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Construction permit

Permit no.: Z-10.8-408

Applicant: Sika Deutschland GmbH
Stuttgarter Strasse 117
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Germany

Subject of permit: SikaTack® Panel adhesive system for fixing particular façade panels to an aluminium substructure

Valid from: 22 February 2013
Valid until: 22 February 2018

The aforementioned subject is hereby granted a construction permit. This permit comprises eight pages and twelve appendices.

This construction permit supersedes permit no. Z-10.8-408 of 19 February 2008, supplemented by decisions of 8 April 2008 and 1 November 2012. The subject was granted as a construction permit first time on 18 June 1998.

[SEAL: Deutsches Institut für Bautechnik]

Please note:
Translation of the German original is not checked by
“Deutsches Institut für Bautechnik”.

I. GENERAL PROVISIONS

1. The construction permit demonstrates the usability or applicability of the subject of the permit in the sense of the regional building law.
2. Insofar as special requirements for expert knowledge and experience are needed in the general technical approval, from people involved in performing building construction and designs according to § 17, section 5 of the prototype building regulations, it has to be observed, that this expert knowledge and experience can also be proven by equivalent certificates from other member states of the European Economic Area (EWR) or other bilateral certificates.
3. The construction permit is not a substitute for the permits, approvals and certificates prescribed by law for the implementation of building plans.
4. The construction permit is granted without prejudice to the rights of third parties, in particular private property rights.
5. Irrespective of further regulations in the “Special Provisions”, the manufacturer and vendor of the subject of the permit must provide the user or operator of the subject of the permit with copies of the construction permit and point out that the permit must be available at the place of use. Copies of the construction permit must be supplied to the relevant authorities on request.
6. The construction permit may only be reproduced in full. Publication of extracts requires the consent of the *Deutsches Institut für Bautechnik* (German Institute for Structural Engineering). Texts and drawings in advertising materials must not contradict the construction permit. Translations of the construction permit must bear the note “Translation of the German original not checked by the *Deutsches Institut für Bautechnik*”.
7. The construction permit may be revoked. The provisions of the general approval may be supplemented and amended at a later date if new technical knowledge necessitates this.

II. SPECIAL PROVISIONS

1. Subject of the approval and application

The construction permit covers the “SikaTack® Panel” adhesive system, consisting of cleaning agents, primer, assembly tape and adhesive. The “SikaTack® Panel” adhesive system is used to produce adhesive bonds between façade panels and substructure profiles.

The force locking adhesive bond may be used to fix certain façade panels, with a construction permit, to aluminium substructure profiles with mounted, rear-ventilated exterior wall claddings without the use of any additional mechanical fixing of the façade panels.

The supporting profiles of the substructure must be vertical or arranged in such a way that no moisture can remain in the area of the bond.

The façade system constructed from the façade panels affixed to aluminium substructure profiles with the “SikaTack® Panel* adhesive system is flame-retardant.

The building height permitted for the use of the façade system is taken from the stability survey unless the applicable fire regulations of the Federal States prescribe lower heights.

Any thermal insulation must be secured directly to the structure of the building, irrespective of the substructure. It must consist of non-flammable mineral fibre insulating materials pursuant to DIN EN 13162¹.

The stability survey of the substructure and its fastening to the structure of the building is not the subject of this construction permit.

2. Provisions for the building products

2.1 General

The subject of the permit and its parts must comply with the Special Provisions and Appendices of this construction permit and the specifications defined by the *Deutsches Institut für Bautechnik*.

2.2 Properties and composition

2.2.1 Façade panels

Only façade panels in accordance with Appendices 4 to 10 may be used.

2.2.2 Aluminium substructure

The supporting profiles of the substructure must consist of the aluminium alloy EN AW 6060 or EN AW 6063 pursuant to DIN EN 755-2 and have a minimum thickness of 1.5 mm, a tensile strength of $R_m \geq 215 \text{ N/mm}^2$ and an elastic limit of $R_{p0.2} \geq 160 \text{ N/mm}^2$.

The supporting profiles must have an even and smooth surface.

In accordance with Appendix 2, the width of the surface of the supporting profiles to be fixed must be at least 40 mm (for profiles across the span of a panel) or at least 90 mm (for profiles in the area of panel joints to which two panels are fixed).

2.2.3 Cleaning agents

The cleaning agents used to prepare the surfaces to be bonded must be “Sika® Aktivator-205” or “Sika® Reinigungsmittel-5”. The recipes of the cleaning agents must comply with the specifications deposited by the *Deutsches Institut für Bautechnik*.

¹ The Building Regulations B Part 1 must be followed in respect of fire resistance.

2.2.4 Primer

The primer used to prepare the surfaces to be bonded must be “SikaTack® Panel Primer”. The recipe of the primer must comply with the specifications deposited by the *Deutsches Institut für Bautechnik*.

2.2.5 Assembly tape

“SikaTack® Panel assembly tape” must be used for immediately fixing the façade panels until the adhesive has cured and to adjust the thickness of the adhesive. It must be a double-sided adhesive fixing tape with a width of 12 mm and a thickness of 3 mm with covering film on both sides. The mechanical characteristics of the assembly tape must comply with the specifications deposited by the *Deutsches Institut für Bautechnik*. It is flammable (building material class DIN 4102-B3).

2.2.6 SikaTack® Panel adhesive

The “SikaTack® Panel” adhesive must consist of a single-component PUR elastomer. The recipe must comply with the specifications deposited by the *Deutsches Institut für Bautechnik*.

2.2.7 SikaTack® Panel adhesive system

The SikaTack® Panel adhesive system must consist of the building products pursuant to sections 2.2.3 to 2.2.6. Each adhesive bond must consist of at least one adhesive strip of the assembly tape pursuant to section 2.2.5 and at least one bead (width 12 mm, thickness 3 mm) of the adhesive pursuant to section 2.2.6.

2.2.8 Façade system

The façade system pursuant to Appendix 1 must consist of the building products pursuant to sections 2.2.1 to 2.2.7.

The façade system must fulfil the requirements for flame-retardant building materials (class C-s2, d0 pursuant to DIN EN 13501-1) and comply with the permit principles for demonstrating the flame-retardant properties of building materials.

2.3 Manufacture, packaging, transport and identification

2.3.1 Manufacture

The building products pursuant to sections 2.2.1 to 2.2.6 must be factory-made.

The cleaning agents pursuant to section 2.2.3, the primer pursuant to section 2.2.4 and the adhesive pursuant to section 2.2.6 must be manufactured in a Sika production plant.

2.3.2 Packaging, transport, storage

The cleaning agents pursuant to section 2.2.3, the primer pursuant to section 2.2.4 and the adhesive pursuant to section 2.2.6 must be filled into containers in ready-to-use form and provided with an air-tight seal in the factory. The containers must be identified in such a way that the application, content, quantity etc. cannot be confused.

The assembly tape, wound up as a roll, must be identifiable as a system component of the SikaTack® Panel adhesive system.

The containers must be protected from direct sunlight and weather during transport and storage. The storage instructions on the containers must be followed.

2.3.3 Identification

The manufacturer must identify the containers for every building product pursuant to sections 2.2.3 to 2.2.6 with the German Mark of Conformity (Ü mark) according to the Federal States’ conformity mark decrees and identified according to the following specifications.

Furthermore, the following must also be specified on the containers for the primer and the adhesive:

- product name
- minimum and maximum usage temperatures
- instructions on the Technical Data Sheet for the application and use
- batch number, storage type, use-before date
- flash-off time prior to bonding (for the primer)

This information may also be provided on a data sheet supplied with the delivery providing no confusion can be caused by an identical product appellation.

The containers may only be identified if all the conditions pursuant to section 2.4 have been met.

2.4 German Mark of Conformity

2.4.1 General

The confirmation that the cleaning agents, primer, assembly tape and adhesive pursuant to sections 2.2.3 to 2.2.6 and the façade system pursuant to section 2.2.8 comply with the provisions of this construction permit must be demonstrated with a certificate of conformity based on a production control in the factory and regular third-party monitoring, including an initial test of the building product according to the following provisions.

The manufacturer must engage an accredited certification centre and an accredited monitoring centre to grant the certificate of conformity and to perform the third-party monitoring including the product tests to be carried out. For the façade system with cladding panels, the applicant for this construction permit shall be deemed to be the manufacturer in this respect.

The certification centre must provide a copy of the certificate of conformity it has granted for information to the *Deutsches Institut für Bautechnik* and the highest building supervisory board in the Federal State in which the production plant is situated.

The *Deutsches Institut für Bautechnik* must also be given a copy of the initial test report for information.

2.4.2 Factory production control

Factory production control must be set up and implemented in every production plant. Factory production control means the continuous production monitoring to be carried out by the manufacturer to ensure that the building products it manufactures comply with the provisions of this construction permit.

Factory production control must include at least the measures listed in Appendix 3.

With regard to the fire resistance of the façade system, the guidelines for the certificate of conformity of flame-retardant building materials (building materials class DIN 4102-B1) pursuant to the construction permit shall apply accordingly.

The results of the factory production control must be recorded and analysed. The records must contain at least the following information:

- name of the building product or the source material and components
- type of control or test
- date on which the building product or source material and components was/were manufactured and tested
- result of the controls and test and, if applicable, comparison with requirements
- signature of the person responsible for the factory production control

The records must be stored for at least five years and submitted to the monitoring centre engaged to perform the third-party monitoring. They must be submitted on request to the *Deutsches Institut für Bautechnik* and the responsible highest building supervisory board.

If the test result is unsatisfactory, the manufacturer must take the necessary measures to eliminate the defect without delay. Building products that do not comply with the requirements must be handled in such a way as to preclude confusion with those that comply. Once the defect has been eliminated, the relevant test must be repeated without delay, insofar as it is technically possible and is necessary to demonstrate that the defect has been eliminated.

2.4.3 Third-party monitoring

In each production plant, the factory production control must be checked by means of third-party monitoring on a regular basis at intervals of no longer than once every six months.

An initial test of the building products must be carried out as part of the third-party monitoring. Random tests may be carried out. It is the responsibility of the accredited centre to take samples and test them.

The tests pursuant to Appendix 3 must be carried out as part of third-party monitoring.

With regard to the fire resistance of the façade system, the guidelines for the certificate of conformity of flame-retardant building materials (building materials class DIN 4102-B1) pursuant to the construction permit shall apply accordingly.

The results of the certification and third-party monitoring must be stored for at least five years. They must be submitted on request to the *Deutsches Institut für Bautechnik* and the responsible highest building supervisory board.

3. Provisions relating to the concept, measurement

3.1 Provisions relating to the concept

Only the building products in sections 2.2.1 to 2.2.7 may be used for the façade system.

3.2 Stability survey

Evidence of the stability survey of the façade panels and their fixing to the substructure for the application pursuant to section 1 must be provided individually. The permissible values are visible in the Appendices 4 to 10.

The deflection of the façade panels must not exceed 1/100 of the open span of the panels and 1/100 of any cantilever arm that may be present.

The supporting profiles of the substructure must be vertical or arranged in such a way that no moisture can remain in the area of the bond. Only beads of adhesive that run along the full length of the façade panels may be applied.

The stability survey of the substructure and its fastening to the structure must be individually demonstrated pursuant to the Technical Building Provisions. The deflection of the substructure must not exceed 1/300 of the open span of the supporting profiles.

3.3 Thermal insulation and climatic moisture protection

DIN 4108-2 is applicable to the thermal insulation certificate.

The air layer (air space) and façade panels must be disregarded when calculating the thermal resistance (R value) under DIN EN ISO 6946 for the exterior wall design.

In the thermal insulation certificate for the insulating material used, the measured value of thermal conductivity pursuant to DIN V 4108-4²: 2007-06, table 2, category I must be used. A measured value pursuant to category II applies to insulating panels for which a threshold of λ_{limit} has been determined as part of a certificate of conformity based on a construction permit.

The thermal bridges that run through the substructure and its fastening because the thermal insulation layer has been penetrated or its thickness reduced must be taken into account.

DIN 4108-3 applies to the climatic moisture protection certificate.

3.4 Fire protection

The façade system consisting of façade panels pursuant to section 2.2.1 that are bonded to the aluminium supporting profiles using the “SikaTack® Panel” adhesive system pursuant to section 2.2.2 is flame-retardant.

3.5 Sound insulation

DIN 4109 applies to the sound insulation certificate (protection against exterior sounds).

4 Provisions relating to the execution

4.1 General

The construction permit including the appendices and the manufacturer’s installation instructions must be available near the bonding work on every building site.

Bonding may only be carried out by companies who have demonstrated their suitability pursuant to Appendix A of this construction permit.

4.2 Inspection of the building products on receipt

The containers for the cleaning agents, the primer and the adhesive and the assembly tape must be checked to ensure they are identified in accordance with this construction permit.

The façade panels must be checked to ensure that they are identified in accordance with the appropriate construction permit and comply with the specifications in the appendices to this permit.

4.3 Substructure

The substructure profiles must be as parallel and even as possible to guarantee even bonding with no secondary movement, on all profiles and over the full length of the profiles.

Welds between vertical substructure profiles must not be covered by façade panels.

4.4 Installation conditions

The bonding work may be carried out on the building site; however the work must be protected from the weather and dust. The façade panels may also be bonded to aluminium profiles in the workshop; if the work is carried out in this way, the assembly tape does not need to be applied if the dimensions of the bonded seam (see Appendix 1) are assured by other measures. In this case the façade panels with the aluminium profiles bonded in the factory must not be assembled on the building site for at least 24 hours.

² DIN V 4108-4: 2007-06

Thermal insulation and energy saving in buildings – Part 4:
Hygrothermal design values

The temperature of the components to be bonded (panels and substructure profiles) must be at least 3°C higher than the dew point temperature of the air. The relative humidity must not exceed 75%.

The air temperature during bonding must not fall below +5°C or exceed +35°C. The temperature must not fall below the minimum temperature of +5°C for 5 hours after assembly. The component temperature should not exceed 40°C for 24–48 hours after bonding.

4.5 Preparation of the bonding surface

4.5.1 Preparation of the aluminium surfaces

The surfaces to be bonded must be clean, dry and free of grease. The aluminium surface must be abraded with a scouring pad (e.g. Scotch “Brite very fine”). The surface to be bonded must then be moistened with “Sika® Aktivator-205” using a clean, grease-free and lint-free cloth and cleaned by wiping it in one direction. Wait for approximately 10 minutes then apply “SikaTack® Panel Primer” evenly to the surfaces to be bonded using a clean, grease-free and lint-free cloth. The façade panel may then be bonded no less than 30 minutes and no more than 8 hours later.

4.5.2 Preparation of the bonding surfaces on the façade panels

The façade panels must be prepared for bonding in accordance with the specifications of Appendices 4 to 10.

4.6 Bonding

4.6.1 Application of the assembly tape

The assembly tape must be rolled out to apply it to the entire length of the vertical substructure profiles parallel to their edges. The adhesive strips must not be pushed together as they serve as spaces for the adhesive bead. The cover film must be left on the adhesive strips until the all the beads of adhesive have been applied.

4.6.2 Application of the adhesive beads

The adhesive bead must be applied using the SikaTack® Panel cartridge or tubular bag with a triangular nozzle (triangular cross section of the adhesive bead: width \geq 8 mm, height \geq 10 mm) at least 5 mm away from the adhesive strips (assembly tape) and the side edge of the substructure profile (see Appendix 2).

4.6.3 Assembly of the façade panels

The cover film on the assembly tape must be removed after the adhesive has been applied and immediately before the panels are assembled.

The façade panel to be bonded must be applied to the adhesive bead in the appropriate position without the façade panel yet touching the assembly tape. Mounting angles etc., for example, must be used to ensure good positioning of the façade panels.

Only after the façade panel has been precisely positioned must contact with the adhesive strips (assembly tape) be made by pressing on the façade panels.

The panel assembly must be completed within 10 minutes of the adhesive being applied to the aluminium profiles.

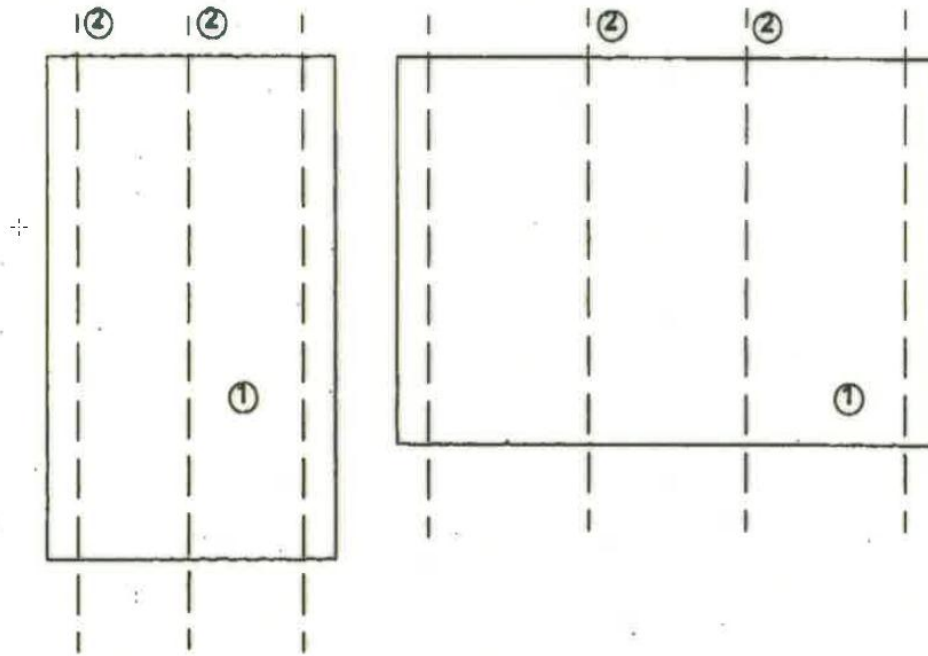
The joints between the façade panels may be left open or joint profiles may be fitted providing there is no secondary movement.

APPENDIX 1

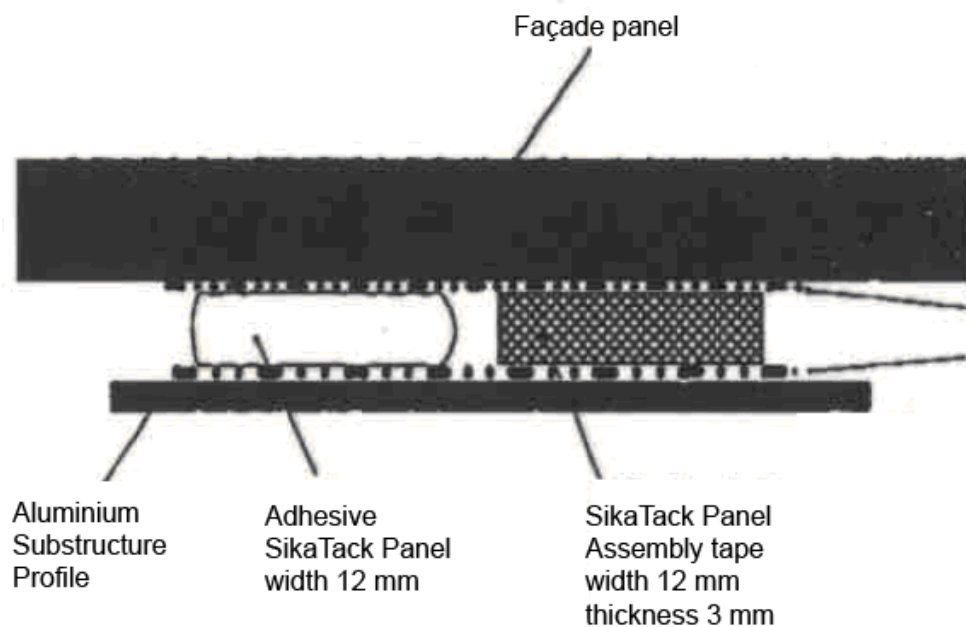
SikaTack® Panel adhesive system

Overview

Design examples for multi-span panels



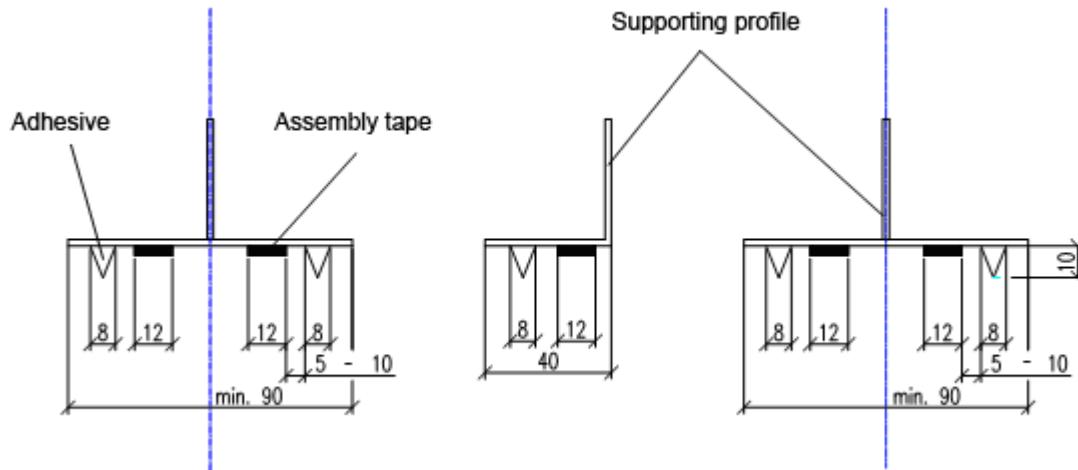
1. Façade panel (maximum panel size see Appendix 4 – 10)
2. Supporting profiles in the aluminium substructure



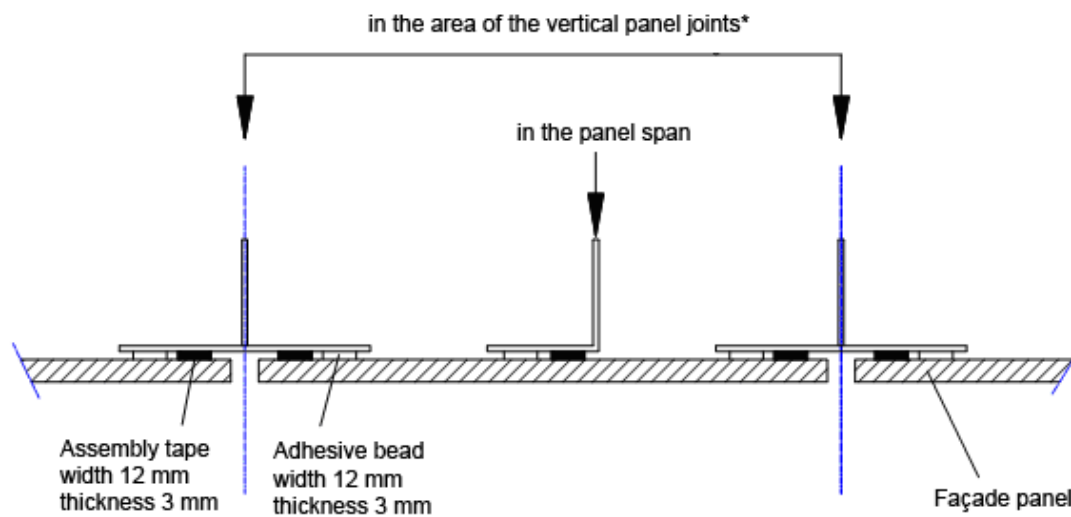
APPENDIX 2

SikaTack® Panel adhesive system Detail of adhesive connection

1. Application of the assembly tape and application of the adhesive to the supporting profiles.



2. Fixing the façade panels



Remark: *Owing to the stability survey to be carried out individually (in the area of the vertical panel joints), it may be necessary to secure adjoining panels to two separate supporting profiles.

APPENDIX 4

SikaTack® Panel adhesive system

Adhesive connection with Trespa Meteon/FR façade panels

Mechanical properties of the façade panels in accordance with the permit no. Z-33.2-17

Bending tensile strength $\geq 120 \text{ N/mm}^2$ (5% quartile with 75% confidence; across)
Coefficient of elasticity $\geq 9000 \text{ N/mm}^2$
Density = 1.42 g/cm^3

Maximum dimensions of the façade panels

Length: $L \leq 3050 \text{ mm}$
Width: $W \leq 1860 \text{ mm}$
Thickness: $t = 8 \text{ to } 13 \text{ mm}$

Preparation of the bonding surfaces of the façade panels:

The surfaces to be bonded must be clean, dry and free of grease. The bonding surface must be abraded with a scouring pad (e.g. Scotch "Brite very fine") or sandpaper with a granularity of 80. The surfaces to be bonded must then be cleaned using a clean, grease-free and lint-free cellular cloth soaked in "Sika® Aktivator-205". After approximately 10 minutes' ventilation time, apply "SikaTack® Panel Primer" thinly and evenly with a brush, roller or felt. The primer must then be left to evaporate for no less than 30 minutes and no more than 8 hours. Once the primer has been applied, prevent any contamination with dust or grease.

Permissible load capacity values

Adhesive bond (Façade panel / SikaTack® Panel adhesive / Profile sub construction)

- applied width of the adhesive joint: 12 mm
- design resistance for tensile loads: 0.30 N/mm^2
(permissible tensile stress: 0.20 N/mm^2)
- design resistance for shear loads: 0.20 N/mm^2
(permissible shear stress: 0.15 N/mm^2)
- maximum permissible shear deformation: 1 mm

Trespa Meteon/FR façade panels

- design resistance for bending: 27 N/mm^2
(permissible bending stress: 18 N/mm^2)

APPENDIX 5

SikaTack® Panel adhesive system Adhesive connection with Resoplan F façade panels

Mechanical properties of the façade panels in accordance with the permit no. Z-33.2-11

Bending tensile strength $\geq 80 \text{ N/mm}^2$ (5% quartile with 75% confidence; across)
Coefficient of elasticity $\geq 9000 \text{ N/mm}^2$ (across)
Density = 1.45 g/cm^3

Maximum dimensions of the façade panels

Length: $L \leq 3660 \text{ mm}$
Width: $W \leq 1525 \text{ mm}$
Thickness: $t = 8 \text{ to } 12 \text{ mm}$

Preparation of the bonding surfaces of the façade panels:

The surfaces to be bonded must be clean, dry and free of grease. The bonding surface must be abraded with a scouring pad (e.g. Scotch "Brite very fine") or sandpaper with a granularity of 80. The surfaces to be bonded must then be cleaned using a clean, grease-free and lint-free cellular cloth soaked in "Sika® Aktivator-205". After approximately 10 minutes' ventilation time, apply "SikaTack® Panel Primer" thinly and evenly with a brush, roller or felt. The primer must then be left to evaporate for no less than 30 minutes and no more than 8 hours. Once the primer has been applied, prevent any contamination with dust or grease.

Permissible load capacity values

Adhesive bond (Façade panel / SikaTack® Panel adhesive / Profile sub construction)

- applied width of the adhesive joint: 12 mm
- design resistance for tensile loads: 0.30 N/mm^2
(permissible tensile stress: 0.20 N/mm^2)
- design resistance for shear loads: 0.20 N/mm^2
(permissible shear stress: 0.15 N/mm^2)
- maximum permissible shear deformation: 1 mm

Resoplan F façade panels

- design resistance for bending: 27 N/mm^2
(permissible bending stress: 18 N/mm^2)

APPENDIX 6

SikaTack® Panel adhesive system Adhesive connection with Max Exterior façade panels

Mechanical properties of the façade panels in accordance with the permit no. Z-33.2-16

Bending tensile strength $\geq 80 \text{ N/mm}^2$ (5% quartile with 75% confidence; across)

Coefficient of elasticity $\geq 9000 \text{ N/mm}^2$ (across)

Density = 1.40 g/cm^3

Thermal coefficient of expansion: $8.9 \cdot 10^{-6} \text{ K}^{-1}$ (longitudinal); $21.3 \cdot 10^{-6} \text{ K}^{-1}$ (across)

Maximum dimensions of the façade panels

Length: $L \leq 3750 \text{ mm}$

Width: $W \leq 1300 \text{ mm}$

Thickness: $t = 8 \text{ to } 10 \text{ mm}$

Preparation of the bonding surfaces of the façade panels:

The surfaces to be bonded must be clean, dry and free of grease. The bonding surface must be abraded with a scouring pad or sandpaper with a granularity of 80 and cleaned using a clean, grease-free and lint-free cellular cloth soaked in "Sika® Aktivator-205". After 10 minutes' ventilation time, apply "SikaTack® Panel Primer" to the surfaces to be bonded thinly and evenly with a brush, roller or felt. The primer must then be left to evaporate for no less than 30 minutes and no more than 8 hours. Once the primer has been applied, prevent any contamination with dust or grease.

Permissible load capacity values

Adhesive bond (Façade panel / SikaTack® Panel adhesive / Profile sub construction)

- applied width of the adhesive joint: 12 mm
- design resistance for tensile loads: 0.30 N/mm^2
(permissible tensile stress: 0.20 N/mm^2)
- design resistance for shear loads: 0.20 N/mm^2
(permissible shear stress: 0.15 N/mm^2)
- maximum permissible shear deformation: 1 mm

Max Exterior façade panels

- design resistance for bending: 27 N/mm^2
(permissible bending stress: 18 N/mm^2)

APPENDIX 7

SikaTack® Panel adhesive system Adhesive connection with “Eternit Façade Boards”

Mechanical properties of the “Eternit Boards” in accordance with the permit no. Z-31.1-34

Min. bending tensile strength:	24 N/mm ² (longitudinal) 17 N/mm ² (across)
Coefficient of elasticity:	15000 N/mm ²
Density:	$\rho = 1.65 \text{ g/cm}^3$
Dead load (calculated values)	0.18 kN/m ² (for 8 mm thick boards) 0.23 kN/m ² (for 10 mm thick boards) 0.28 kN/m ² (for 12mm thick boards)
Thermal coefficient of expansion	$10 \cdot 10^{-6} \text{ K}^{-1}$

Maximum dimensions of the façade panels

Width x Length:	≤ 1500 mm x 3100 mm
Thickness:	8 to 12 mm

Preparation of the bonding surfaces of the façade panels:

The surfaces to be bonded must be clean, dry and free of grease. The bonding surface must be abraded with a scouring pad (e.g. Scotch “Brite very fine”) or sandpaper with a granularity of 80. **The seal on the surface of the fibre cement board to be bonded must be completely sanded off.** The surfaces to be bonded must then be cleaned using a clean, grease-free and lint-free cellular cloth soaked in “Sika® Aktivator-205”. After 10 minutes’ ventilation time, apply “SikaTack® Panel Primer” thinly and evenly with a brush, roller or felt. The primer must then be left to evaporate for no less than 30 minutes and no more than 8 hours. Once the primer has been applied, prevent any contamination with dust or grease.

Permissible load capacity values

Adhesive bond (Façade panel / SikaTack® Panel adhesive / Profile sub construction)

- applied width of the adhesive joint: 12 mm
- design resistance for tensile loads: 0.30 N/mm²
(permissible tensile stress: 0.20 N/mm²)
- design resistance for shear loads: 0.20 N/mm²
(permissible shear stress: 0.15 N/mm²)
- maximum permissible shear deformation: 1 mm

Eternit façade panels

- design resistance for bending: 9 N/mm²
(permissible bending stress: 6.0 N/mm²)

APPENDIX 8

SikaTack® Panel adhesive system

Adhesive connection with Rieder fibreC façade panels

Mechanical properties of the GFRC façade boards in accordance with the permit no. Z-31.4-166

Bending tensile strength, Coefficient of elasticity, Thermal coefficient of expansion,
Dead load: see construction permit no. Z-31.4-166

Maximum dimensions of the GFRC façade boards “Rieder fibreC”

Width x Length: ≤ 1250 mm x 3600 mm
Thickness: 13 mm

Preparation of the bonding surfaces of the façade panels:

The surfaces to be bonded must be clean, dry and free of grease. They must be abraded with a scouring pad or sandpaper with a granularity of 80 and then any dust removed. Then apply “SikaTack® Panel Primer” to the surfaces to be bonded thinly and evenly with a brush, roller or felt. The primer must then be left to evaporate for no less than 30 minutes and no more than 8 hours. Once the primer has been applied, prevent any contamination with dust or grease.

Permissible load capacity values

Adhesive bond (Façade panel / SikaTack® Panel adhesive / Profile sub construction)

- applied width of the adhesive joint: 12 mm
- design resistance for tensile loads: 0.30 N/mm²
(permissible tensile stress: 0.20 N/mm²)
- design resistance for shear loads: 0.20 N/mm²
(permissible shear stress: 0.15 N/mm²)
- maximum permissible shear deformation: 1 mm

GFRC façade boards “Rieder fibreC” (see permit no. Z-31.4-166)

- design resistance for bending:
valid for 13 mm thick panels “fibre C” with white cement: 6.2 N/mm²
valid for 13 mm thick panels “fibre C” with grey cement: 7.4 N/mm²

APPENDIX 9

SikaTack® Panel adhesive system

Adhesive connection with “ALUCOBOND plus” and “ALUCOBOND A2” façade boards

Mechanical properties of the “ALUCOBOND plus” and “ALUCOBOND A2” façade boards (aluminium sandwich)

Bending tensile strength, section modulus, permissible strength and dead load: see permit no. Z-33.2-6

Coefficient of elasticity 70000 N/mm²

Thermal coefficient of expansion: 23 10⁻⁶ K⁻¹

Backside of the ALUCOBOND panels:

In combination with the SikaTack® Panel adhesive system it is allowed only to use “ALUCOBOND plus” and “ALUCOBOND A2” sandwich panels where the back side (side which should be bonded) is factory made blank, coated with epoxy primer or with polyester finish.

Maximum dimensions of the façade panels

Length:	$L \leq 3.0$ m
Width:	$W \leq 1.5$ m
Thickness of the façade panel:	3 or 4 mm
Thickness of the aluminium layer:	on each side 0.5 mm

Preparation of the surfaces of the “ALUCOBOND plus” and “ALUCOBOND A2” sandwich boards:

The surfaces of the ALUCOBOND sandwich panel must be clean, dry and free of grease. The bonding surface must be abraded with a scouring pad (e.g. Scotch “Brite very fine”) and cleaned using a clean, grease-free and lint-free cellular cloth soaked in “Sika® Aktivator-205”. After 10 minutes ventilation time, apply “SikaTack® Panel Primer” to the surfaces to be bonded thinly and evenly with a brush, roller or felt. The primer must then be left to evaporate for no less than 30 minutes and no more than 8 hours. Once the primer has been applied, prevent any contamination with dust or grease.

Permissible load capacity values

Adhesive bond (Façade panel / SikaTack® Panel adhesive / Profile sub construction)

- applied width of the adhesive joint: 12 mm
- design resistance for tensile loads: 0.30 N/mm²
(permissible tensile stress: 0.20 N/mm²)
- design resistance for shear loads: 0.20 N/mm²
(permissible shear stress: 0.15 N/mm²)
- maximum permissible shear deformation: 1 mm

“ALUCOBOND plus” and “ALUCOBOND A2” sandwich boards

- design resistance for bending: 79.5 N/mm²
(permissible bending stress: 53 N/mm²)

APPENDIX 10

SikaTack® Panel adhesive system Adhesive connection with Metawell façade element BK

Properties of the façade panel

For the mechanical properties of the Metawell façade element BK see construction permit no. Z-33.2-889.

In combination with the SikaTack® Panel adhesive system only Metawell façade element BK (Metawell façade elements with covered edges) with a maximum dimension of 1.50 m x 4.30 m are allowed.

The bonding surface of the Metawell façade element BK must be primed (hard lacquer coated) original factory made. Metawell façade element BK with other coatings on the bonding surface are not allowed for bonding.

Preparation of the bonding surfaces of the Metawell façade element BK:

The surfaces to be bonded of the Metawell façade element BK (with factory applied primer coat) must be clean, dry and free of grease. The bonding surface must be cleaned using a clean, grease-free and lint-free cellular cloth soaked in “Sika® Aktivator-205”. The bonding of the elements must be started in no more than 8 hours after pre-treatment. Once the activator has been applied, prevent any contamination with dust or grease.

Permissible load capacity values

Adhesive bond (Façade panel / SikaTack® Panel adhesive / Profile sub construction)

- applied width of the adhesive joint: 12 mm
- design resistance for tensile loads: 0.30 N/mm²
(permissible tensile stress: 0.20 N/mm²)
- design resistance for shear loads: 0.20 N/mm²
(permissible shear stress: 0.15 N/mm²)
- maximum permissible shear deformation: 1 mm

Metawell façade element BK (see permit no. Z-33.2-889)

Design resistance for bending = 1.50 x permissible bending stress according to Z-33.2-889; $\gamma_F = 1.50$: partial safety factor for variable actions out of wind loads

APPENDIX A - Page 1 -

Guideline for the demonstration of suitability for the installation companies which are instructed with the bonding application on site

1 General

The demonstration of suitability comprises the initial check of the operation, its staff and practical suitability tests by a specific test centre accredited by the building authorities. Suitability is deemed to have been demonstrated if the operation can provide a certificate issued by this test centre on its suitability to bond façade panels to aluminium substructures.

The certificate is issued for 5 years and may be revoked. The validity of the certificate may be extended for 5 years at a time on application. Prior to any extension, it must be demonstrated to the test centre that the conditions of the construction permit have been complied with and that the responsible specialists have carried out several bonding operations over the course of the past years. If no bonding operations were carried out, the suitability tests must be repeated.

The certificate holder must notify the test centre of any change in responsible specialists.

2 Initial check

2.1 Goals of the initial check

The initial check by the test centre serves to ascertain whether the conditions exist in terms of staff and equipment for proper bonding and self-monitoring to be carried out.

2.2 Check of staff qualifications

The operation must have site specialists with particular knowledge of the preparation of surfaces and using adhesives.

The qualification of the site specialists must be demonstrated by certification by the accredited test centre (e.g. attendance at a training course by the manufacturer of the adhesive system and poss. the façade panels with subsequent verification by the accredited test centre).

Check of equipment in the operation

During the initial assessment, the test centre assesses the completeness and maintenance condition of the tools, test devices etc, required to work in accordance with this construction permit. The test centre checks the operation's self-monitoring procedure for completeness and compliance with the requirements of this construction permit.

3 Suitability tests

The following tests will be performed by the staff who will actually perform the work under the supervision of the test centre and under site conditions.

The suitability test can be repeated as a whole.

Guideline for the demonstration of suitability for the installation companies which are instructed with the bonding application on site

3.1 Fixing a façade panel

A façade panel with dimensions 0.6 m x 0.9 m will be fixed to a vertical wall with an installed aluminium substructure.

The substructure must be aligned and the façade panels bonded to an L-shaped frame with the planned joints pursuant to the permit.

The bonding work must be carried out taking account of the relevant sections of this construction permit.

The self-monitoring report and the records of the staff performing the work must be checked.

3.2 Assessment of the bonding

Once the adhesive has cured, the fixing of the façade panels is checked.

For assessing the quality of the bonding the following parameters have to be checked: application of the adhesive (cavities, width of the adhesive bead, etc.), adhesion of the adhesive on the material surfaces and the load capacity of the adhesive.

The qualitative assessment of the bonding application work will be done after curing of the adhesive on one joint of each panel. The joint must be inspected for air bubbles by making cuts in the adhesive joint parallel to the panel over the whole length. For the qualitative assessment of adhesion peel tests must be done. The cavities must not exceed 10% of the area on visual inspection.

For the quantitative evaluation of the load bearing capacity of the adhesive, minimum three samples with a length of 100 mm must cut out of the panel and must be tested with a tensile test up to break under consideration of a testing speed of 5 mm/min. Adhesion loss is not allowed. The strength requirement according to Appendix 3 must be considered.

4 Report

The test centre will issue the operation with a certificate of suitability for the application of façade panels bonded on aluminium substructure according to the permit providing this has been demonstrated. A copy of this certificate and the corresponding assessment report must be sent to the *Deutsches Institut für Bautechnik*.