	5.2.1.4	From black to white color and all the grey scales in-between

1.1.4 Ancillary products for structural seal adhesion surface preparation

1.1.4.1 DC 895

Cleaning product:

- R40 manufacturer DOW CORNING
- Organic cleaner (isopropanol / acetone)

Primer:

- DC 1200 manufacturer DOW CORNING
- Silane solution in an organic solvent

1.1.4.2 DC 993 and DC 993N

Cleaning product:

- R40 manufacturer DOW CORNING
- Organic cleaner (isopropanol / acetone)

Primer:

- DC 1200-OS manufacturer DOW CORNING
- Silane solution in an organic solvent

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

2.1 General

Structural sealants DC 895 and DC993 / DC 993N are silicone based sealants intended to be used in structural sealant glazing system (SSGS) to bond glazing products on metallic structural seal support frames. Suitable substrates are defined for each sealant in the present ETA § 4.2.2.3.

Sealant DC 895 is a single component sealant which can be used in structural glazing systems types I or II as per ETAG 002 SSGS table 1, while DC 993 / DC 993N is a bi-component sealant which can be used in structural glazing systems types I, II, III, IV as per ETAG 002 SSGS 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 structural 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

2.2.1 DC 895

Structural sealant DC 895 is fabricated and packaged by the firm Dow Corning Seneffe Belgium

The maximum storage duration of the sealant is 12 months after the fabrication date in its original unopened packaging, when stored below 30°C.

2.2.2 DC 993 DC 993N

The structural sealant DC 993/ DC 993N is fabricated and packaged in the following sites:

- The base : Dow Corning Seneffe Belgium and Jincheon Korea,
- The catalyst is fabricated and packaged by the firm Dow Corning Wiesbaden Germany and Jincheon Korea.

The maximum storage duration of the sealant is 14 months for the base and 14 months for the catalyst after the 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 seal design

See method of calculation in ETAG 002

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.

2.3.1.2 Suitable substrates for structural adhesion surface

The generic types of suitable adhesion substrates are being specified as a function of the structural 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 structural sealant shall be assessed in the framework SSGS ETA by passing the following set of tests by reference to the ETAG 002 , § 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, 5.1.4.2.5.

In addition this particular substrate for structural seal adhesion surface has to be identified and assessed as per the relevant § of the chapter 5 and 6 of the ETAG 002.

Table 3 – Structural Sealants – Generic type of substrates

Generic types of substrates	DC 895	DC 993 DC 993N
Glass	Suitable	Suitable
Coated glass	Suitable	Suitable
Stainless steel	Suitable	Suitable
Anodised aluminium	Suitable	Suitable

2.3.1.3 Drainage and ventilation

Water stagnation is not allowed in the vicinity of the structural seal. Therefore, 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 structural sealant

DC 895 is suitable to be used in SSGS type I or II as defined in ETAG 002. This means that the SSGS shall be equipped with mechanical self-weight devices in order to transfer the dead load of the glass to the façade structure.

DC 993 / DC 993N 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

DC 993 / DC 993N and DC 895 sealants are category 1 sealant according ETAG 002 § 6.1.4.6.4 and inserts in the sealant joint are allowed.

2.3.2 Application of the sealant

2.3.2.1 Description of the structural sealant application

European Technical Assessments for structural 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

Dow Corning DC 895 sealant has to be applied between 5 and 35°C in a dust free location. The seal needs to 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 can vary with temperature and relative humidity.

After the skin-over time has been reached, there should be no further relative movement induced between the glass and the metal frame.

Dow Corning DC 993 DC 993 N needs to be mixed at a ratio base/catalyst by weight of 10/1 (min. 9/1 and max. 11/1). The Dow Corning DC 993/ DC 993N sealant has to be applied between 5 and 35°C in a dust free location. The joint needs to 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 can 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:

- cleaning agent EXTRAN 02 Neutral -MERK dilution 2% for DC 895 and DC 993 - DC 993N
- cleaning agent PRIL dilution 1% for DC 993 / DC 993N

Nevertheless, the assessment of the façade cleaning product must be done in the framework of the ETA for the structural 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 has to be assessed in the framework of the ETA for the structural sealant glazing kit as required by the ETAG 002 SSGS, § 5.1.4.2.5.

In the assessment procedure of the present ETA, the following combinations of products have been evaluated as satisfactory.

- The structural sealant DC 895 is compatible with the NORTON spacer V2100.
- The structural sealant DC 993 / DC 993N is compatible with the NORTON spacers V2100 and V3100.

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 fitness for use of the structural 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 the "Guideline for European Technical Assessment for Structural Sealant Glazing Systems (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 has to be assessed in the framework of the ETA for the structural sealant glazing kit

ER3 Hygiene, health and environment

In matter of "Dangerous substances", the sealant manufacturer made a declaration of conformity to 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: 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, 5.2.1.4, with reference to ETAG 002

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 structural 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 structural sealants in structural bond 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 4 – System(s) of assessment and verification of constancy of performance

Product(s)	Intended use(s)	Level(s) or class(es)	Assessment and verification of constancy of performance system(s)*
Structural sealant glazing kits type II and IV	External walls and roofs	none	1
Structural sealant glazing kits type I and III		none	2+
* See Annex V to Regulation (EU) N° 305/2011			

The structural 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.

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 stated performance characteristics. 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 European Technical Assessment (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 structural sealants, it is necessary for the manufacturer to undertake adhesion/cohesion tests to rupture after thermal conditioning as described in ETAG 002 §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.

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

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 assessment body (UBAtc) in accordance with Chapter 5 of the ETAG 002. The assessment body (UBAtc) has assessed the results of these tests in accordance with Chapter 6 of this ETAG, as part of the ETA issuing procedure. These tests should be used for the purposes of Initial Type Testing.

As required by the System 1, this work is to be validated by the assessment body for Certification of Conformity 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 ETA § 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.

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 by UBAtc asbl on the basis of the technical work carried out by the Assessment Operator, BCCA.

On behalf of UBAtc asbl,



Peter Wouters,
Director

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



Benny De Blaere,
Director general

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