

# Perfect sealing and bonding on façades







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# OTTOCOLL® S 645

The premium 2-component silicone for structural glazing



ETAG tested,  
**individual colours** possible

**[snif]**-VEC  
n° 4763



Colour sample with OTTOCOLL® S 645  
in an individual colour



Component A in a 200l drum,  
component B in a 20l pail





2-component silicone adhesive and sealant based on alkoxy neutral, condensation cross-linking



Find out  
more about

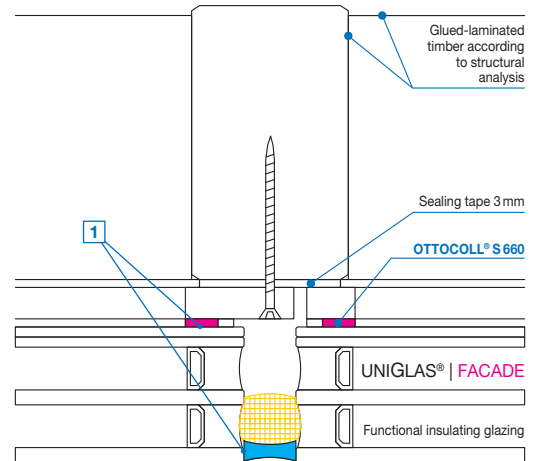




# Timber-glass-composite elements



- Bond
- Façade sealing
- PE back-up foam rod



*Detailed cross-section of post*



*Schematic construction of a TGC façade*

## Elegance with added value

Timber-glass-composite elements (TGC) with structurally effective bonding open up creative scope for architects and planners when designing attractive façades. The relatively new production technology holds national technical approval. TGC elements can be used to create energy-optimised façades with a frameless view and previously unattainable  $U_{cw}$  values. This is one of the reasons why UNIGLAS® | FACADE was presented with the Innovation Award by Fensterbau Frontale in 2016 and the Italian Archiproducts Design Award in the category "Building Shell" in 2017.

The principle is simple: in UNIGLAS® | FACADE timber-glass-composite elements, the glazing is fitted directly to the timber substructure, i.e. without metal profiles. An interlocked wooden glazing strip made from a defined timber material is bonded to the pane of glass on the room side with a special silicone.

This timber-glass-composite element is screwed to the wooden skeleton of the substructure on site. All that can be seen from the outside is a narrow joint.

During the development of the TGC façade element, many individual tests were carried out on timber-glass adhesive samples and large-format wall panels. The findings resulting from this show that TG composite elements can also be used to transfer planned loads – even to brace buildings in special individual cases. This allows an all-glass architecture to be achieved without closed wall panels and without wind bracing.

The new façade element is based on two materials that differ greatly in their structure and life cycle: firstly, the renewable raw material wood and, secondly, fully recyclable glass from industrial production. TG composite elements combine the best properties of both materials with regard to naturalness, energy efficiency and structural flexibility.

**S7****OTTOSEAL® S7**

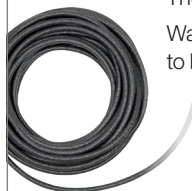
The weather sealing silicone

Weather-resistant sealing of glass joints in façades and conservatories

**PE****OTTOCORD PE-B2**

The closed-cell PE back-up foam rod

Water-repellent, closed-cell PE-back-up foam rod to backfill joints

**RET****OTTO Cleaner T**

The universal cleaner

Toluene-free – cleaning of glass, metals and some plastics such as PVC and polyester



According to the EU study by Prof. Michael Bauer (Drees & Sommer Advanced Building Technologies, co-author of the book “Green Building – Konzepte für nachhaltige Architektur”), it is possible to almost halve the primary energy requirement from 407 kWh/m<sup>2</sup> to 209 kWh/m<sup>2</sup> by using wood instead of aluminium profiles. TGC elements thus reduce the CO<sub>2</sub> footprint of the façade by up to 43 % compared to conventional all-glass façades. At the same time, heat insulation can be optimised by up to a  $U_{CW}$  value of 0.69 W/m<sup>2</sup>K. The lack of a metal substructure also reduces thermal bridges. The manufacturer has a system structural analysis for maximum element sizes up to 3500 x 2500 mm, as well as evidence of the fall protection of the construction for categories A and C. A  $U_{CW}$  value calculation showing the isotherms can also be provided for property-specific sizes.

However, the composite's efficiency is not limited to good insulation values. The façade elements pre-fabricated in the factory guarantee simple installation. In this way, they offer architects and planners high cost and deadline reliability. A further advantage is that the

element construction makes it possible to carry out environmentally friendly repairs, as individual elements can be replaced. You can ultimately separate the TGC elements into the components timber, silicone and glass at the end of their life cycle.



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**TGC production with OTTO and UNIGLAS®**

Watch video





## Tested according to ETAG 002

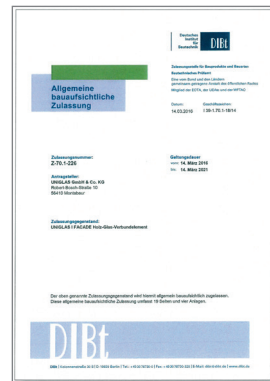
Façades are subjected to a wide range of loads. As, with UNIGLAS® | FACADE, the glass takes on a structurally load-bearing function in the building envelope, no aesthetically unpleasant wind bracing is needed to the brace buildings. The adhesive bond between timber and glass ensures that the load-bearing structure fulfils all structural requirements. UNIGLAS® | FACADE timber-glass-composite elements are tested in accordance with ETAG 002 for structural sealant glazing systems (SSG).



## National technical approval

In March 2016, the DIBt issued national technical approval no. Z-70.1-226 for the UNIGLAS® | FACADE timber-glass-composite elements. "National technical approval" (abZ) offers security for all planners and tradespeople.

With abZ, the building product is equivalent to a regulated construction. It enables quick and simple approval, planning and implementation of the construction project.



### UNIGLAS® | FACADE

Detailed technical information, key details, tips on system structural analysis, system limits, and supplementary requirements and implementation aids can be found in the technical manual on UNIGLAS® | FACADE.

Order a copy by e-mail:  
info@uniglas.de.



### UNIGLAS®

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Outside glass, inside  
timber – the creation of the  
OTTO TGC façade

Watch video





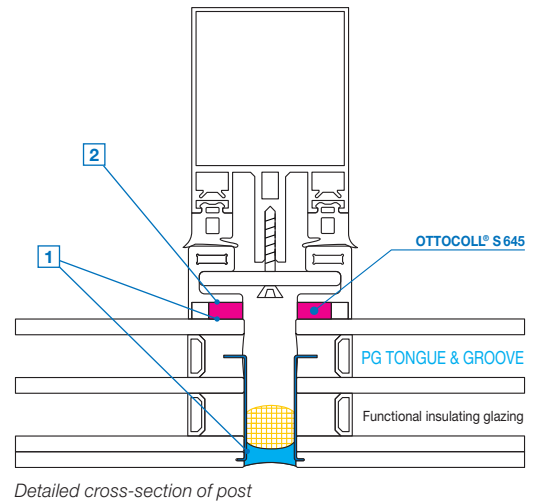




# Metal-glass-composite elements



- Bond
- Façade sealing
- PE back-up foam rod



Component A in a 200l drum,  
component B in a 20l pail

## ETA-certified for metal-glass façades in accordance with ETAG 002

Metal-glass façades and other special constructions made from glass, such as skywalks or glass ceilings that can be walked on, convey transparency and a sense of space. Their production demands a high level of security in terms of construction and bonding. The requirements on the adhesive for bonded glass structures or structural sealant glazing systems (SSGS) are defined in ETAG 002.

With OTTOCOLL® S 645, the new adhesive for structural and geometric solutions made from glass and metal, such structures can be produced flawlessly, safely and economically. The 2K-RTV silicone adhesive was certified in accordance with ETA and boasts very good weathering, ageing and UV resistance; its high expansion-tension value guarantees high-stability bonding.

Its fast curing, even in thick layers, enables the bonded elements to be processed quickly. It can be used with all common mixing and dosing equipment from large containers – component A in a 200l drum, component B in a 20l pail. To use it with a dosing gun, the product is also available in 490 ml side-by-side cartridges with a mixing ratio of 10:1.

OTTOCOLL® S 645 can be produced in different ETA-certified shades by agreement.

## S645

### OTTOCOLL® S645

The premium 2-component silicone for structural glazing

Bonding requiring technical approval, tested according to ETAG 002, available in colours



## S7

### OTTOSEAL® S7

The weather sealing silicone

Weather-resistant sealing of glass joints in façades and conservatories

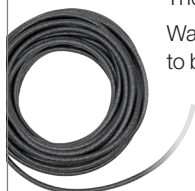


## PE

### OTTCORD PE-B2

The closed-cell PE back-up foam rod

Water-repellent, closed-cell PE-back-up foam rod to backfill joints



## RET

### OTTO Cleaner T

The universal cleaner

Toluene-free – cleaning of glass, metals and some plastics such as PVC and polyester



## PR1216

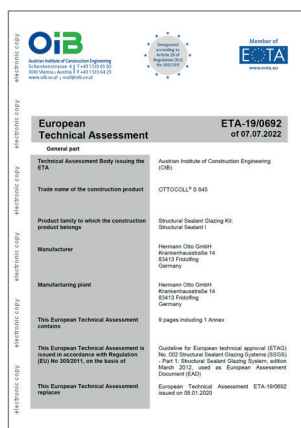
### OTTO Primer 1216

The primer for natural stone and metal

Improve adhesion on natural stone and metallic materials



Certification of constancy of performance in accordance with ETAG 002 for OTTOCOLL® S645



Evidence of ETA approval for OTTOCOLL® S645



# Sealing of glass/glass and glass/metal



*Sealing with sealant and PE back-up foam rod*

## Façade sealing – “weather sealing”

Weather sealing, i.e. the sealing of mullion and transom façades and angled glazing, such as roof glazing and conservatories, requires a silicone that is specially adapted to suit the requirements. Due to its exposure to weathering, the silicone must be extremely UV resistant and highly resistant to notches and tearing.

It also mustn't corrode. As the laminated safety glass and PVB sheets come into contact with each other, it is essential that the silicone is compatible with these sheets.

One essential prerequisite for the sealing at the edges of insulating glass is compliance with ift Regulation DI-02/1, according to which the sealant is compatible with the respective insulating glass edge bonding.

**S7****OTTOSEAL® S7**

The weather sealing silicone  
Weather-resistant sealing of glass joints in façades and conservatories

**S10****OTTOSEAL® S10**

The silicone sealant for glass constructions  
Weather-resistant sealing of glass joints in façades and conservatories

**S110****OTTOSEAL® S110**

The premium construction silicone  
Neutral sealing at windows, doors and in the entire glass area

**S120****OTTOSEAL® S120**

The premium glazing silicone  
Low-odour – sealing of glazing rebating and channel glass

**PR1216****OTTO Primer 1216**

The primer for natural stone and metal  
Improve adhesion on natural stone and metallic materials

**PR1101****OTTO Cleanprimer 1101**

The adhesion improver  
Toluene-free – clean and improve the adhesion on coated and non-coated metallic substrates and plastics

**PE****OTTOCORD PE-B2**

The closed-cell PE back-up foam rod  
Water-repellent, closed-cell PE-back-up foam rod to backfill joints

**GL****OTTO Smoothing Agent**

Smoothing of sealant surfaces

**GLK****OTTO Concentrated smoothing agent**

Smoothing of sealant surfaces

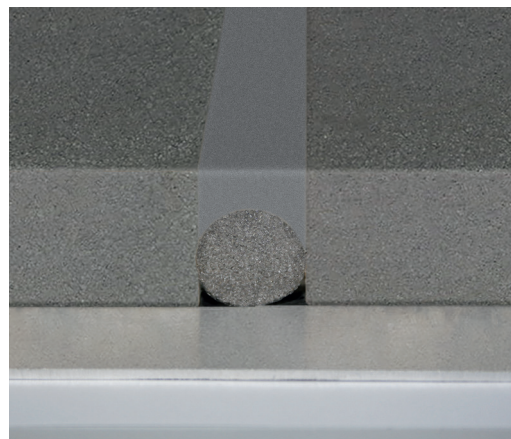
**RET****OTTO Cleaner T**

The universal cleaner  
Universally usable for glass





# Sealing of building and façade joints



*Sealing with sealant and PE back-up foam rod*

## Building construction and façade

The building envelope of new builds has undergone a striking change in recent years in both residential and non-residential construction. The trend towards energy-efficient façades has increased through the use of glass and elements with heat insulation and heat gain properties and will continue to play an increasingly important role in the future.

One focus of construction activity is the renovation of old buildings. Expansion joints, which compensate for building and component movements and prevent weather-related damage, are a basic prerequisite for a functioning façade.

During larger construction projects, it is sometimes necessary to erect parts of the building separately for structural reasons. The joints between these buildings are then classified as building separation joints and compensate for movements in the parts of the building. Joints of this kind can be sealed with elastomer tape. Sprayable sealants are not suitable here.

The elastic sealing of façade joints can be carried out with sealants in accordance with DIN EN 15651-1 or with pre-compressed joint tapes.

Classic building construction joints are a special type of façade joint. These are external wall joints, for example between in-situ concrete and/or precast concrete parts with closed joints, made from unrendered masonry and/or natural stone. In addition to the requirements of EN 15651-1, further requirements are placed on the joint sealants in accordance with DIN 18540.

**M360****OTTOSEAL® M360**

The hybrid sealant for building joints  
Stress-compensating sealing with adhesive-free surface, can be painted over

**M361****OTTOSEAL® M361**

The structure-hybrid sealant for building joints  
Stress-compensating sealing with a textured, adhesive-free surface, can be painted over

**P305****OTTOSEAL® P305**

The premium PU sealant for connection joints  
Weathering and paint-compatible PU sealant for buildings

**S110****OTTOSEAL® S110**

The premium construction silicone  
Neutral sealing at windows, doors and in the entire glass area

**S120****OTTOSEAL® S120**

The premium glazing silicone  
Low-odour – sealing of glazing rebating and channel glass

**S94****OTTOSEAL® S94**

The neutral fire protection silicone B1  
Sealing of flame-resistant components, neutral 1K silicone, UV-resistant

**OFB****OTTO Jointing tape BG1**

The precompressed jointing tape BG1

**ODB****OTTO Insulating tape BG2**

The precompressed insulating tape BG2

**PR1215** OTTO Primer 1215

Very low viscosity mineral primer

**PR1216** OTTO Primer 1216

The primer for natural stone and metal

**PR1225** OTTO Primer 1225

The highly viscous universal primer

**PR1226** OTTO Cleanprimer 1226

The special cleanprimer

**PE****OTTOCORD PE-B2**

The closed-cell PE back-up foam rod

**SXN****OTTO Siloxan 290L**

The silicone for surface impregnation





# Sealing of joints in natural stone façades



*Sealing with sealant and PE back-up foam rod*

## Protection for beautiful stone

The jointing of natural stone is clearly different from other jointing tasks in the façade. One reason for this is that stone as a material has a wide range of material properties that need to be taken into account.

The purely technical requirements that the natural stone joint sealant must fulfil are very high UV resistance, secure adhesion to a wide range of materials, flexibility under pressure and tension loads, and high notch resistance. However, the compatibility of the sealant with various types of natural stone is of crucial importance. Defective jointing or the selection of an unsuitable silicone not only ruins the work done, but also leads to incalculable costs due to complaints concerning cleaning or even damage.

Alongside the technical function of the elastic joint seal, natural stone silicone also has an aesthetic role. The surface structure, which can be selected based on the type of stone, contributes to the high-quality look of the natural stone façade. OTTO offers natural stone silicone with a shiny, matt or textured surface.

**S70****OTTOSEAL® S70**

The premium natural stone silicone  
Weathering and UV-resistant sealing and jointing  
for natural stone

**S80****OTTOSEAL® S80**

The low odour natural stone silicone  
Weathering and UV-resistant sealing and jointing  
of matt and matt sanded surfaces for natural stone

**S117****OTTOSEAL® S117**

The natural stone silicone  
Weathering and UV-resistant sealing and jointing  
for natural stone

**PR 1216****OTTO Primer 1216**

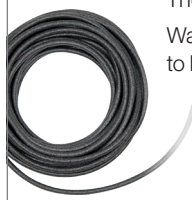
The primer for natural stone and metal  
Improve adhesion on natural stone and metallic  
materials

**PR 1102****OTTO Primer 1102**

The sandstone primer  
Priming on sandstone

**PE****OTTOCORD PE-B2**

The closed-cell PE back-up foam rod  
Water-repellent, closed-cell PE-back-up foam rod  
to backfill joints

**GLN****OTTO Natural stone smoothing agent**

Maintains the shine of the sealant surface,  
especially for delicate marble and natural stone  
varieties





# Hydrophobic treatment of façades



*Untreated façade*



*Façade with hydrophobic treatment using OTTO Siloxan 290L*

## Weathering protection for walls

What are known as hydrophobic treatments offer effective protection against weather influences for walls made of concrete, cellular concrete, fibre cement, brickwork, natural and artificial stone, mineralic plasters and coatings. All this means is that a “water-repellent” coating is applied. Protection against frost damage, salt or pollutant deposits, as well as against the growth of algae, lichens, moss or fungi, extends the service life and maintains the beauty of the façade.

In contrast to film-forming coatings, the pores of façade building materials are not blocked when treated with OTTO Siloxan 290L. Instead, the hydrophobic treatment lies on the porous walls in a thin layer, preserving the breathability of the façade. The amount of water absorbed by the building materials due to overhead irrigation is significantly reduced, but the moisture already present is still able to diffuse out of the masonry.

The hydrophobic treatment consists of silanes, which have a very small molecular structure and are thus absorbed by the building material's pore system. This impregnates or waterproofs the building material down to a depth of a few millimetres. The hydrophobic treatment itself is colourless and usually causes the colour of the treated substrate to deepen. The hydrophobic treatment makes the building material become water-repellent.



## SXN

### OTTO Siloxan 290L

The silicone for surface impregnation  
UV-resistant and paintable hydrophobic treatment  
for façades





## Standards and directives for expansion joints in the façade

### DIN EN 15651/CE Marking:

Definitions and requirements for sprayable sealants are governed in EN 15651. Sealants that are used in the areas stated there must be tested in accordance with the stated standards and are subject to CE Marking.

### Façade sealants according to DIN EN 15651-1:

EN 15651-1 sets down definitions and requirements for non-load-bearing façade sealants intended for exterior use in building construction for sealing joints in exterior walls, window and door surrounds, including visible surfaces in interior areas.

### Glazing sealants according to DIN EN 15651-2:

EN 15651-2 sets down definitions and requirements for elastic sealants for non-load-bearing applications for sealing glazing in building construction.

This European standard covers glazing joints from an angle of 7° to the horizontal. The main areas in which these joint sealants are used are:

- Glass to glass
- Glass to frames
- Glass to porous carrier materials.

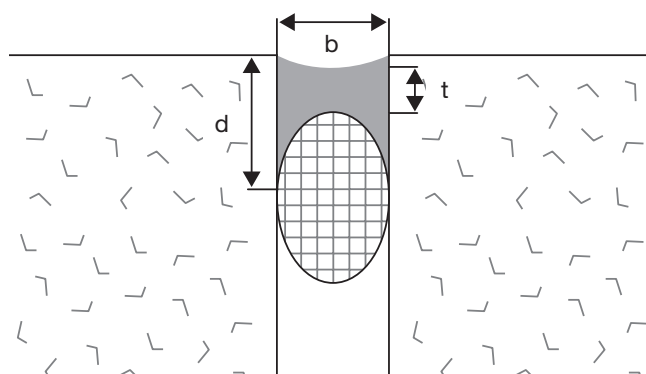
Relevant standards for expansion joints in buildings are also DIN 18540 "Sealing of exterior wall joints in building using joint sealant" and DIN EN ISO 11600 "Building construction — Jointing products — Classification and requirements for sealants".

## General valid joint dimension

The rule of thumb for calculating the joint dimension is as follows:

**Sealant depth (t) = 0.5 x joint width (b).**

The thickness of the sealant (d) equals 2/3 of the joint width (b).



These minimum joint widths are also valid for joints in the interior with sealants ≥ 15 % movement capability.

The ratio between the width of the sealant in the joint (b) and the depth of the sealant in the joint (t) has to be as follows:

Joint width b in a ratio of joint depth t

| b in mm | 10 – 15 | 15 – 20 | 20 – 25 | 25 – 30 | 30 – 35 |
|---------|---------|---------|---------|---------|---------|
| t in mm | 8 ± 2   | 10 ± 2  | 12 ± 2  | 15 ± 3  | 15 ± 3  |

Source: Industrieverband Dichtstoffe e. V./HS PR.

Additional information to the IVD's instruction leaflets under [www.ivd-ev.de](http://www.ivd-ev.de).



## Maximum joint width for building expansion joints between concrete façade parts

The maximum recommended joint width for building joints is 35 mm. The correct joint dimension is measured according to the following table:

### Joint dimension

| Joint spacing in m | Joint width                             |                                      | Depth of the joint sealant <sup>③</sup> |                       |
|--------------------|-----------------------------------------|--------------------------------------|-----------------------------------------|-----------------------|
|                    | Nominal dimension <sup>①</sup> bF in mm | Minimum dimension <sup>②</sup> in mm | tD in mm                                | Tolerance limit in mm |
| up to 2            | 15                                      | 10                                   | 8                                       | ± 2                   |
| over 2 to 3.5      | 20                                      | 15                                   | 10                                      | ± 2                   |
| over 3.5 to 5      | 25                                      | 20                                   | 12                                      | ± 2                   |
| over 5 to 6.5      | 30                                      | 25                                   | 15                                      | ± 3                   |
| over 6.5 to 8      | 35 <sup>④</sup>                         | 30                                   | 15                                      | ± 3                   |

① Nominal dimension for planning

② Minimum dimension at the time of joint sealing

③ The stated values apply to the end state, whereby the volume change in the joint sealant is also to be taken into account

④ For larger joint widths, the instructions of the sealant manufacturer are to be taken into account





## Fire protection in building construction

Building material classes describe the fire performance of an individual building material and are not identical to fire resistance classes, which indicate the fire resistance of a complete component.

Alongside building material classes according to DIN 4102, there are also European classes according to DIN EN 13501. The classes are compared in the table below.

Classes s1, s2 and s3 are additional requirements according to DIN EN 13501 for smoke development. Classes d0, d1 and d2 are additional requirements according to DIN EN 13501 for flaming droplets/particles. The tests are carried out in accordance with DIN EN 13823.

Construction materials in buildings must be classified as at least normally flammable. Our sealants OTTOSEAL® M360, OTTOSEAL® M361, OTTOSEAL® P305, OTTOSEAL® S110 and OTTOSEAL® S120 are classified as normally flammable (B2).

OTTOSEAL® S94 — the fire-proof silicone — is tested in accordance with DIN 4102 building material class B1 (flame resistant), with increased requirements on fire performance, such as for fire-retardant components.

## Special case of laminated safety glass

Experiments within the scope of directive DI-02/1 at the Institute of Window Technology, Rosenheim, have shown that an interaction between a laminate made from PVB sheets and a sealant cannot be ruled out. Discolouration or small bubbles can form at the edge of the glass. For weather joints with a visible glass edge, possible changes can occur in the form of small bubbles at the edge up to approx. 5 mm in diameter and with a maximum penetration depth of approx. 1 cm, although these do not change further. As a result, it must always be clarified in advance to what extent the user accepts the possible subsequent changes to the laminated safety glass edge.

Complete freedom from bubbles is not feasible. However, they have no impact on safety of use.

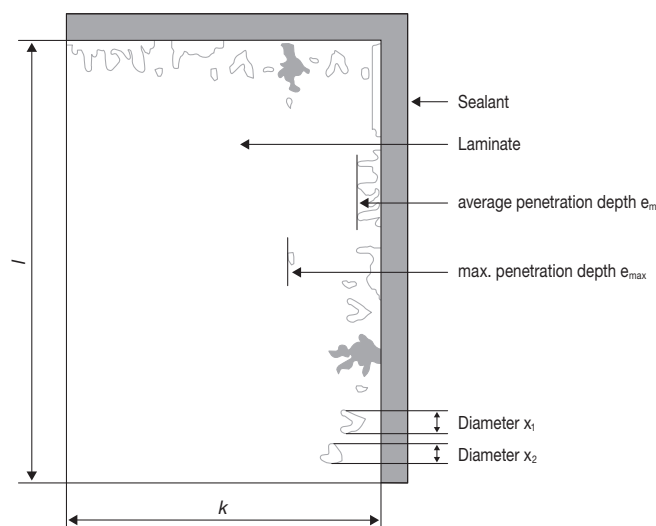


Diagram on the assessment of changes in the laminate.  
(Source: ift Rosenheim, ift Directive DI-02/1)

### Building material classes – Fire performance of building materials

| Building authority designations | Additional requirement:<br>no smoke | Additional requirement:<br>no flaming droplets/particles | European class according to<br>DIN EN 13501-1 | Class according to DIN 4102-1 |
|---------------------------------|-------------------------------------|----------------------------------------------------------|-----------------------------------------------|-------------------------------|
| Non-flammable                   | X                                   | X                                                        | A1                                            | A1                            |
|                                 | X                                   | X                                                        | A2-s1 d0                                      | A2                            |
| Flame resistant                 | X                                   | X                                                        | B,C-s1 d0                                     | B1                            |
|                                 | –                                   | X                                                        | B,C-s3 d0                                     |                               |
|                                 | X                                   | –                                                        | B,C-s1 d2                                     |                               |
|                                 | –                                   | –                                                        | B,C-s3 d2                                     |                               |
| Normally flammable              | –                                   | X                                                        | D-s3 d0                                       | B2                            |
|                                 | –                                   | –                                                        | E                                             |                               |
|                                 | –                                   | –                                                        | D-s3 d2                                       |                               |
|                                 | –                                   | –                                                        | E-d2                                          |                               |
| Easily flammable                | –                                   | –                                                        | F                                             | B3                            |

## Paint compatibility of sealants according to DIN 52452

If façades are not made from natural stone and/or glass, they are normally painted externally. Walls inside buildings are also usually painted. As a result, sealants for interior and exterior joints need to be paint-compatible.

OTTOSEAL® M360, OTTOSEAL® M361 and OTTOSEAL® P305 can be painted/coated. The compatibility between the chosen coating and our product must be checked in advance by the user – if necessary, under production conditions. Our OTTO application technology department will be happy to provide you with non-binding assistance. If our product is painted over completely following a successful compatibility check, the paint/coating must also follow the elastic movement of the sealant. Otherwise, cracks may form in the coating or visual impairments may result. Due to the many possible influences during and after application, the customer always has to carry out trials first.

## Compatibility with natural stone

The staining of natural stone due to the migration of material from the joint sealant into the stone is an aesthetically unwanted process. ISO 16938-1 assesses the risk of marginal staining of natural stone due to joint sealants. We have had our products OTTOSEAL® S70 and OTTOSEAL® S80 tested by SKZ Würzburg according to ISO 16938-1 and can thus guarantee that both sealants are compatible with natural stone.

## Prevention of staining and moisture damage on façades

The hydrophobic treatment of façades leads, among other things, to a significant reduction in water absorption, good UV resistance and very good beading. The ready-to-use solution from OTTO Siloxan 290L can be applied directly with a brush or a spray gun. The substrate has to be largely dry and free of moss, mould or algae during application.

Weathered surfaces with salt efflorescences should be cleaned by sandblasting, steaming or by cleaning with suitable detergents. Neighbouring components, such as windows, doors, gutters, etc., must be covered. The second coat is applied from top to bottom while the previous layer is still wet. The hydrophobically treated façade is rainproof after approx. 24 hours. The hydrophobe effect prevents the penetration of moisture from the outside to the inside but it lets the internal moisture escape to the outside. The hydrophobic effect lasts for several years, although it is dependent on the properties of the façade, the direction and thus the intensity of weathering.

The differences in the water absorption of building materials are considerable (please refer to the following table).

### Differences in the water absorption of building materials

|                 | Water absorption untreated<br>(approx. average values depending on material properties) | Water absorption hydrophobic treatment with OTTO Siloxan 290L<br>(approx. average values depending on material properties) |
|-----------------|-----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| Concrete        | 3 %                                                                                     | 0.8 %                                                                                                                      |
| Sandstone       | 5 %                                                                                     | 0.2 %                                                                                                                      |
| Sand-lime brick | 13 %                                                                                    | 0.8 %                                                                                                                      |
| Limestone       | 12 %                                                                                    | 1.1 %                                                                                                                      |
| Clinker         | 3 %                                                                                     | 0.1 %                                                                                                                      |
| Clay brick      | 18 %                                                                                    | 0.1 %                                                                                                                      |
| Tuff            | 18 %                                                                                    | 1.1 %                                                                                                                      |
| Mortar          | 7 %                                                                                     | 1.2 %                                                                                                                      |



#### Head office

☎ +49 8684 908-0 Monday to Thursday from 7:00 am – 4:00 pm  
☎ +49 8684 908-1840 and Friday from 7:00 am – 1:00 pm  
✉ info@otto-chemie.com

#### Order processing

☎ +49 8684 908-3300 Monday to Thursday from 7:00 am – 4:00 pm  
☎ +49 8684 908-1810 and Friday from 7:00 am – 1:00 pm  
✉ order@otto-chemie.com

Please send your orders using the online order form or by e-mail in order to ensure rapid and correct processing. Many thanks!

#### International Sales Construction Division

☎ +49 8684 908-5300 Monday to Thursday from 7:00 am – 4:00 pm  
☎ +49 8684 908-1885 and Friday from 7:00 am – 1:00 pm  
✉ sales.international@otto-chemie.com

#### Product and application consulting

☎ +49 8684 908-4300 Monday to Thursday from 7:00 am – 4:00 pm  
☎ +49 8684 908-1830 and Friday from 7:00 am – 1:00 pm  
✉ technical.service@otto-chemie.com



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Use our OTTO order form to be flexible with your time and easily put together the products you want.

[www.otto-chemie.com/en/customer-order-form](http://www.otto-chemie.com/en/customer-order-form)

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