DIBt

Licensing body for construction products and construction types
Civil engineering testing body
An institution under public law jointly sponsored by the federal government and the German federal states

Member of the EOTA\(^2\), the UEAtc\(^3\) and the WFTAO\(^4\)

Date:
17.06.2013

Ref.
IL 13-1.10.9-459/1

Type approval number:
Z-10.9-459

Period of validity
from: 17 June 2013
to 17 June 2018

Subject of approval:
"BEMO-TEKOFIX" wall bracket made of glass-fibre reinforced plastic for use on hung rear-ventilated façades

The above-named subject of approval is hereby granted national technical approval (allgemeine bauaufsichtliche Zulassung). This national technical approval comprises nine pages and five Annexes comprising twelve pages.

[round stamp: Deutsches Institut für Bautechnik, 13]

[DIBt address details]

[signature(s)]

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\(^1\) Translator’s note: German Institute for Civil Engineering (DIBt)

\(^2\) Translator’s note: European Organisation for Technical Approvals

\(^3\) Translator’s note: European network of independent institutes, centres or organisations that are engaged in the issue of technical approvals for innovative construction products or systems

\(^4\) Translator’s note: World Federation of Technical Assessment Organisations

I hereby certify that this translation is a true and correct translation of a copy of the German original.

Freiburg, 16th August 2013

Katherina Polig (sworn translator and interpreter for the courts of Baden-Württemberg, Germany)
I GENERAL CONDITIONS

1. The national technical approval verifies the usability or applicability of the subject of approval in accordance with the building regulations (Landesbauordnungen) of the German federal states.

2. Where the national technical approval places requirements on the specific expertise and experience of persons entrusted with the manufacture of construction products and construction types in accordance with the regulations of the German federal states corresponding to Article 17 section 5 of the Model Building Code (Musterbauordnung), it must be ensured that this expertise and experience can also be verified by equivalent certificates of other member states of the European Union. This shall also apply, where applicable, to equivalent certificates submitted in accordance with the Agreement on the European Economic Area (EEA) or other bilateral agreements.

3. The national technical approval does not replace the legally required authorisations, approvals and certifications for carrying out construction projects.

4. The national technical approval is granted without prejudice to the rights of third parties, particularly private intellectual property rights.

5. Manufacturers and distributors of the subject of approval must, without prejudice to additional regulations in the “Special conditions”, provide the user or operator of the subject of approval with copies of the national technical approval and point out to them that the national technical approval must be available at the site of use. The public authorities concerned must be provided with copies of the national technical approval on request.

6. The national technical approval must be duplicated only in its entirety. Publication of extracts requires the approval of the Deutsches Institut für Bautechnik. Text and drawings in advertising materials must not contradict the national technical approval. Translations of the national technical approval must contain the note “This translation of the German original document has not been verified by the Deutsches Institut für Bautechnik”.

7. The national technical approval may be withdrawn. The provisions of the national technical approval can be subsequently supplemented and amended, particularly where this is required by new technical findings.

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SPECIAL CONDITIONS

1 Subject of approval and area of application
The national technical approval applies to the "BEMO-TEKOFIX" wall brackets made of glass-fibre-reinforced polyamide and their fastening to aluminium profiles by means of specified blind rivets and self-drilling screws on hung rear-ventilated external wall claddings as per DIN 18516-1.
The wall brackets are made of injection-moulded components with a bracket base and a web with strengthening ribs. The bracket base is 5 mm thick and 80 mm wide. The web is 4 mm thick and has a length (overhang) of 100 mm, 150 mm, 200 mm, 250 mm, 300 mm or 350 mm. The height of the wall brackets is 100 mm, 200 mm or 300 mm.
Approved anchoring devices must be used to anchor the wall brackets to the load-bearing substrate.
The "BEMO-TEKOFIX" wall brackets are normally flammable.
Dependent on the design of the façade system the "BEMO-TEKOFIX" wall brackets may be used as a component of the substructure in exterior wall claddings to which either the "normally flammable" or "not easily flammable" requirement applies, as prescribed by the fire safety regulations of the German federal states.
The permitted area of application is determined by the verification of structural stability unless the applicable fire safety regulations of the German federal states impose further restrictions.
The verification of structural stability for the cladding elements (cladding panels), the substructure profiles and the anchoring devices falls outside the scope of this national technical approval.

2 Conditions for the construction products

2.1 General points
The wall brackets must meet the above special conditions of this national technical approval and the requirements set out in the Annexes as well as the specifications lodged with the Deutsches Institut für Bautechnik.

2.2 Properties and composition

2.2.1 Wall brackets
The "BEMO-TEKOFIX" wall brackets in Annex 1 must be constructed of glass-fibre-reinforced polyamide (base material Ultramid® A3WG10, polyamide PA 66, manufactured by BASF SE). They must have the dimensions specified in Annex 2.1 to 2.8 and have the following material properties:
- Glass content: 46 to 52% mass fraction
- Tensile strength: 83.6 MPa
- Tensile modulus of elasticity: 7053 MPa
The wall brackets must meet the requirements of building material class B2 as per DIN 4102-1:1998-05, section 0.2.
The composition of the "BEMO-TEKOFIX" wall brackets must meet the specifications lodged with the Deutsches Institut für Bautechnik, DIBt.

[round stamp: Deutsches Institut für Bautechnik, 13]
2.2.2 Fasteners

The following fasteners may be used to fasten the wall brackets to the substructure profiles:

- Blind rivets “BWM Spezialniete SNA 5 x 12 K14” as specified in the test certificate No. P-OGI-lI-2.17.1 issued by the general building supervisory authority (manufacturer: BWM)
- Self-drilling screws “SL5/4-6-S4-6x19” or “SLA5/6-8-S4-6x21” as specified in the test certificate No. P-BWU02-118009 issued by the general building supervisory authority (manufacturer: SFS Intec)
- Self-drilling screws “JT4-3H/5-5,5x19”, “JT4-3H/5-5,5x20”, “JT9-3H/5-5,5x19” or “JT9-3H/5-5,5x20” as specified in the test certificate No. P-BWU02-118016 issued by the general building supervisory authority (manufacturer: EJOT)

2.2.3 Anchoring devices

A national technical approval or a European technical approval must be held for the anchoring devices used to fasten the wall brackets to the load-bearing substrate (wall). Anchoring devices with a diameter of at least 10 mm must be used. Washers (sheet thickness ≥1 mm) made of stainless steel with an external diameter of at least 20 mm must be used unless washers meeting these specifications are an integral part of the anchoring devices used. The specifications relating to corrosion protection in DIN 18516-1, section 7.1.3 must be complied with.

2.2.4 Substructure profiles

The substructure profiles to which the wall brackets are fastened must be made of the aluminium alloy EN AW 6063 T66 as per DIN EN 755-2 and have a profile thickness of at least 2 mm.

2.3 Manufacture and labelling

2.3.1 Manufacture

The “BEMO-TEKOFIX” wall brackets are to be manufactured in the factory.

2.3.2 Labelling

The “BEMO-TEKOFIX” wall brackets must be marked by the manufacturer with the conformity mark (U-marking) in accordance with the conformity mark ordinances of the German federal states. Alternatively, the U-marking may be applied to the packaging or the delivery note.

The following information must also be added:

- “BEMO-TEKOFIX”
- Dimensions: height and length (overhang)
- Building material class B2 as per DIN 4102-1

The wall brackets must not be labelled unless the requirements in section 2.4 Certificate of conformity have been complied with.

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1 DIN 18516-1:2010-06

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Freiburg, 16th August 2013

Katherina Pollig (sworn translator and interpreter for the courts of Baden-Württemberg, Germany)
2.4 Certificate of conformity

2.4.1 Verification of conformity by certification

A certificate of conformity must be held for each manufacturing plant to confirm that the "BEMO-TEKOFIX" wall brackets described in section 2.2.1 comply with the conditions of this national technical approval. The certificate of conformity must be based on in-house production checks and regular external monitoring including an initial test of the wall brackets which meets the conditions set out below.

The manufacturer of the wall brackets must engage a recognised certification body and a recognised external monitoring body to issue the certificate of conformity and carry out the external monitoring, including the associated product testing.

The manufacturer must indicate that a certificate of conformity has been awarded by marking the construction products with the conformity mark (U-marking) and indicating the designated use.

If the applicant is not also the manufacturer of the wall brackets, they must ensure that the terms of the contract stipulate that the wall brackets must undergo in-house production checks and external monitoring complying with the conditions under which approval was granted.

The certification body is to provide for information purposes a copy of the conformity certificate to the Deutsches Institut für Bautechnik and the highest construction supervisory authority of the German federal state in which the manufacturing plant is located.

In addition, the Deutsches Institut für Bautechnik is to be provided with a copy of the first test report for information.

2.4.2 In-house production checks

In-house production checks must be set up and carried out in every manufacturing plant. The term 'in-house production checks' means the continuous monitoring of production which must be undertaken by the manufacturer to ensure that the construction products they manufacture comply with the conditions of this national technical approval.

The in-house production checks must include as a minimum the tests set out in Annex 5.

The results of the in-house production checks must be recorded and evaluated. The records must contain as a minimum the following information:

- Description of the construction product or base material and components
- Type of checks or test
- Date of manufacture and testing of the construction product or base material
- Results of the checks and testing and, where relevant, comparison with the requirements
- Signature of the person responsible for the in-house production checks

The records must be retained for at least five years and submitted to the monitoring body engaged to carry out external monitoring. The records must also be submitted to the Deutsches Institut für Bautechnik and the responsible highest construction supervisory authority on request.

If the test results are unsatisfactory, the manufacturer must take the necessary measures to rectify the defect immediately. Construction products that do not meet the requirements must be handled in such a way as to ensure that they cannot be confused with conforming products. After the defect has been rectified, the relevant test should be repeated immediately provided this is technically possible and is necessary to prove that the defect has been rectified.

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2.4.3 External monitoring

The in-house production checks in every manufacturing plant producing “BEMO-TEKOFIX” wall brackets must be monitored regularly by an external company at least twice a year.

Initial testing of the wall brackets must be carried out as part of the external monitoring. The tests described in section 2.4.2 must be carried out each time. Samples may also be taken for random sampling. In each case the recognised monitoring body is responsible for carrying out the sampling and testing.

In addition, the fire behaviour of the wall brackets must be tested as per DIN 4102-1, section 6.2.

The results of the certification and external monitoring must be retained for at least five years. The results must also be submitted on request to the Deutsches Institut für Bautechnik and the responsible highest construction supervisory authority.

3 Conditions for design and dimensioning

3.1 General points

The verification of structural stability of the cladding elements (cladding panels), the substructure profiles and the anchoring devices falls outside the scope of this national technical approval. Verification of these items is to be provided on a project by project basis in accordance with the approvals as amended or the 'Technical building regulations' introduced by the building supervisory authorities.

The installation of the “BEMO-TEKOFIX” wall brackets must be planned in compliance with the conditions of this national technical approval, and standard engineering practice.

The following descriptions of the wall brackets as fixed point, sliding point and sliding point in the joint area refer to the type of rivet or screw fastening on the aluminium substructure profile (see Annex 3.1 to 3.3):

- Fixed point (see Annex 3.1):
  - Fastening of a wall bracket to an aluminium profile with 2 fasteners fitted in round holes in the web of the bracket.
- Sliding point (see Annex 3.2):
  - Fastening of a wall bracket to an aluminium profile with 2 fasteners fitted in oblong holes in the web of the bracket.
- Sliding point in the joint area (see Annex 3.3):
  - Fastening of a wall bracket in the joint area of the aluminium profiles with 4 fasteners (2 fasteners for each aluminium profile) fitted in oblong holes in the web of the bracket.

100 mm high wall brackets must be anchored to the substrate by 1 anchoring device and 200 mm and 300 mm wall brackets must be anchored by 2 symmetrically arranged anchoring devices (see Annex 3.1 to 3.3).

The exterior cladding and the substructure must be constructed in such a way as to allow for the expansion of the aluminium profiles (it must be ensured by means of fixed and sliding points that the aluminium profiles can expand concordantly because of temperature changes).

There must be no horizontal loading on the wall brackets in the façade plane.

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See www.dibt.de section: <Fields of activity>, Sub-sections: <Building rules lists/Technical building regulations>
In choosing the spans and the cantilever arms of the substructure profiles care must be taken to ensure that the brackets are not exposed to any significant additional stresses because of the different deflections of the support profiles. The fasteners of a wall bracket must be arranged symmetrically as in Annex 3.1 to 3.3. The anchoring devices must also be fitted as in Annex 3.1 to 3.3.

3.2 Verification of structural stability

The structural stability of the “BEMO-TEKOFIX” wall brackets as specified in section 2.2.1 and their fastening by rivets or screws as specified in section 2.2.2 to aluminium profiles as specified in section 2.2.3 must be verified on a project by project basis for the area of application specified in section 1, taking into account the effects of dead load and wind loads and the rated values of the building component resistance named below.

\[ E_d \leq R_d \] must be satisfied where

- \( E_d \): The rated value of the effect
- \( R_d \): The rated value of the building component resistance

\[ E_d = \gamma_F \times E_k \] with

- \( E_k \): Characteristic value of the effect as prescribed by the technical building regulations introduced by the building supervisory authorities
- \( \gamma_F \): Partial safety factor of the effect in accordance with the technical building regulations introduced by the building supervisory authorities (where \( \gamma_F = 1.5 \) for wind loads and \( \gamma_F = 1.35 \) for dead loads)

\[ R_d = R_k / (\gamma_m \times A_{mod}) \]

- \( R_k \): Characteristic value of the building component resistance as in Table 1;
- \( \gamma_m = 1.5 \): Material-related partial safety factor
- \( A_{mod} = A_1 \times A_2 \times A_3 \times A_4 \) (modification factor)

Reduction factors: \( A_1 \): effect of the duration of the load effect, \( A_2 \): effect of media, \( A_3 \): effect of temperature, \( A_4 \): effect of the manufacturing process

\( A_{mod} = 1.6 \) must be applied to determine the rated value of the building component resistance under wind load, or \( A_{mod} = 2.88 \) to determine the rated value of the building component resistance under dead load.

Both the failure of the fastening between the wall bracket and the aluminium profile of the substructure and the failure of the wall bracket were taken into account in determining the resistance values in Table 1.

[round stamp: Deutsches Institut für Bautechnik, 13]
Table 1: Characteristic values of the building component resistance

<table>
<thead>
<tr>
<th>Dimensions of the wall bracket</th>
<th>Type of fastening</th>
<th>Characteristic values $R_u$ [kN] for</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Suction (wind suction)</td>
<td>Pressure (wind pressure)</td>
</tr>
<tr>
<td>Height H [mm]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>Fixed point</td>
<td>5.4</td>
</tr>
<tr>
<td></td>
<td>Sliding point</td>
<td>4.6</td>
</tr>
<tr>
<td></td>
<td>Fixed point</td>
<td>4.7</td>
</tr>
<tr>
<td></td>
<td>Sliding point</td>
<td>5.0</td>
</tr>
<tr>
<td>200</td>
<td>Fixed point</td>
<td>5.4</td>
</tr>
<tr>
<td></td>
<td>Sliding point</td>
<td>5.4</td>
</tr>
<tr>
<td></td>
<td>Sliding point in the joint area</td>
<td>10.0</td>
</tr>
<tr>
<td></td>
<td>Fixed point</td>
<td>5.4</td>
</tr>
<tr>
<td></td>
<td>Sliding point</td>
<td>5.4</td>
</tr>
<tr>
<td></td>
<td>Sliding point in the joint area</td>
<td>8.8</td>
</tr>
<tr>
<td>300</td>
<td>Fixed point</td>
<td>5.4</td>
</tr>
</tbody>
</table>

* In determining the characteristic values under lateral forces the acting dead load was taken into account as a single load on the end of the cantilever arm (length of cantilever $L$).

In extending the length of the bracket as in Annex 4 the values must be reduced by the factor $L_v / L$ where $L_v = $ length of the plastic part and $L_v = $ the total length of the cantilever arm including the web extension.

The following conditions must be met where there is an overlap of tensile and lateral forces (or compressive and lateral forces) on the fixed points:

$$ \frac{F_{tu}}{R_{tu}} \text{ tensile force/pressure} + \frac{F_{lu}}{R_{lu}} \text{ lateral force} \leq 1.0 $$

3.3 Fire behaviour

The “BEMO-TEKOFIX” wall brackets are normally flammable.

The wall brackets may be used on exterior wall claddings to which the “normally flammable” requirement as prescribed by the fire safety regulations of the German federal states applies.

In addition, the wall brackets may be used on exterior wall claddings to which the “not easily flammable” requirement as prescribed by the fire safety regulations of the German federal states applies, provided the conditions in section 4.2 are complied with.

4 Conditions for fitting the wall brackets

4.1 General points

The wall brackets together with the fasteners, the anchoring devices and the support profiles of the substructure as in section 2.2 must be used only for the area of application described in section 1 and in compliance with the planning provisions (see section 3).

The support area for the wall brackets must be flat. The conditions for the approvals for the anchoring devices must be observed.

[round stamp: Deutsches Institut für Bautechnik, 13]
4.2 Additional conditions for fitting wall brackets to exterior wall claddings that are not easily flammable

The wall brackets may be fitted to exterior wall claddings to which the "not easily flammable" requirement applies provided all the following conditions are met:
- The façade cladding is composed of regulated or approved cladding panels which are either not easily flammable or non-combustible.
- The conditions of the sample list of the Technical building regulations, Part 1, Annex 2.6/4 to the DIN standard 18516-1 have been complied with and, notwithstanding this, fire barriers have been constructed on every floor.
- The thermal insulation layer is composed of non-combustible mineral wool insulation boards as per DIN EN 13162 with the following properties:
  - Fire behaviour: Class A1 as per DIN EN 13501-1 or DIN 4102-1;
  - Melting point > 1,000°C as per DIN 4102-17
  - Bulk density ≥ 40 kg/m²
  - Maximum thickness: 360 mm
- The depth of the rear ventilation gap is restricted to a maximum of 65 mm; notwithstanding this, the gap may be increased to a maximum of 100 mm provided the wall brackets are constructed as in Annex 4.
- A maximum of 5 wall brackets per m² of wall surface may be fitted.

Manfred Klein
Head of division

[signature]

Certified

[round stamp: Deutsches Institut für Bautechnik, 13]
<table>
<thead>
<tr>
<th>Verankerungsmittel</th>
<th>Anchoring device</th>
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<tr>
<td>Verbindungsmittel</td>
<td>Fastener</td>
</tr>
<tr>
<td>Wandhalter “BEMO-TEKOFIX” Festpunkt</td>
<td>Fixed point on “BEMO-TEKOFIX” wall bracket</td>
</tr>
<tr>
<td>Tragprofil der Unterkonstruktion</td>
<td>Support profile of the substructure</td>
</tr>
<tr>
<td>Wandhalter “BEMO-TEKOFIX” Gleitpunkt</td>
<td>Sliding point on “BEMO-TEKOFIX” wall bracket</td>
</tr>
<tr>
<td>Fassadenplatte</td>
<td>Cladding panel</td>
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</tbody>
</table>

[isometric projection]

“BEMO-TEKOFIX” wall bracket made of glass-fibre-reinforced plastic for use on hung rear-ventilated façades

Annex 1
Verankerungsmittel

Verbindungsmittel

Wandhalter "BEMO-TEKOFIX" Festpunkt

Trapezprofil der Unterkonstruktion

Wandhalter "BEMO-TEKOFIX" Gleitpunkt

Fassadenplatte

Wandhalter "BEMO-TEKOFIX" aus glasfaserverstärktem Kunststoff zur Verwendung bei vorgehängten hinterlüfteten Fassaden

Isométrische Darstellung

Anlage 1
For the purpose of this translation, a table showing the German and the corresponding English terms is used for the reader's convenience; the German original does not contain this table.

<table>
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<td>Lochung Konsolenfuß</td>
<td>Perforation on base of bracket</td>
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</tbody>
</table>

[drawings]

[round stamp: Deutsches Institut für Bautechnik, 13]

"BEMO-TEKFIX" wall bracket made of glass-fibre-reinforced plastic for use on hung rear-ventilated façades

Wall bracket, overhang 100 mm

Annex 2.1

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Katherina Polig (sworn translator and interpreter for the courts of Baden-Württemberg, Germany)
Allgemeine bautechnische Zulassung
Nr. 2-10.8-488 vom 17. Juni 2013

Wandhalter "BEMO-TEKOFIX" aus giesfaserverstärktem Kunststoff zur Verwendung bei vorgehängten hinterlüfteten Fassaden

Wandhalter, Ausladung 100 mm

Anlage 2.1
National technical approval
No. Z-10.9-459 of 17 June 2013

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[drawings]

[round stamp: Deutsches Institut für Bautechnik, 13]

"BEMO-TEKOFIX" wall bracket made of glass-fibre-reinforced plastic for use on hung rear-ventilated façades

| Wall bracket, overhang 150 mm |

Annex 2.2

Katherina Polig (sworn translator and interpreter for the courts of Baden-Württemberg, Germany)
Wandhalter "BEMO-TEKOFIX" aus glasfaserverstärktem Kunststoff zur Verwendung bei vorgehängten hinterlüfteten Fassaden

Wandhalter, Ausladung 150 mm

Anlage 2.2
National technical approval
No. Z-10.9-459 of 17 June 2013

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[drawings]

[round stamp: Deutsches Institut für Bautechnik, 13]

*BEMO-TEKOFIX* wall bracket made of glass-fibre-reinforced plastic for use on hung rear-ventilated façades

Wall bracket, overhang 200 mm

Annex 2.3

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Freiburg, 16th August 2013
Katherina Polig (sworn translator and interpreter for the courts of Baden-Württemberg, Germany)
Wandhalter "BEMO-TEKOFIX" aus glasfaserverstärktem Kunststoff zur vorgestięgten hinterlüfteten Fassaden

Wandhalter, Ausladung 200 mm

Anlage 2.3
National technical approval
No. Z-10.9-459 of 17 June 2013

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[drawings]

[round stamp: Deutsches Institut für Bautechnik, 13]

*BEMO-TEKOFIX* wall bracket made of glass-fibre-reinforced plastic for use on hung rear-vented façades

Wall bracket, overhang 250 mm

Annex 2.4
Allgemeine bauphysikalische Zulassung
Nr. 2-10.6-469 vom 17. Juni 2013

Deutsches Institut für Bautechnik

Diagramm: Wandhalter "BEMO-TEKOFIX" aus glasfaserverstärktem Kunststoff zur Verwendung bei vorgehängten hinterlüfteten Fassaden

Wandhalter, Ausladung 250 mm

Anlage 2.4
[Certified translation from German into English. This translation of the German original document has not been verified by the Deutsches Institut für Bautechnik.]

National technical approval
No. Z-10.9-459 of 17 June 2013

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[drawings]

[round stamp: Deutsches Institut für Bautechnik, 13]

BEMO-TEKOFIX® wall bracket made of glass-fibre-reinforced plastic for use on hung rear-ventilated façades

Wall bracket, overhang 300 mm

Annex 2.5

Z53178.13

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Freiburg, 10th August 2013
Katherina Polig (sworn translator and interpreter for the courts of Baden-Württemberg, Germany)
Wandhalter "BEMO-TEKOFIX" aus glasfaserverstärktem Kunststoff zur Verwendung bei vorgehängten hinterlüfteten Fassaden

Wandhalter, Ausladung 300 mm

Anlage 2.5
National technical approval
No. Z-10.9-459 of 17 June 2013

[For the purpose of this translation, a table showing the German and the corresponding English terms is used for the reader's convenience; the German original does not contain this table]

<table>
<thead>
<tr>
<th>Höhe</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ausladung</td>
<td>Overhang</td>
</tr>
<tr>
<td>Lochung Steg</td>
<td>Perforation on web</td>
</tr>
<tr>
<td>Lochung Konsolenfuß</td>
<td>Perforation on base of bracket</td>
</tr>
</tbody>
</table>

[drawings]

[round stamp: Deutsches Institut für Bautechnik, 13]

"BEMO-TEKOFIX" wall bracket made of glass-fibre-reinforced plastic for use on hung rear-ventilated façades

| Wall bracket, overhang 350 mm |

Annex 2.6

Z53178.13

I hereby certify that this translation is a true and correct translation of a copy of the German original
Freiburg, 16th August 2013
Katherina Polig (sworn translator and interpreter for the courts of Baden-Württemberg, Germany)
Wandhalter "BEMO-TEKOFIX" aus glasfaserverstärktem Kunststoff zur Verwendung bei vorgehängten hinterlüfteten Fassaden

Wandhalter, Ausbildung 350 mm

Anlage 2.6
National technical approval
No. Z-10.9-459 of 17 June 2013

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<table>
<thead>
<tr>
<th>Wandhalter</th>
<th>Wall bracket</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verankerungsmittel</td>
<td>Anchoring device</td>
</tr>
<tr>
<td>Verbindungsmittel</td>
<td>Fastener</td>
</tr>
<tr>
<td>Aluminiumprofil</td>
<td>Aluminium profile</td>
</tr>
<tr>
<td>Wandhalter &quot;BEMO-TEKOFIX&quot;</td>
<td>&quot;BEMO-TEKOFIX&quot; wall bracket</td>
</tr>
</tbody>
</table>

[drawings]

[BEMO-TEKOFIX" wall bracket made of glass-fibre-reinforced plastic for use on hung rear-ventilated façades | Annex 3.1]

Fixed points

Katherine Polig (sworn translator and interpreter for the courts of Baden-Württemberg, Germany)
Wandhalter H= 100mm
Verankerungsmittel

Verbindungsmitte
Aluminiumprofil
Wandhalter "BEMO-TEKOFIX"

Wandhalter H= 200mm
Verankerungsmittel

Verbindungsmitte
Aluminiumprofil
Wandhalter "BEMO-TEKOFIX"

Wandhalter H= 300mm
Verankerungsmittel

Verbindungsmitte
Aluminiumprofil
Wandhalter "BEMO-TEKOFIX"

Wandhalter "BEMO-TEKOFIX" aus giesfaserverstärktem Kunststoff zur Verwendung bei vorgehängten hinterlüfteten Fassaden

Festpunkte
National technical approval
No. Z-16.9-459 of 17 June 2013

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<table>
<thead>
<tr>
<th>Wandhalter</th>
<th>Wall bracket</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verankerungsmittel</td>
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<tr>
<td>Verbindungsmittel</td>
<td>Fastener</td>
</tr>
<tr>
<td>Aluminiumprofil</td>
<td>Aluminium profile</td>
</tr>
<tr>
<td>Wandhalter “BEMO-TEKOFIX”</td>
<td>“BEMO-TEKOFIX” wall bracket</td>
</tr>
</tbody>
</table>

[drawings]

[round stamp: Deutsches Institut für Bautechnik, 13]

| BEMO-TEKOFIX” wall bracket made of glass-fibre-reinforced plastic for use on hung rear-ventilated façades | Annex 3.2 |
| Sliding points                                                                                         |           |

KATHERINA POLIG
I hereby certify that this translation is a true and correct translation of a copy of the German original
Freiburg, 16th August 2013
Katherina Polig (sworn translator and interpreter for the courts of Baden-Württemberg, Germany)
Allgemeine bauaufsichtliche Zulassung
Kt. Z-10.8-456 vom 17. Juni 2013

Deutsches Institut für Bautechnik

Wandhalter H = 100mm

Verankerungsmittel

Verbindungsmittel

Aluminiumprofil

Wandhalter "BEMO-TEKOFIX"

Wandhalter H = 200mm

Verankerungsmittel

Verbindungsmittel

Aluminiumprofil

Wandhalter "BEMO-TEKOFIX"

Wandhalter "BEMO-TEKOFIX" aus glasfaserverstärktem Kunststoff zur Verwendung bei vorgehängten hinterfüllten Fassaden

Gleitpunkte

Anlage 3.2
[Certified translation from German into English. 
This translation of the German original document has not been verified by the Deutsches Institut für Bautechnik.]

Deutsches Institut für Bautechnik
DIBt

National technical approval
No. Z-10.9-459 of 17 June 2013

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<table>
<thead>
<tr>
<th>Wandhalter</th>
<th>Wall bracket</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verankernungsmittel</td>
<td>Anchoring device</td>
</tr>
<tr>
<td>Verbindungsmittel</td>
<td>Fastener</td>
</tr>
<tr>
<td>Aluminiumprofil</td>
<td>Aluminium profile</td>
</tr>
<tr>
<td>Wandhalter “BEMO-TEKOFIX”</td>
<td>“BEMO-TEKOFIX” wall bracket</td>
</tr>
</tbody>
</table>

[drawing]

[round stamp: Deutsches Institut für Bautechnik, 13]

BEMO-TEKOFIX" wall bracket made of glass-fibre-reinforced plastic for use on hung rear-ventilated façades

Sliding points in joint areas

Annex 3.3

Z53178.13

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Freiburg, 16th August 2013

Katherina Polig (sworn translator and interpreter for the courts of Baden-Württemberg, Germany)
Wandhalter H= 200mm

Wandhalter "BEMO-TEKOFIX" aus glasfaserverstärktem Kunststoff zur Verwendung bei vorgehängten hinterlüfteten Fassaden

Gleitstoßpunkte

Anlage 3.3
<table>
<thead>
<tr>
<th>Ausladung</th>
<th>Overhang</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wärmedämmung Mineralwolle</td>
<td>Thermal insulation mineral wool</td>
</tr>
<tr>
<td>BEMO-TEKOFIX</td>
<td>BEMO-TEKOFIX</td>
</tr>
<tr>
<td>Aluminium-Profil</td>
<td>Aluminium profile</td>
</tr>
<tr>
<td>Profildicke ≥ 2mm</td>
<td>Profile thickness ≥ 2mm</td>
</tr>
<tr>
<td>Legierung EN AW 6063 T66</td>
<td>Alloy EN AW 6063 T66</td>
</tr>
<tr>
<td>Tragprofil</td>
<td>Support profile</td>
</tr>
<tr>
<td>Bekleidung</td>
<td>Cladding</td>
</tr>
<tr>
<td>Horizontalschnitt</td>
<td>Horizontal section</td>
</tr>
<tr>
<td>max. Hinterlüftungsspalt</td>
<td>Max. rear ventilation gap</td>
</tr>
<tr>
<td>max. freiliegender Steg der Thermokonsole</td>
<td>Max. exposed web of the thermal bracket</td>
</tr>
</tbody>
</table>

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[drawings]

[round stamp: Deutsches Institut für Bautechnik, 13]

---

BEMO-TEKOFIX wall bracket made of glass-fibre-reinforced plastic for use on hung rear-ventilated façades

Extension of the attachment web by an aluminium profile

Annex 4

KATHERINA POLIS

I hereby certify that this translation is a true and correct translation of a copy of the German original

Freiburg, 16th August 2013

Katherina Polig (sworn translator and interpreter for the courts of Baden-Württemberg, Germany)

Z53178.13
Wandhalter "BEMO-TEKOFIX" aus gieseserverstärktem Kunststoff zur Verwendung bei vorgefertigten hinterlüfteten Fassaden

Verlängerung des Befestigungsecks durch ein Aluminiumprofil

Anlage 4
Thermal brackets as wall brackets for rear-ventilated façades

In-house production control

- **Incoming goods inspection of the base materials**
  The following properties for each batch delivered must be verified either by certificates for the base materials or by inspections:
  - Viscosity (as per ISO 307): 120 to 150 mPa*s
  - Residual moisture content (as per ISO 15512): max. 0.15% (if the residual moisture content is exceeded, the base materials must be pre-dried)
  - Total filling material content (as per DIN EN ISO 1172): 48 to 52% mass fraction

- **Tests on the finished product**
  The following tests must be carried out:

<table>
<thead>
<tr>
<th>Property</th>
<th>Requirement</th>
<th>Number of samples</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Component geometry, surface</td>
<td>see Annex 2.1 to 2.6</td>
<td></td>
<td>continuously during production</td>
</tr>
<tr>
<td>Compression test on the component</td>
<td>Characteristic value of the resistance as in Section 3, Table 1</td>
<td>5 components</td>
<td>1 x each start of a new production run and 1x each production week</td>
</tr>
<tr>
<td>Determination of fibre content and eye composition as per DIN EN ISO 1172</td>
<td>48 to 52% mass fraction</td>
<td>3 components</td>
<td></td>
</tr>
<tr>
<td>Verification of the crystallisation behaviour by DSC analysis as per ISO 11357-5 or determination of the melt mass-flow rate (MFR) and the melt volume-flow rate (MVR) of thermoplastics as per DIN EN ISO 1133, Procedure A</td>
<td>Melting point &gt; 260°C dry, 275°C, 5 kg/20 cm²/10 min</td>
<td>3 components</td>
<td></td>
</tr>
<tr>
<td>Tensile strength as per DIN EN ISO 527-2 (in normal climates 23/50)</td>
<td>83.6 MPa*</td>
<td>10 samples</td>
<td></td>
</tr>
<tr>
<td>Tensile modulus of elasticity as per DIN EN ISO 527-2 (in normal climates 23/50)</td>
<td>Mean value: 7,053 MPa</td>
<td>10 samples</td>
<td></td>
</tr>
</tbody>
</table>

*No individual value must fall below the specified value, otherwise an evaluation of the updated values of the production variance must be used in order to determine the 5% fractile value with a 75% confidence level, taking into account the large volume of the sampling. If the fractile value is still too small, additional test specimens must be taken, tested and the 5% fractile value re-determined. This value must not be smaller than the required value, otherwise the component must be discarded as unusable. The characteristic value for the determination of the 5% fractile value may be taken as $k = 1.65$ in the specified cases.*