

European Technical Assessment

Zemseal[®]

ETA-19/0607 | 18.12.2019

issued by: OIB Austrian Institute of Construction Engineering, Vienna/Austria

Notice: Zemseal[®] Premium is no longer in our product range



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European Technical Assessment

ETA-19/0607
of 18.12.2019

General part

Technical Assessment Body issuing the European Technical Assessment

Österreichisches Institut für Bautechnik (OIB)
Austrian Institute of Construction Engineering

Trade name of the construction product

Zemseal®

Product family to which the construction product belongs

Fully bonded, pre-applied flexible sheet for waterproofing

Manufacturer

Max Frank GmbH & Co. KG
Mitterweg 1
94339 Leiblfing
Germany

Manufacturing plant

Max Frank GmbH & Co. KG
Mitterweg 1
94339 Leiblfing
Germany

This European Technical Assessment contains

27 pages including 6 Annexes which form an integral part of this assessment.

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

EAD 030378-00-0605,
European Assessment Document, "Fully bonded, pre-applied flexible sheet for waterproofing".

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Remarks

Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and should be identified as such.

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Specific parts

1. Technical description of the product

This European Technical Assessment – ETA – applies to the fully bonded, pre-applied flexible sheet for waterproofing

Zemseal®.

Zemseal® is made of polyolefin and comprises two or three laminated layers, thermally fused, see Annex 1.

Zemseal® 05, 08 or 12 comprises 2 layers. The rough side, which provides full and permanent bond to concrete, is made of polymer-coated geotextile and features an embossed dimpled texture. A primer is factory-applied to the rough side of Zemseal® 05, 08 or 12, to facilitate bond between concrete and Zemseal®. The smooth side is a polypropylene membrane, see Annex 1. For vertical applications the smooth side is firstly attached to the formwork and - after stripping the formwork – in contact with the ground. The characteristic data of the Zemseal® 05, 08 and 12 is shown in Annex 2.

Zemseal® Premium comprises 3 layers. The rough side is made of polypropylene grid with a heavy-duty grid pattern, see Annex 1. The middle layer is a polymer-coated geotextile. A primer is factory-applied to the rough side of Zemseal® Premium, to facilitate bond between concrete and Zemseal®. The smooth side is a polypropylene membrane. For vertical applications the smooth side is firstly attached to the formwork and - after stripping the formwork – in contact with the ground. The characteristic data of the Zemseal® Premium is shown in Annex 2.

For horizontal applications, the membrane is rolled out flat on top of the plane and smooth substrate. Lateral joints are overlapped and sealed with self-adhesive edge strips. Splicing is carried out by overlapping and jointing with double-sided adhesive tapes. Double-sided adhesive tapes are based on acryl or butyl with a width of 50 mm. Acryl double-sided adhesive tapes are factory-applied in longitudinal direction on both sides of Zemseal® 05, 08 or 12. Butyl double-sided adhesive tapes are factory-applied in longitudinal direction on one side of Zemseal® Premium. Self-adhesive edge strips are used for connecting 2 rolls of Zemseal® in transversal direction. Self-adhesive edge strips for Zemseal® 05, 08 or 12 with a width of 120 mm and for Zemseal® Premium with a width of 100 mm and 150 mm are available. Vertical installation methods are specific to the formwork. Lateral jointing and splicing is carried out as described above for horizontal applications.

Finally, the complete building envelope in contact with the ground is covered with Zemseal®.

2. Specification of the intended use in accordance with the applicable European Assessment Document (hereinafter EAD)

2.1 Intended use

The Zemseal[®] is intended to be used for:

- envelope seal as waterproofing barrier
- crack bridging and waterproof sealing of cracks
- prevention of lateral water migration between barrier seal and concrete substrate
- the product is exclusively applied to a waterproof concrete structure

The intended use does not cover bridge deck waterproofing.

2.2 Assumptions

2.2.1 General

Concerning product packaging, transport, storage, maintenance, replacement, and repair it is the responsibility of the manufacturer to undertake the appropriate measures and to advise his clients on transport, storage, maintenance, replacement, and repair of the product as he considers necessary.

2.2.2 Recommendations on packaging, transport and storage

Zemseal[®] is stored in original wrapping and in lying or standing position, protected against snow, ice, water, solar radiation, heat, or heat sources.

2.2.3 Installation

2.2.3.1 General

It is assumed that Zemseal[®] will be installed according to the manufacturer's instructions or – in absence of such instructions – according to the usual practice of the building professionals. An installation procedure to be applied in absence of standards and regulations in force at the place of use is given for:

- Horizontal, ground slab installation in Annex 3.
- Vertical, wall installation in Annex 3.

2.3 Assumed working life

The European Technical Assessment is based on an assumed working life of Zemseal[®] of 50 years, provided that Zemseal[®] is subject to appropriate installation, use, and maintenance, see Clause 2.2.

The real working life may in normal use conditions be considerably longer without major degradation affecting the basic requirements for construction works¹.

The indications given as to the working life of the composite wall cannot be interpreted as a guarantee neither given by the product manufacturer or his representative nor by the Technical Assessment Body, but are regarded only as a means for selecting the appropriate products in relation to the expected economically reasonable working life of the works.

¹ The real working life of a product incorporated in a specific works depends on the environmental conditions to which that works are subject, as well as on the particular conditions of design, execution, use, and maintenance of that works. Therefore, it cannot be excluded that in certain cases the real working life of the product may also be shorter than the working life indicated above.

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

3.1 Essential characteristics

The performance of Zemseal[®] for the essential characteristics is given in Table 1.

Table 1: Essential characteristics and performances of Zemseal[®] 05, 08, 12 and Zemseal[®] Premium

| No | Essential characteristic | Product performance |
|--|--|--------------------------|
| Basic requirement for construction works² 2: Safety in case of fire | | |
| 1 | Reaction to fire | See Annex 4 and Annex 5. |
| 2 | Reaction to fire of adhesive tape | See Annex 4 and Annex 5. |
| Basic requirement for construction works 3: Hygiene, health and the environment | | |
| 3 | Visible defects | See Annex 4 and Annex 5. |
| 4 | Dimensions and tolerances | See Annex 4 and Annex 5. |
| 5 | Thickness and mass per unit area | See Annex 4 and Annex 5. |
| 6 | Mechanical strength – Tensile strength | See Annex 4 and Annex 5. |
| 7 | Elongation at maximum tensile force | See Annex 4 and Annex 5. |
| 8 | Resistance to static loading | See Annex 4 and Annex 5. |
| 9 | Resistance to impact | See Annex 4 and Annex 5. |
| 10 | Watertightness | See Annex 4 and Annex 5. |
| 11 | Watertightness of adhesive tape | See Annex 4 and Annex 5. |
| 12 | Artificial ageing by long term exposure to elevated temperature | See Annex 4 and Annex 5. |
| 13 | Water vapour transmission property | See Annex 4 and Annex 5. |
| 14 | Alkali resistance in high pH solution | See Annex 4 and Annex 5. |
| 15 | Acid resistance | See Annex 4 and Annex 5. |
| 16 | Compatibility with bitumen | See Annex 4 and Annex 5. |
| 17 | Shear resistance of joints | See Annex 4 and Annex 5. |
| 18 | Resistance to tearing (nail shank) | See Annex 4 and Annex 5. |
| 19 | Elongation at maximum tensile force and maximum tensile force at low temperatures (- 45°C ± 2 C) | See Annex 4 and Annex 5. |
| 20 | Crack bridging ability | See Annex 4 and Annex 5. |
| 21 | Peel-resistance (180 degree peel) | See Annex 4 and Annex 5. |
| 22 | Peel resistance after immersion in water | See Annex 4 and Annex 5. |
| 23 | Peel resistance after exposure to elevated temperature (70°C) | See Annex 4 and Annex 5. |
| 24 | Peel-resistance after cleaning | See Annex 4 and Annex 5. |
| 25 | Resistance to damage – water creep at leakage | See Annex 4 and Annex 5. |
| 26 | Resistance to damage – water creep at leakage after cleaning | See Annex 4 and Annex 5. |

² Basic requirement for construction works as defined in Annex I of Regulation (EU) № 305/2011.

3.2 Assessment methods

The assessment of the essential characteristics in Clause 3.1 of the Zemseal[®] for the intended use and in relation to the requirements for safety in case of fire, and for hygiene, health and the environment, in the sense of the basic requirements for construction works № 2 and 3 of Regulation (EU) № 305/2011 has been made in accordance with the European Assessment Document EAD 030378-00-0605³ "Fully bonded, pre-applied flexible sheet for waterproofing".

3.3 Identification

The European Technical Assessment for the Zemseal[®] is issued on the basis of agreed data⁴ that identify the product that has been assessed. Changes to materials, to composition or characteristics of the product, or to the production process could result in these deposited data being incorrect and should be immediately notified to Österreichisches Institut für Bautechnik before the changes are introduced. Österreichisches Institut für Bautechnik will decide whether or not such changes affect the European Technical Assessment, and, if so, whether further assessment or alterations to the European Technical Assessment are considered necessary.

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

4.1 System of assessment and verification of constancy of performance

4.1.1 AVCP System 2+

According to Commission Decision 1999/90/EC the system of assessment and verification of constancy of performance to be applied to the Zemseal[®] is System 2+. System 2+ is detailed in Commission Delegated Regulation (EU) № 568/2014 of 18 February 2014, Annex, point 1.3, and provides for the following items.

- (a) The manufacturer shall carry out
 - (i) an assessment of the performance of the construction product on the basis of testing (including sampling), calculation, tabulated values, or descriptive documentation of that product;
 - (ii) factory production control;
 - (iii) testing of samples taken at the manufacturing plant by the manufacturer in accordance with the prescribed test plan⁵.
- (b) The notified factory production control certification body shall decide on the issuing, restriction, suspension, or withdrawal of the certificate of conformity of the factory production control on the basis of the outcome of the following assessments and verifications carried out by that body
 - (i) initial inspection of the manufacturing plant and of factory production control;
 - (ii) continuing surveillance, assessment, and evaluation of factory production control.

4.1.2 AVCP System 3

In addition, with regard to e.g. reaction to fire for products covered by this ETA the applicable European legal act is: Decision 1999/90/EC together with Decision 2001/596/EC. According to Commission Decision 1999/90/EC, the system of assessment and verification of constancy of performance to be applied to the Zemseal[®] is System 3. System 3 is detailed in Commission

³ Standards and other documents referred to in the European Technical Assessment are listed in Annex 6.

⁴ The technical file of the European Technical Assessment is deposited at Österreichisches Institut für Bautechnik.

⁵ The prescribed test plan has been deposited with Österreichisches Institut für Bautechnik and is handed over only to the notified factory production control certification body involved in the procedure for the assessment and verification of constancy of performance. The prescribed test plan is also referred to as control plan.

Delegated Regulation (EU) № 568/2014 of 18 February 2014, Annex, point 1.4., and provides for the following items.

(a) The manufacturer shall carry out factory production control.

(b) The notified laboratory shall assess the performance on the basis of testing (based on sampling carried out by the manufacturer), calculation, tabulated values or descriptive documentation of the construction product.

4.2 AVCP for construction products for which a European Technical Assessment has been issued

Manufacturers undertaking tasks under System 2+ shall consider the European Technical Assessment issued for the construction product in question as the assessment of the performance of that product. Manufacturers shall therefore not undertake the tasks referred to in Clause 4.1.1, point (a) (i).

Notified bodies undertaking tasks under System 3 shall consider the European Technical Assessment issued for the construction product in question as the assessment of the performance of that product. Notified bodies shall therefore not undertake the tasks referred to in Clause 4.1.2, point (b).

5. Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

5.1 Tasks for the manufacturer

5.1.1 Factory production control

In the manufacturing plant the manufacturer shall establish and continuously maintain a factory production control. All procedures and specification adopted by the manufacturer shall be documented in a systematic manner. The factory production control shall ensure the constancy of performances of the Zemseal[®] with regard to the essential characteristics.

The manufacturer shall only use raw materials supplied with the relevant inspection documents as laid down in the test plan. The incoming raw materials shall be subject to controls by the manufacturer before acceptance. Check of incoming materials shall include control of inspection documents presented by the manufacturer of the raw materials.

The procedures of the manufacturer shall incorporate the specifications of EN 13967 for flexible sheets for waterproofing regarding factory production control.

The frequencies of controls and tests conducted during manufacturing and on the assembled product are defined by taking account of the manufacturing process of the product and are laid down in the prescribed test plan. The results of factory production control are to be recorded and evaluated.

The records shall be presented to the notified factory production control certification body involved in continuous surveillance. On request the records shall be presented to Österreichisches Institut für Bautechnik.

If test results are unsatisfactory, the manufacturer shall immediately implement measures to eliminate the defects. Products or components that are not in conformity with the requirements shall be removed. After elimination of the defects, the respective test – if verification is required for technical reasons – shall be repeated immediately.

5.1.2 Declaration of performance

The manufacturer is responsible for preparing the declaration of performance. When all the criteria of the assessment and verification of constancy of performance are met, including the

certificate of conformity of the factory production control issued by the notified factory production control certification body, the manufacturer shall draw up a declaration of performance.

5.2 Tasks for the notified factory production control certification body

5.2.1 Initial inspection of the manufacturing plant and of factory production control

The notified factory production control certification body shall verify the ability of the manufacturer for a continuous and orderly manufacturing of the Zemseal® according to the European Technical Assessment. In particular the following items shall be appropriately considered.

- Personnel and equipment;
- the suitability of the factory production control established by the manufacturer;
- full implementation of the control plan.

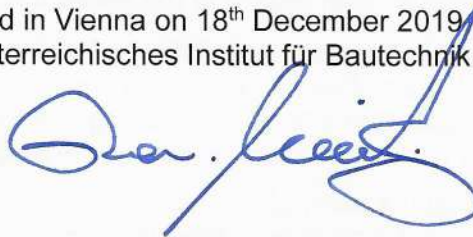
5.2.2 Continuing surveillance, assessment, and evaluation of factory production control

The notified factory production control certification body shall visit the factory at least once a year for routine inspection. In particular the following items shall be appropriately considered.

- The manufacturing process including personnel and equipment;
- the factory production control;
- the implementation of the control plan.

The results of continuous surveillance shall be made available on demand by the notified factory production control certification body to Österreichisches Institut für Bautechnik. When the provisions of the European Technical Assessment and the test plan are no longer fulfilled, the certificate of conformity of the factory production control shall be withdrawn.

Issued in Vienna on 18th December 2019
by Österreichisches Institut für Bautechnik



Rainer Mikulits
Managing Director

Zemseal® - Description

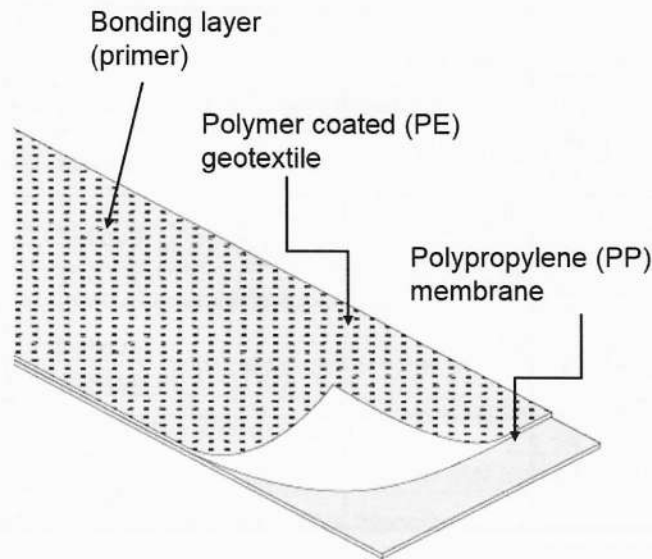


Figure 1: Zemseal® 05, 08, 12

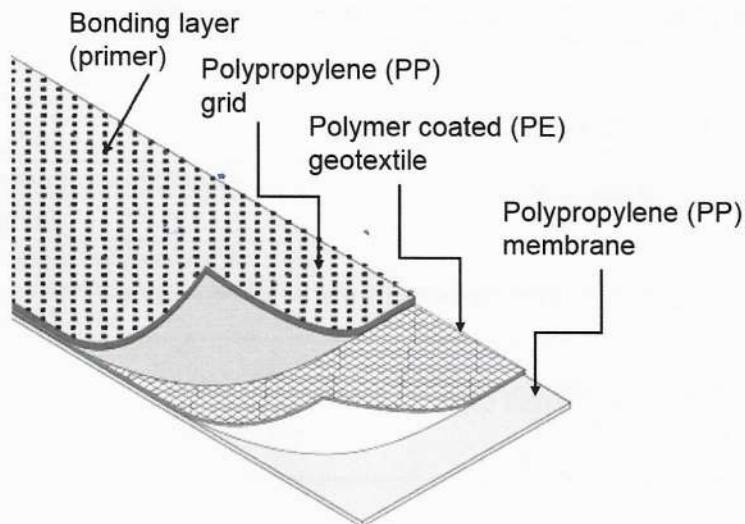


Figure 2: Zemseal® Premium

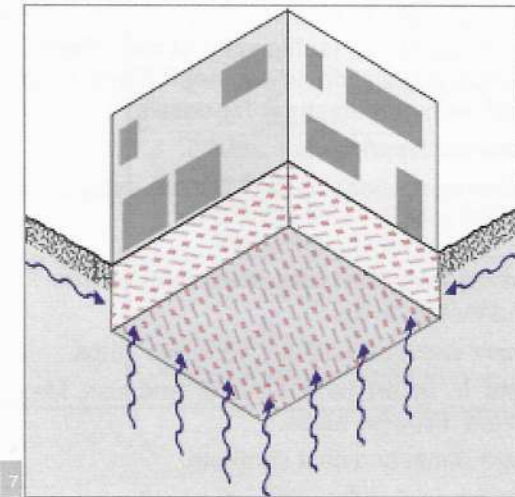
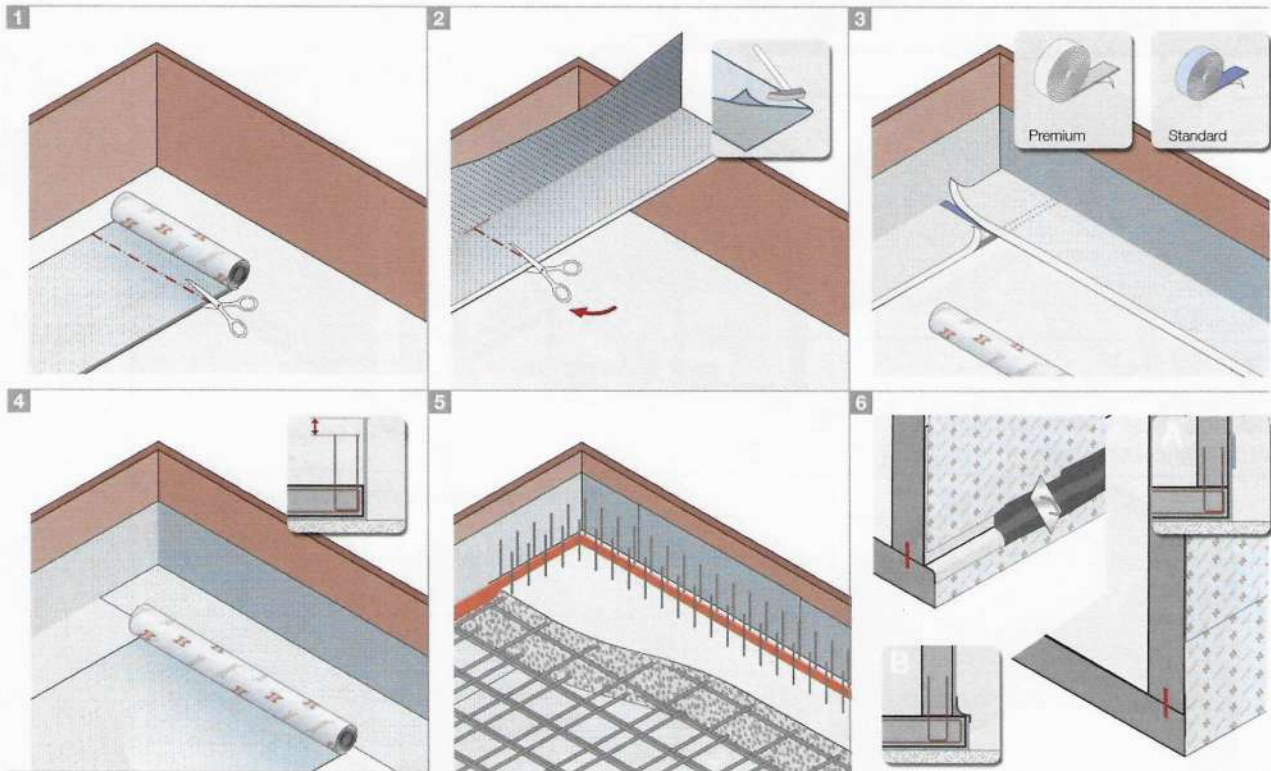
Zemseal[®] - Dimensions, mass and tolerances

| Description | Number of layers | Thickness | Straightness | Flatness | Width | Length | Mass per unit area |
|------------------------------|------------------|-------------|--------------|----------|----------------------|--------------------------|---------------------|
| - | - | mm | mm / 10 m | mm | m | m | g/m ² |
| Zemseal [®] 05 | 2 | 0.8 ± 0.15 | ≤ 10 | ≤ 5 | 1 up to 2 ± 0.020 | 20 ± 0.200 20 ± 0.200 | 520 ± 40 |
| Zemseal [®] 08 | 2 | 1.0 ± 0.15 | ≤ 10 | ≤ 20 | 1 up to 2 ± 0.020 | 20 ± 0.200 20 ± 0.200 | 720 ± 40 |
| Zemseal [®] 12 | 2 | 1.2 ± 0.15 | ≤ 10 | ≤ 30 | 1 up to 2 ± 0.020 | 20 ± 0.200 20 ± 0.200 | 870 ± 40 |
| Zemseal [®] Premium | 3 | 1.85 ± 0.15 | ≤ 10 | ≤ 20 | 1 up to 2 ± 0.020 | 20 ± 0.200 20 ± 0.200 | 980 + 85 / - 100 |

Table 2: Dimensions, mass and tolerances of Zemseal[®] 05, 08, 12 and Zemseal[®] Premium

Zemseal® - Installation instructions

- horizontal (for example a ground slab):



Verify suitability of substrate (sufficiently stable, clean, and flat) and commence installation under appropriate weather conditions (consult with manufacturer for details)

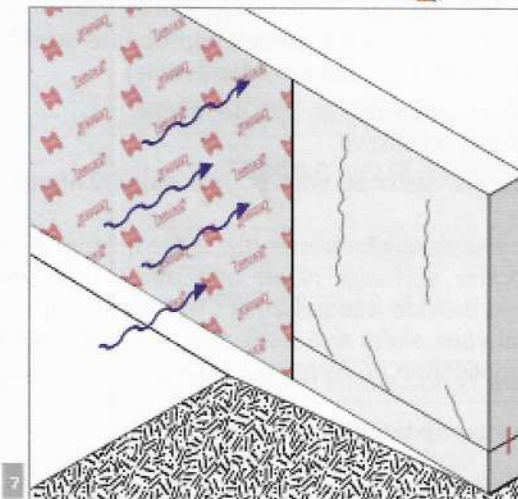
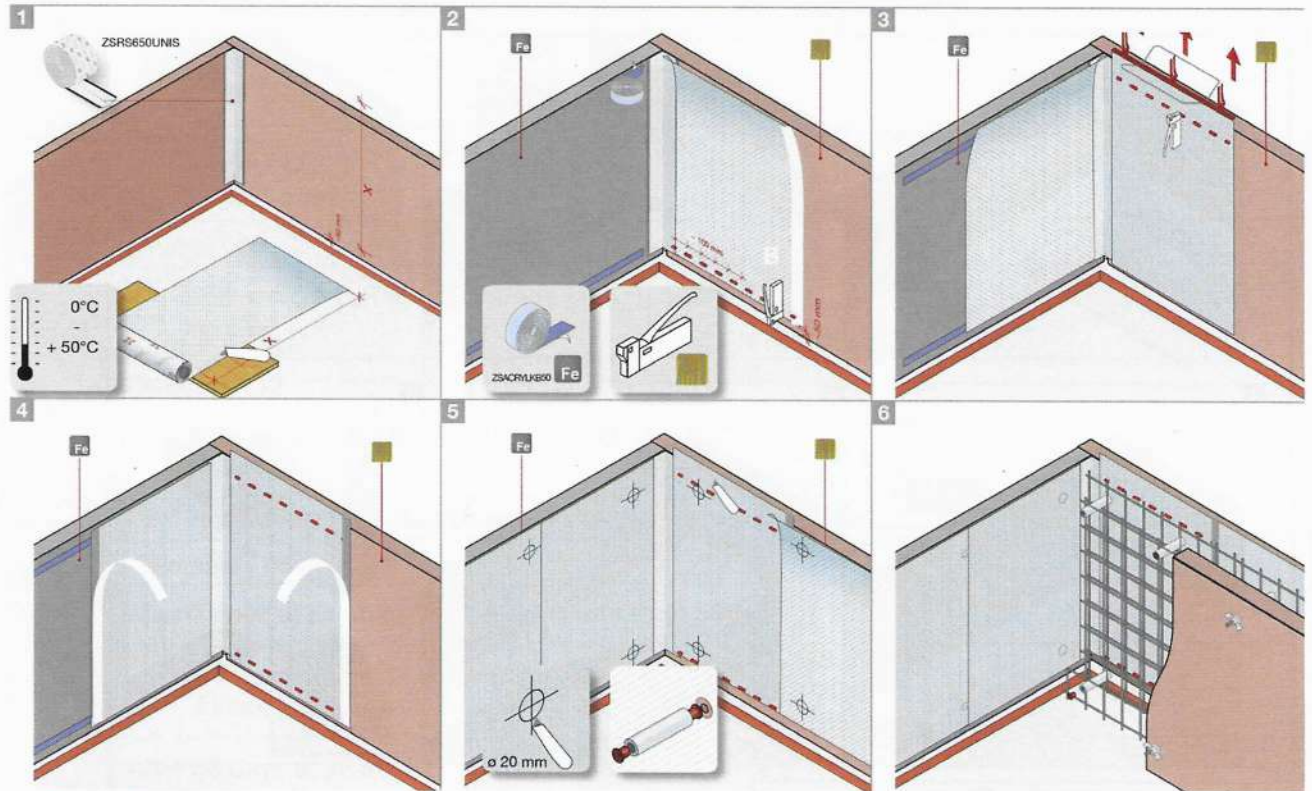
1. Begin installation preferably at slab perimeter.
2. Fit corners on site as shown.
3. Overlap joints are secured with double sided Zemseal® tapes.
4. For splicing and jointing of rolls use the self-adhesive strips.
5. Keep membrane surfaces clean and defect free until concrete pour and provide adequate joint waterproofing.
6. Transitions between slabs and walls can be carried out as overlaps or by application of Zemseal Flex Paste CB (PMBC render).
7. Finished envelope seal of the ground slab.

NOTE: Alternative installation methods and details are possible, depending on the specific site conditions. Ask manufacturer for individual advice.

Figure 3: Installation of Zemseal®, horizontal

Zemseal® - Installation instructions

- vertical (for example a wall):



Verify suitability of substrate (sufficiently stable, clean and flat) and commence installation under appropriate weather conditions (consult with manufacturer for details)

1. Begin installation in the corners.
2. Fasten membrane sections at the bottom (staple or Zemseal® tape).
3. Tension membrane when needed using the Zemseal® clamping tool and fasten on top.
4. Overlap adjacent sections with self adhesive strips.
5. Cut membrane to insert form tie-rods and use Max Frank fibre concrete distance tubes.
6. Close form work panel and cast concrete.
7. Finished envelope seal of the wall.

NOTE: Alternative installation methods and details are possible, depending on the specific site conditions. Ask manufacturer for individual advice.

Figure 4: Installation of Zemseal®, vertical

Table 3: Essential characteristics of the Zemseal[®] 05, 08, 12 and the acryl adhesive tape

| BRCW ¹⁾ | Essential characteristic | Assessment method | Performance |
|--|--|---|-----------------|
| 2 | Reaction to fire | | |
| | - Zemseal [®] 05, 08 and 12 | Classification: Commission Delegated Regulation (EU) 2016/364 | E |
| | Reaction to fire of adhesive tape | | |
| | - acryl adhesive tape | Classification: Commission Delegated Regulation (EU) 2016/364 | E |
| 3 | Visible defects | | |
| | Zemseal [®] 05, 08, 12 | EN 1850-2 | Free of defects |
| | Dimensions and tolerances | | |
| | Zemseal [®] 05, 08 12 | | |
| | Length L | EN 1848-2 | See Table 2 |
| | Width B | | |
| | Straightness | | |
| | Flatness | | |
| | Thickness and mass per unit area | | |
| | Thickness | | |
| | Zemseal [®] 05, 08, 12 | EN 1849-2 | See Table 2 |
| Mass per unit area | | | |
| Zemseal [®] 05, 08, 12 | EN 1849-2 | See Table 2 | |
| 1) Basic requirement for construction works. | | | |

Table 3: Essential characteristics of the Zemseal[®] 05, 08, 12 and the acryl adhesive tape – continuation

| BRCW | Essential characteristic | Assessment method | Performance |
|--|---|-------------------|---------------|
| 3 | Mechanical strength – Tensile strength | | |
| | Zemseal [®] 05 | | |
| | - max. tensile force, longitudinal, mean | EN 12311-2 | ≥ 500 N/50 mm |
| | - max. tensile force, transverse, mean | EN 12311-2 | ≥ 380 N/50 mm |
| | Zemseal [®] 08 | | |
| | - max. tensile force, longitudinal, mean | EN 12311-2 | ≥ 670 N/50 mm |
| | - max. tensile force, transverse, mean | EN 12311-2 | ≥ 530 N/50 mm |
| | Zemseal [®] 12 | | |
| | - max. tensile force, longitudinal, mean | EN 12311-2 | ≥ 800 N/50 mm |
| | - max. tensile force, transverse, mean | EN 12311-2 | ≥ 580 N/50 mm |
| | Elongation at maximum tensile force | | |
| | Zemseal [®] 05 | | |
| | - longitudinal, mean | EN 12311-2 | ≥ 10 % |
| | - transverse, mean | EN 12311-2 | ≥ 12 % |
| | Zemseal [®] 08 | | |
| | - longitudinal, mean | EN 12311-2 | ≥ 20 % |
| | - transverse, mean | EN 12311-2 | ≥ 30 % |
| | Zemseal [®] 12 | | |
| | - longitudinal, mean | EN 12311-2 | ≥ 19 % |
| | - transverse, mean | EN 12311-2 | ≥ 25 % |
| | Resistance to static loading | | |
| | Zemseal [®] 05, 08, 12 | EN 12730 | 35 kg |
| | Resistance to impact | | |
| | Zemseal [®] 05 | EN 12691 | 350 mm |
| | Zemseal [®] 08 | | 500 mm |
| | Zemseal [®] 12 | | 650 mm |
| | Watertightness | | |
| Zemseal [®] 05, 08, 12 | EN 1928, procedure B, pressure 60 kPa | Passed | |
| Watertightness of adhesive tape | | | |
| - acryl adhesive tape | EAD 030378-00-0605, EN 1928, procedure B, pressure 60 kPa | Passed | |

Table 3: Essential characteristics of the Zemseal[®] 05, 08, 12 and the acryl adhesive tape - continuation

| BRCW | Essential characteristic | Assessment method | Performance |
|---|--|--|------------------------------|
| 3 | Artificial ageing by long term exposure to elevated temperature ²⁾ | | |
| | Zemseal [®] 05 | | |
| | 1. Visible defects after artificial ageing | EN 1296 EN 1850-2 | Free of defects |
| | 2. Tensile force: | | Changes, ratio after / prior |
| | - longitudinal, mean | EN 1296 EN 12311-2 | ≥ 95 % |
| | 3. Elongation: | | Changes, ratio after / prior |
| | - longitudinal, mean | EN 1296 EN 12311-2 | ≥ 95 % |
| | 4. Modulus of elasticity: | | Changes, ratio after / prior |
| | - longitudinal, mean | EN 1296 EN 12311-2 | ≥ 95 % |
| | 5. Watertightness: | | |
| | at 23°C ± 2°C | EN 1928, procedure B, pressure 60 kPa | Passed |
| | at 40°C ± 2°C | | Passed |
| | at 70°C ± 2°C | | Passed |
| 6. Oxidation induction time (isothermal OIT): | | | |
| OIT, minimum mean value | EAD 030378-00-0605, EN ISO 11357-6 | 3 min. | |

²⁾ The product shows very good ageing behaviour. In particular, no undue high increase of the characteristics 1-6 were found.

Table 3: Essential characteristics of the Zemseal[®] 05, 08, 12 and the acryl adhesive tape – continuation

| BRCW | Essential characteristic | Assessment method | Performance |
|------|---|--|------------------------------|
| 3 | Water vapour transmission property | | |
| | Zemseal [®] 05 | | |
| | - moisture resistance factor μ | EN 1931, procedure B | 270 000 |
| | Alkali resistance in high pH solution (calcium hydroxide, 28 days) | | |
| | Zemseal [®] 05 | | |
| | 1. Tensile force, longitudinal, mean | EN 1847, EN 12311-2 | Changes, ratio after / prior |
| | 2. Elongation, longitudinal, mean | | ≥ 90 % |
| | 3. Modulus of elasticity, longitudinal, mean | | ≥ 95 % |
| | 4. Watertightness | EN 1847, EAD 030378-00-0605, EN 1928 | ≥ 90 % |
| | Acid resistance (6 % sulfurous acid, 28 days) | | |
| | Zemseal [®] 05 | | |
| | 1. Tensile force, longitudinal, mean | EN 1847, EN 12311-2 | Changes, ratio after / prior |
| | 2. Elongation, longitudinal, mean | | ≥ 95 % |
| | 3. Modulus of elasticity, longitudinal, mean | | ≥ 95 % |
| | 4. Watertightness | EN 1847, EAD 030378-00-0605, EN 1928 | ≥ 95 % |
| | Compatibility with bitumen | | |
| | Zemseal [®] 05 | | |
| | 1. Tensile force, longitudinal, mean | EN 1548, EN 13304, EN 12311-2 | Changes, ratio after / prior |
| | 2. Elongation, longitudinal, mean | | ≥ 90 % |
| | 3. Modulus of elasticity, longitudinal, mean | | ≥ 95 % |
| | 4. Watertightness | EN 1548, EAD 030378-00-0605, EN 1928 | ≥ 60 % |
| | Passed | | |

Table 3: Essential characteristics of the Zemseal[®] 05, 08, 12 and the acryl adhesive tape – continuation

| BRCW | Essential characteristic | Assessment method | Performance |
|------|--|---|---|
| 3 | Shear resistance of joints | | |
| | Zemseal [®] 05 | | |
| | Lateral seam: | | |
| | - shear resistance of joints, mean | EN 12317-2 | ≥ 400 N |
| | - mode of failure | | separate / split, adhesive area, cohesion fracture |
| | Splice: | | |
| | - shear resistance of joints, mean | EN 12317-2 | ≥ 425 N |
| | - mode of failure | | separate / split, adhesive area, cohesion fracture |
| | Resistance to tearing (nail shank) | | |
| | Zemseal [®] 05 | | |
| | - longitudinal, mean | EN 12310-1 | ≥ 290 N |
| | - transverse, mean | | ≥ 290 N |
| | Elongation at maximum tensile force and maximum tensile force at low temperatures (at - 45 °C ± 2 °C) | | |
| | Zemseal [®] 05 | | |
| | 1. Max. tensile force, longitudinal, mean | EN 12311-2, EAD 030378-00-0605 2.2.19 | ≥ 950 N/50 mm |
| | 2. Elongation at max. tensile force, longitudinal, mean | | ≥ 2 % |
| | 3. Max. tensile force, transverse, mean | | ≥ 790 N/50 mm |
| | 4. Elongation at max. tensile force, transverse, mean | | ≥ 3 % |
| | Crack bridging ability | | |
| | Zemseal [®] 05 Reference hydrostatic pressure = 2 bar | EAD 030378-00-0605 2.2.20 | No water leakage, no flaking, no blistering along the joint, passed |

Table 3: Essential characteristics of the Zemseal[®] 05, 08, 12 and the acryl adhesive tape – continuation

| BRCW | Essential characteristic | Assessment method | Performance |
|---|---|--|-------------|
| 3 | Peel-resistance (180 degree peel) | | |
| | Zemseal [®] 05 | | |
| | - arithmetic mean of the average peel forces | EAD 030378-00-0605 2.2.21, EN ISO 8510-2 | 30 N |
| | Zemseal [®] 08 | | |
| | - arithmetic mean of the average peel forces | EAD 030378-00-0605 2.2.21, EN ISO 8510-2 | 22 N |
| | Zemseal [®] 12 | | |
| | - arithmetic mean of the average peel forces | EAD 030378-00-0605 2.2.21, EN ISO 8510-2 | 35 N |
| | Peel-resistance (180 degree peel) after immersion in water | | |
| | Zemseal [®] 05 | | |
| | After 7 days at air at 20 °C ± 5 °C and moisture 50 % ± 10 % | | |
| | - arithmetic mean of the average peel forces | EAD 030378-00-0605 2.2.22, EN ISO 8510-2 | 50 N |
| | After 56 days at air at 20 °C ± 5 °C and moisture 50 % ± 10 % | | |
| | - arithmetic mean of the average peel forces | EAD 030378-00-0605 2.2.22, EN ISO 8510-2 | 43 N |
| | After 7 days of immersion in water at 20 °C ± 5 °C | | |
| | - arithmetic mean of the average peel forces | EAD 030378-00-0605 2.2.22, EN ISO 8510-2 | 43 N |
| After 28 days of immersion in water at 20 °C ± 5 °C | | | |
| - arithmetic mean of the average peel forces | EAD 030378-00-0605 2.2.22, EN ISO 8510-2 | 42 N | |
| After 56 days of immersion in water at 20 °C ± 5 °C | | | |
| - arithmetic mean of the average peel forces | EAD 030378-00-0605 2.2.22, EN ISO 8510-2 | 42 N | |

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Zemseal[®] 05, 08, 12**Annex 4**
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Table 3: Essential characteristics of the Zemseal[®] 05, 08, 12 and the acryl adhesive tape – continuation

| BRCW | Essential characteristic | Assessment method | Performance |
|--|---|--|-------------|
| 3 | Peel-resistance (180 degree peel) after exposure to elevated temperature (70°C) | | |
| | Zemseal [®] 05 | | |
| | After 56 days at air at 20 °C ± 5 °C and moisture 50 % ± 10 % | | |
| | - arithmetic mean of the average peel forces | EAD 030378-00-0605 2.2.23, EN ISO 8510-2 | 42 N |
| | After 28 days of storage at 70 °C ± 2 °C | | |
| | - arithmetic mean of the average peel forces | EAD 030378-00-0605 2.2.23, EN ISO 8510-2 | 42 N |
| | After 56 days of storage at 70 °C ± 2 °C | | |
| | - arithmetic mean of the average peel forces | EAD 030378-00-0605 2.2.23, EN ISO 8510-2 | 46 N |
| | Peel-resistance (180 degree peel) after cleaning | | |
| | Zemseal [®] 05 | | |
| | - arithmetic mean of the average peel forces after cleaning | EAD 030378-00-0605 2.2.24, EN ISO 8510-2 | 51 N |
| | Resistance to damage – water creep to leakage, duration 7 days, water pressure 500 kPa | | |
| | Zemseal [®] 05 | EAD 030378-00-0605 2.2.25, EN 12390-8 | ≤ 25 mm |
| | - maximum value of water creep | | |
| | Zemseal [®] 08 | | |
| | - maximum value of water creep | | |
| Zemseal [®] 12 | EAD 030378-00-0605 2.2.26, EN 12390-8 | ≤ 25 mm | |
| - maximum value of water creep | | | |
| Resistance to damage – water creep to leakage after cleaning, duration 7 days, water pressure 500 kPa | | | |
| Zemseal [®] 05 | | | |
| - maximum value of water creep | EAD 030378-00-0605 2.2.26, EN 12390-8 | ≤ 25 mm | |

Table 4: Essential characteristics of the Zemseal[®] Premium and the butyl adhesive tape

| BRCW ¹⁾ | Essential characteristic | Assessment method | Performance |
|-------------------------------------|---|--|-------------------|
| 2 | Reaction to fire | | |
| | - Zemseal [®] Premium | Classification: Commission Delegated Regulation (EU) 2016/364 | E |
| 2 | Reaction to fire of adhesive tape | | |
| | - butyl adhesive tape | Classification: Commission Delegated Regulation (EU) 2016/364 | E |
| 3 | Visible defects | | |
| | Zemseal [®] Premium | EN 1850-2 | No visual defects |
| | Dimensions and tolerances | | |
| | Zemseal [®] Premium | | |
| | Length L | EN 1848-2 | See Table 2 |
| | Width B | | |
| | Straightness | | |
| | Flatness | | |
| | Thickness and mass per unit area | | |
| | Thickness | | |
| | - Zemseal [®] Premium | EN 1849-2 | See Table 2 |
| | Mass per unit area | | |
| | - Zemseal [®] Premium | | |
| | Mechanical strength – Tensile strength | | |
| | Zemseal [®] Premium | | |
| | - max. tensile force, longitudinal, mean | EN 12311-2 | ≥ 730 N/50 mm |
| | - max. tensile force, transverse, mean | | ≥ 600 N/50 mm |
| | Elongation at maximum tensile force | | |
| | Zemseal [®] Premium | | |
| | - longitudinal, mean | EN 12311-2 | ≥ 20 % |
| - transverse, mean | EN 12311-2 | ≥ 40 % | |
| Resistance to static loading | | | |
| Zemseal [®] Premium | EN 12730 | 35 kg | |
| Resistance to impact | | | |
| Zemseal Premium | EN 12691 | 700 mm | |
| Watertightness | | | |
| Zemseal [®] Premium | EN 1928, procedure B, pressure 60 kPa | Passed | |

¹⁾Basic requirement for construction works.



Zemseal[®]
Essential characteristics of the
Zemseal[®] Premium

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Table 4: Essential characteristics of the Zemseal[®] Premium and the butyl adhesive tape – continuation

| BRCW | Essential characteristic | Assessment method | Performance |
|---|--|---|------------------------------|
| 3 | Watertightness of adhesive tape | | |
| | - butyl adhesive tape | EAD 030378-00-0605, EN 1928, procedure B, pressure 60 kPa | Passed |
| | Artificial ageing by long term exposure to elevated temperature ²⁾ | | |
| | Zemseal [®] Premium | | |
| | 1. Visible defects after artificial ageing | EN 1296 EN 1850-2 | Free of defects |
| | 2. Tensile force: | | Changes, ratio after / prior |
| | - longitudinal, mean | EN 1296 EN 12311-2 | ≥ 95 % |
| | 3. Elongation: | | Changes, ratio after / prior |
| | - longitudinal, mean | EN 1296 EN 12311-2 | ≥ 90 % |
| | 4. Modulus of elasticity: | | Changes, ratio after / prior |
| | - longitudinal, mean | EN 1296 EN 12311-2 | ≥ 95 % |
| | 5. Watertightness: | | |
| | at 23°C ± 2°C | EN 1928, procedure B, pressure 60 kPa | Passed |
| | at 40°C ± 2°C | | Passed |
| | at 70°C ± 2°C | | Passed |
| | 6. Oxidation induction time (isothermal OIT): | | |
| OIT, minimum mean value | EAD 030378-00-0605, EN ISO 11357-6 | 8 min. | |
| Water vapour transmission property | | | |
| Zemseal [®] Premium | | | |
| - moisture resistance factor μ | EN 1931, procedure B | 120 000 | |

²⁾ The product shows very good ageing behaviour. In particular, no undue high increase of the characteristics 1-6 were found.

Table 4: Essential characteristics of the Zemseal[®] Premium and the butyl adhesive tape - continuation

| BRCW | Essential characteristic | Assessment method | Performance |
|------------------------------------|---|--|--|
| 3 | Alkali resistance in high pH solution (calcium hydroxide, 28 days) | | |
| | Zemseal [®] Premium | EN 1847, EN 12311-2 | Changes, ratio after / prior |
| | 1. Tensile force, longitudinal, mean | | ≥ 95 % |
| | 2. Elongation, longitudinal, mean | | ≥ 80 % |
| | 3. Modulus of elasticity, longitudinal, mean | | ≥ 95 % |
| | 4. Watertightness | EN 1847, EAD 030378-00-0605, EN 1928 | Passed |
| | Acid resistance (6 % sulfurous acid, 28 days) | | |
| | Zemseal [®] Premium | EN 1847, EN 12311-2 | Changes, ratio after / prior |
| | 1. Tensile force, longitudinal, mean | | ≥ 95 % |
| | 2. Elongation, longitudinal, mean | | ≥ 90 % |
| | 3. Modulus of elasticity, longitudinal, mean | | ≥ 95 % |
| | 4. Watertightness | EN 1847, EAD 030378-00-0605, EN 1928 | Passed |
| | Compatibility with bitumen | | |
| | Zemseal [®] Premium | EN 1548, EN 13304, EN 12311-2 | Changes, ratio after / prior |
| | 1. Tensile force, longitudinal, mean | | ≥ 75 % |
| | 2. Elongation, longitudinal, mean | | ≥ 95 % |
| | 3. Modulus of elasticity, longitudinal, mean | | ≥ 70 % |
| | 4. Watertightness | EN 1548, EAD 030378-00-0605, EN 1928 | Passed |
| | Shear resistance of joints | | |
| | Zemseal [®] Premium | | |
| | Lateral seam: | | |
| | - shear resistance of joints, mean | EN 12317-2 | ≥ 525 N |
| | - mode of failure | | separate / split, adhesive area, cohesion fracture |
| | Splice: | | |
| - shear resistance of joints, mean | EN 12317-2 | ≥ 520 N | |
| - mode of failure | | separate / split, adhesive area, cohesion fracture | |



Zemseal[®]
Essential characteristics of the
Zemseal[®] Premium

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Table 4: Essential characteristics of the Zemseal[®] Premium and the butyl adhesive tape – continuation

| BRCW | Essential characteristic | Assessment method | Performance |
|---|---|--|---|
| 3 | Resistance to tearing (nail shank) | | |
| | Zemseal [®] Premium | | |
| | - longitudinal, mean | EN 12310-1 | ≥ 540 N |
| | - transverse, mean | EN 12310-1 | ≥ 590 N |
| | Elongation at maximum tensile force and maximum tensile force at low temperatures (at - 45 °C ± 2 °C): | | |
| | Zemseal [®] Premium | | |
| | 1. Max. tensile force, longitudinal, mean | EN 12311-2 EAD 030378-00-0605 2.2.19 | ≥ 1400 N/50 mm |
| | 2. Elongation at max. tensile force, longitudinal, mean | | ≥ 5 % |
| | 3. Max. tensile force, transverse, mean | | ≥ 1200 N/50 mm |
| | 4. Elongation at max. tensile force, transverse, mean | | ≥ 15 % |
| | Crack bridging ability | | |
| | Zemseal [®] Premium Reference hydrostatic pressure = 2 bar | EAD 030378-00-0605 2.2.20 | No water leakage, no flaking, no blistering along the joint, passed |
| | Peel-resistance (180 degree peel) | | |
| | Zemseal [®] Premium | | |
| | - arithmetic mean of the average peel forces | EAD 030378-00-0605 2.2.21, EN ISO 8510-2 | 43 N |
| | Peel-resistance (180 degree peel) after immersion in water | | |
| | Zemseal [®] Premium | | |
| | After 7 days at air at 20 °C ± 5 °C and moisture 50 % ± 10 % | | |
| | - arithmetic mean of the average peel forces | EAD 030378-00-0605 2.2.22, EN ISO 8510-2 | 28 N |
| | After 56 days at air at 20 °C ± 5 °C and moisture 50 % ± 10 % | | |
| | - arithmetic mean of the average peel forces | EAD 030378-00-0605 2.2.22, EN ISO 8510-2 | 28 N |
| | After 7 days of immersion in water at 20 °C ± 5 °C | | |
| | - arithmetic mean of the average peel forces | EAD 030378-00-0605 2.2.22, EN ISO 8510-2 | 21 N |
| After 28 days of immersion in water at 20 °C ± 5 °C | | | |
| - arithmetic mean of the average peel forces | EAD 030378-00-0605 2.2.22, EN ISO 8510-2 | 21 N | |

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Zemseal[®] Premium**Annex 5**

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Table 4: Essential characteristics of the Zemseal[®] Premium and the butyl adhesive tape – continuation

| BRCW | Essential characteristic | Assessment method | Performance |
|--|--|--|-------------|
| 3 | Peel-resistance (180 degree peel) after immersion in water | | |
| | Zemseal [®] Premium | | |
| | After 56 days of immersion in water at 20 °C ± 5 °C | | |
| | - arithmetic mean of the average peel forces | EAD 030378-00-0605 2.2.22, EN ISO 8510-2 | 21 N |
| | Peel-resistance (180 degree peel) after exposure to elevated temperature (70°C) | | |
| | Zemseal [®] Premium | | |
| | After 56 days at air at 20 °C ± 5 °C and moisture 50 % ± 10 % | | |
| | - arithmetic mean of the average peel forces | EAD 030378-00-0605 2.2.23, EN ISO 8510-2 | 27 N |
| | After 28 days of storage at 70 °C ± 2 °C | | |
| | - arithmetic mean of the average peel forces | EAD 030378-00-0605 2.2.23, EN ISO 8510-2 | 27 N |
| | After 56 days of storage at 70 °C ± 2 °C | | |
| | - arithmetic mean of the average peel forces | EAD 030378-00-0605 2.2.23, EN ISO 8510-2 | 36 N |
| | Peel-resistance (180 degree peel) after cleaning | | |
| | Zemseal [®] Premium | | |
| | - arithmetic mean of the average peel forces after cleaning | EAD 030378-00-0605 2.2.24, EN ISO 8510-2 | 88 N |
| Resistance to damage – water creep to leakage, duration 7 days, water pressure 500 kPa | | | |
| Zemseal [®] Premium | | | |
| - maximum value of water creep | EAD 030378-00-0605 2.2.25, EN 12390-8 | ≤ 25 mm | |
| Resistance to damage – water creep to leakage after cleaning, duration 7 days, water pressure 500 kPa | | | |
| Zemseal [®] Premium | | | |
| - maximum value of water creep | EAD 030378-00-0605 2.2.26, EN 12390-8 | ≤ 25 mm | |

Reference documents

| | |
|----------------------|--|
| EN 1848-2 (05.2001) | Flexible sheets for waterproofing - Determination of length, width, straightness and flatness - Part 2: Plastic and rubber sheets for roof waterproofing |
| EN 1849-2 (12.2009) | Flexible sheets for waterproofing - Determination of thickness and mass per unit area - Part 2: Plastic and rubber sheets |
| EN 1850-2 (05.2001) | Flexible sheets for waterproofing - Determination of visible defects - Part 2: Plastic and rubber sheets for roof waterproofing |
| EN 12730 (04.2015) | Flexible sheets for waterproofing - Bitumen, plastic and rubber sheets for roof waterproofing - Determination of resistance to static loading |
| EN 12691 (02.2018) | Flexible sheets for waterproofing - Bitumen, plastic and rubber sheets for roof waterproofing - Determination of resistance to impact |
| EN 1548 (09.2007) | Flexible sheets for waterproofing – Plastic and rubber sheets for roof waterproofing – Method for exposure to bitumen |
| EN 1928 (03.2000) | Flexible sheets for waterproofing - Bitumen, plastic and rubber sheets for roof waterproofing - Determination of watertightness |
| EN 1931 (07.2000) | Flexible sheets for waterproofing - Bitumen, plastic and rubber sheets for roof waterproofing - Determination of water vapour transmission properties |
| EN 1296 (12.2000) | Flexible sheets for waterproofing - Bitumen, plastic and rubber sheets for roofing - Method of artificial ageing by long term exposure to elevated temperature |
| EN 12310-1 (09.1999) | Flexible sheets for waterproofing - Part 1: Bitumen sheets for roof waterproofing - Determination of resistance to tearing (nail shank) |
| EN 12311-2 (05.2013) | Flexible sheets for waterproofing - Determination of tensile properties - Part 2: Plastic and rubber sheets for roof waterproofing |
| EN 12317-2 (07.2010) | Flexible sheets for waterproofing - Determination of shear resistance of joints - Part 2: Plastic and rubber sheets for roof waterproofing Add to basket |
| EN 12390-8 (02.2009) | Testing hardened concrete - Part 8: Depth of penetration of water under pressure |
| EN 13416 (06.2001) | Flexible sheets for waterproofing - Bitumen, plastic and rubber sheets for roof waterproofing – rules for sampling |
| EN 13967 (04.2012) | Flexible sheets for waterproofing — Plastic and rubber damp proof sheets including plastic and rubber basement tanking sheet — Definitions and characteristics |



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| EN 1847 (12.2009) | Flexible sheets for waterproofing - Plastics and rubber sheets for roof waterproofing - Methods for exposure to liquid chemicals, including water |
| EN 13304 (03.2009) | Bitumen and bituminous binders — Framework for specification of oxidised bitumens |
| EN 206 (11.2016) | Concrete — Specification, performance, production and conformity |
| EN 12390-2 (04.2009) | Testing hardened concrete — Part 2: Making and curing specimens for strength tests |
| EN 11357-6 (04.2018) | Plastics — Differential scanning calorimetry (DSC) — Part 6: Determination of oxidation induction time (isothermal OIT) and oxidation induction temperature (dynamic OIT) (ISO 11357-6:2008) |
| EN ISO 8510-2 (09.2010) | Adhesives - Peel test for a flexible-bonded-to-rigid test specimen assembly - Part 2: 180 degree peel |
| 1999/90/EC | Commission Decision of 25 January 1999 on the procedure for attesting the conformity of construction products pursuant to Article 20(2) of Council Directive 89/106/EEC as regards membranes (notified under document number C(1999) 114; Official Journal № L 029 of 3.2.1999, p. 38; as amended by Commission Decision of 8 January 2001, Official Journal L 209, 2.8.2001; as corrected by Corrigendum OJ L 83 of 27.3.1999, p. 80. |
| 2016/364 | Commission Delegated Regulation (EU) 2016/364 of 1 July 2015 on the classification of the reaction to fire performance of construction products pursuant to Regulation (EU) No 305/2011 of the European Parliament and of the Council, Official Journal L 68, 15.3.2016, p. 4-11. |
| 305/2011 | Regulation (EU) № 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonized conditions for the marketing of construction products and repealing Council Directive 89/106/EEC, Official Journal of the European Union № L 88, 4.4.2011, p. 5; as amended by Commission Delegated Regulation (EU) No 568/2014 of 18 February 2014, Official Journal № L 157, 27.05.2014, p. 76, Commission Delegated Regulation (EU) № 574/2014 of 21 February 2014, Official Journal № L 159, 28.05.2014, p. 41 and Regulation (EU) 2019/1020 of 20 June 2019, OJ L 169, 25.6.2019, p. 1–44. |



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| | | |
|--|---------------------|--|
|  MAX FRANK BUILDING COMMON GROUND | Zemseal® | Annex 6 Page 3 of 3 of European Technical Assessment ETA-19/0607 of 18.12.2019 |
| | Reference documents | |