

## Allgemeine bauaufsichtliche Zulassung

### Zulassungsstelle für Bauprodukte und Bauarten Bautechnisches Prüfamts

Eine vom Bund und den Ländern  
gemeinsam getragene Anstalt des öffentlichen Rechts  
Mitglied der EOTA, der UEAtc und der WFTAO

Datum: 24.01.2012      Geschäftszeichen:  
II 13-1.33.1-27/7

**Zulassungsnummer:**  
**Z-33.1-27**

**Geltungsdauer**  
vom: **1. Februar 2012**  
bis: **1. Februar 2017**

**Antragsteller:**  
**AGROB BUCHTAL GmbH**  
Buchtal 1  
92521 Schwarzenfeld

**Zulassungsgegenstand:**  
**Fassadenplatten "KerAion-Quadro" und Keramik-Verbundelemente "KerAion-Plus" mit  
Plattentragprofilen**



Der oben genannte Zulassungsgegenstand wird hiermit allgemein bauaufsichtlich zugelassen.  
Diese allgemeine bauaufsichtliche Zulassung umfasst acht Seiten und fünf Anlagen mit 13 Blatt.  
Der Gegenstand ist erstmals am 15. Dezember 1992 allgemein bauaufsichtlich zugelassen worden.

# DIBt

**DEUTSCHES INSTITUT FÜR BAUTECHNIK**  
(German Institute for Structural Engineering)

Incorporated public-law institution

"This translation has not been authorised by the German Institute for Structural Engineering (Deutsches Institut für Bautechnik)."

10829 Berlin, January 21<sup>st</sup>, 2003  
Kolonnenstr. 30 L  
Phone: (030) 787 30-394  
Fax: (030) 787 30-320  
Ref.: II 13-1.33.1-27/5

**Administrative decision**  
**on**  
**the alteration, supplementation and prolongation of the validity**  
**of the general approval of the building supervisory authority of**  
**December 4<sup>th</sup>, 1997**

Approval number:

**Z-33.1-27**

**Applicant:**

Deutsche Steinzeug Keramik GmbH  
92519 Schwarzenfeld

**Subject of approval:**

KerAion Quadro facade panels and ceramic compound elements  
KerAion Plus with panel bearing profile

**Valid until:**

31<sup>st</sup> January, 2007

The aforementioned subject of approval is herewith admitted for use by the building supervisory authority.\*  
This general supervisory approval consists of seven pages and 13 enclosures.

(Official stamp of the Deutsches Institut für Bautechnik)

\* This administrative decision replaces the general approval of the building supervisory authority No. Z-33.1-27 of 04<sup>th</sup> December, 1997, altered and supplemented by the administrative decision of 21<sup>st</sup> January, 2003.  
The subject was first admitted for use by the building supervisory authority on December 15<sup>th</sup>, 1992.

### **Ad. I GENERAL REGULATIONS**

1. The use and/or the applicability of the subject of approval according to the federal state building regulations is proven with the general approval of the building supervisory authority.
2. The general approval of the building supervisory authority does not supersede the statutory specified authorisations, approvals and certificates needed for the realisation of construction projects.
3. The general approval of the building supervisory authority shall be granted irrespective of the rights of a third party, especially in the case of private property rights.
4. Producer and distributor of the subject of approval, irrespective of further regulations in "Specific regulations", shall be required to provide the user of the subject of approval copies of the general approval of the building supervisory authority and shall inform him/her that the general approval of the building supervisory authority must be at the place for one's disposal. Copies of the general approval of the building supervisory authority must be submitted to the authorities concerned if required.
5. The general approval of the building supervisory authority may only be duplicated in its complete form. A publication in extracts requires the approval of the Deutsche Institut für Bautechnik (German Institute for Structural Engineering). Text and drawings of advertising publications must not contradict the general approval of the building supervisory authority. Translations of the general approval of the building supervisory authority must be supplemented by the pointer "This translation has not been authorised by the German Institute for Structural Engineering (Deutsches Institut für Bautechnik)."
6. The general approval of the building supervisory authority is revocably granted. The regulations of the general approval of the building supervisory authority may be supplemented and altered at a later date, especially as occasion may require such as in the event of new technical knowledge.

(Official stamp of the Deutsches Institut für Bautechnik)

## Ad. II SPECIFIC REGULATIONS

### 1 Subject of approval and scope of applicability

The general approval of the building supervisory authority concerns a bracket-mounted, rear-ventilated façade system with ceramic façade panels "KerAion Quadro" or ceramic compound elements "KerAion Plus" with Quadro fastening points sintered to the rear side. The façade panels are fastened on vertical aluminium panel bearing profiles connected to an aluminium subconstruction.

The ceramic façade panels KerAion Quadro including the Quadro fastening points and the aluminium subconstruction are non-combustible (Building material classification DIN 4102-A1 according to DIN 4102-1).

The ceramic façade panels KerAion Plus are non-combustible (Building material classification DIN 4102-A1 according to DIN 4102-1).

The permitted height of buildings for the application of the façade system is the result of the certification of stability.

The aluminium subconstruction and its anchorage to the building are not subject of the general approval of the building supervisory authority.

It is required, in the event of existing heat insulation made of non-combustible mineral fibre panels according to DIN EN 13162<sup>1</sup> (Building material classification Din 4102-A or European classification A1 or A2 -s1,d0 according to DIN EN 13501-1).

The subject of approval and its parts must correspond to the Specific Regulations, in addition to the enclosures of this general approval of the building supervisory authority as well as to the data deposited to the Deutsches Institut für Bautechnik (German Institute for Structural Engineering).

### 2 Regulations for the building products

#### 2.1 Properties and composition

##### 2.1.1 Façade panels

##### 2.1.1.1 KerAion Quadro façade panels

The 8 mm thick KerAion Quadro façade panels must be extruded ceramic panels  $E \leq 3$  % group AI according to DIN EN 14411. Varying from the requirements of DIN EN 14411, appendix A, table A.1, the bending tensile strength must amount to minimum 30 N/mm<sup>2</sup>.

The panels may be produced according to enclosures 2 and 3 in sizes up to 1200 mm x 1200 mm. Smaller panels may be produced by cutting larger panels.

The panels may be coated with glaze on the front side.

##### 2.1.1.2 Ceramic compound elements KerAion Plus

The ceramic compound elements KerAion Plus consist of KerAion Quadro panels (basic panels) according to part 2.1.1.1 which may be coated on the front side instead of a glaze with glass mosaic or the following ceramic tiles or panels stuck on in the factory according to DIN EN 14411 (see enclosures 5.1 to 5.4):

- extruded ceramic tiles or panels  $E \leq 3$  % group AI or
- dry-pressed ceramic tiles or panels  $E \leq 0.5$  % group BIa or
- ceramic tiles or panels 0.5 %  $E \leq 3$  % group BIb.

The ceramic tiles or panels to be stuck on the base panel must have a surface of  $\leq 0.12$  m<sup>2</sup> with a max. side length of 40 cm.

The thickness of the cladding tiles (glass mosaic or ceramic tiles or panels) may be up to 8 mm.

This must be realised according to DIN 18157-1.

<sup>1</sup> Regarding the behaviour in fire please observe the Building regulations list B, part 1, annex 03.

As adhesive mortar, the hydraulically hardening thin-bed mortar PCI-Polyflott-Schnell according to DIN 18 156-2 by PCI Augsburg GmbH must be used in a layer no thicker than 2 mm.

The joints between the ceramic coating material or the glass mosaic must be filled with the cement bound joint mortar PCI-Flexfuge by PCI Augsburg GmbH.

The ceramic compound elements KerAion Plus must fulfil the requirements of non-combustible building material (building material classification DIN 4102-A2 according to DIN 4102-1:1998-5, part 5.2) and the approval principles for the evidence of non-combustibility of building products.

The composition of the individual elements must correspond to the data deposited at the Deutsches Institut für Bautechnik (German Institute for Structural Engineering).

## **2.1.2 Fastening elements**

### **2.1.2.1 Quadro fastening elements**

The fastening must consist of a ceramic compound body with the following structure: a round, ceramic plate with an integrated, stainless screw with a glass plumb ring sintered onto the rear side of the panel. This fastening is non-combustible.

On the rear side of the façade panels 4 or 8 Quadro fastening elements must be factory-mounted (see enclosures 2 and 3).

The minimum tear resistance for central traction must amount to 2 kN with a support ring diameter of 55 mm.

The panel bearing profile is fixed on the screw of the fastening elements with a nut. Between the panel bearing profile and the ceramic compound element an Elastomer plate must be set up (see enclosure 1).

### **2.1.2.2 Panel bearing profile**

The panel bearing profile types U0 to U3 according to enclosure 2 must consist of a symmetrical profile of the aluminium alloy EN AW-6060 according to DIN EN 755-2:1997-8, material state T66 (AlMgSi 0.5 F 22 according to DIN 1748-1:1983-2).

## **2.2 Production, packaging, transportation, storage and identification**

### **2.2.1 Production**

The building products according to part 2.1 must be factory-produced.

### **2.2.2 Packaging, transportation, storage**

The façade panels according to part 2.1.1 must be stored according to the specifications of the producer. They must be protected during transportation and storage on the construction site in order to prevent damages.

### **2.2.3 Identification**

The façade panels according to part 2.1.1 must be identified by the producer with the sign of conformity (Ü-sign) according to the sign of conformity regulations of the states. The identification is only allowed if the requirements according to part 2.3 are fulfilled.

Furthermore the factory and the name of the façade panels "KerAion Quadro" and/or "KerAion Plus" must be noted on the façade panels.

## **2.3 Evidence of conformity**

### **2.3.1 General information**

#### **2.3.1.1 Evidence of conformity by certificate of conformity**

The conformity of the façade panels according to part 2.1.1 including the Quadro fastening elements according to part 2.1.2.1 with the regulations of this general approval of the building supervisory authority must be certificated for each factory with a certificate of conformity on the basis of an internal factory production control and regular external monitoring including an initial test of the building product according to the requirements of the following regulations.

For the granting of a certificate of conformity and external monitoring including the necessary product tests, the producer of the façade panels including the Quadro fastening elements must submit this to an approved certification authority for this purpose as well as to a monitoring authority.

A copy of the approved certificate of conformity must be handed out to the Deutsches Institut für Bautechnik (German Institute for Structural Engineering) by the certification authority.

In addition a copy of the initial test report must be handed out to the Deutsches Institut für Bautechnik (German Institute for Structural Engineering).

### 2.3.2 Internal factory production control

In every factory an internal factory production control must be established and realised. Internal factory production control is the continuous monitoring of the production by the producer to guarantee that the building products produced in this factory correspond to the general approval of the building supervisory authority.

The internal factory production control must at least include the measures shown in the following table.

Table 1: Scope, kind and frequency of the internal factory production control

Building part	Test	Requirement	Scope Frequency
Façade panels "KerAion Quadro" and ceramic compound elements "KerAion Plus" according to part 2.1.1	Bending tensile strength according to DIN EN 100 (ISO 10545-4)	Minimum value 30 N/mm <sup>2</sup>	each minimum 10 tests per batch
Quadro fastening according to part 2.1.2.1	Resistance to abrasion	Minimum value 2 kN with a support ring diameter of 55 mm	4 tests per production day

With regard to the behaviour in fire of the ceramic compound elements "KerAion Plus" according to part 2.1.1.2, the "Guidelines concerning the evidence of conformity of non-combustible building materials (building material classification DIN 4102-A) according to the general approval of the building supervising authority"<sup>2</sup> shall prevail.

The results of the internal factory production control must be registered and evaluated. The registrations must at least contain the following data/figures:

- name of building product and/or the original material and the components
- kind of control or test
- date of production and test of the building product and/or the original material or the components
- result of controls and tests and, as far as appropriate, comparison with the requirements
- signature of the person responsible for the internal factory production control

<sup>2</sup> The "Guidelines" are published in the "Mitteilungen" of the Deutsches Institut für Bautechnik (German Institute for Structural Engineering) of 01<sup>st</sup> April 1997.

The registrations must be saved for at least five years and must be submitted to the monitoring authority concerned with external monitoring. The registrations must be submitted to the Deutsches Institut für Bautechnik (German Institute for Structural Engineering) and to the superior building supervisory authority on demand.

In case the test result is not satisfactory the producer must immediately take the measures necessary for rectifying the defect. Building products that do not correspond to the requirements must be handled in a manner that confusion with corresponding products are excluded. After rectifying the defect – as far as technically possible and necessary for the evidence of the correction of faults – the corresponding test must immediately be repeated.

### **2.3.3 External monitoring**

In each factory the internal factory production control must be surveyed regularly by an external monitoring, at least twice a year.

Within the scope of external monitoring, an initial test of façade panels according to part 2.1.1 including the Quadro fastening elements according to part 2.1.2.1 must be carried out. Test pieces for random sampling procedures can be extracted. The taking of test pieces and the tests are the duty of each monitoring authority. At least the tests according to part 2.3.2 must be carried out:

With regard to the behaviour in fire of the ceramic compound elements KerAion Plus according to part 2.1.1.2, the current version of the "Guidelines concerning the evidence of conformity of non-combustible building materials (building material classification DIN 4102-A) according to the general approval of the building supervising authority"<sup>1</sup> and the approval principles for the evidence of non-combustibility of building products shall prevail.

The results of the certification and the external monitoring must be saved for at least five years. They must be submitted upon demand by the certification authority and/or the monitoring authority to the Deutsches Institut für Bautechnik (German Institute for Structural Engineering) and the superior building supervisory authority.

## **3 Regulations for drawing and measuring**

### **3.1 Evidence of stability**

The evidence of stability of façade panels including the Quadro fastening elements and the panel bearing profiles according to enclosure 2 has been proven on from all sides closed prismatic building elements with wind loads according to DIN 1055-4:1986-08, part 6.3.1 in the approval procedure for the applicability according to enclosures 4.1 to 4.6. Depending on the panel size, the quantity and the order of Quadro fastening elements as well as the panel bearing profile types must be defined on the basis of the nomographs in the enclosures 4.1 to 4.6.

In case other profile types than the ones shown in enclosure 2 are used for the panel bearing profile, the minimum stiffness as in enclosure 2 must be achieved.

If the bearing profile is diverging from the graph in enclosure 3, horizontally arranged, there must be additional evidence that no calculated stress by distortion is caused.

For the fastening of the panel bearing profiles on the subconstruction, the subconstruction as well as its anchorage, the evidence of stability must be individually proven according to the technical building regulations. For the evidence of stability of the substructure the estimated weight of the facade panels including the panel bearing profiles must be calculated by 0.25 kN/m<sup>2</sup> for "KerAion Quadro" facade panels and by 0.45 kN/m<sup>2</sup> for "KerAion Plus" ceramic compound elements.

### **3.2 Heat protection and moisture protection depending on climate**

For the calculated proof of the heat insulation and climatic moisture protection, DIN 4108-2 is valid.

For the calculation of the thermal resistance (R-value) according to DIN EN ISO 6946 for the external wall structure the air space (rear-ventilation gap) and the façade panels must not be taken into account.

For the evidence of heat protection for the used insulating material the rated value of the heat conductivity according to DIN V 4108-4:2004-07, table 2, category I is valid. The rated value according to category II is valid for insulating boards for which a limiting value  $\lambda_{\text{grenz}}$  has been determined within the scope of a proof of evidence on basis of a general approval of the building supervisory authority.

Thermal bridges evoked by the substructure and its anchorage, because the heat insulating layer has been penetrated or reduced in thickness, must be taken into account.

For the evidence of moisture protection depending on the climate DIN 4108-3 is valid.

### **3.3 Fire protection**

The ceramic façade panels KerAion Quadro including the Quadro fastening points and the bearing profiles as well as the aluminium subconstruction are non-combustible (building material classification DIN 4102-A1 according to DIN 4102-1).

The ceramic compound elements KerAion Plus are non-combustible (building material classification DIN 4102-A1 according to DIN 4102-1).

### **3.4 Sound protection**

The evidence of the sound protection against external noise must be in line with DIN 4109.

## **4 Regulations for the execution**

The bearing profile butt joints of the subconstruction must not be covered by the panel bearing profiles, i.e. the fastening of the bearing profile must always be located on a rod of the subconstruction (bearing profile butt joint = panel bearing butt joint). Free shifting possibility of the panel bearing profile must be guaranteed within the scope of the slide points.

On each façade panel two panel bearing profiles must be fixed freely according to enclosure 3 on the Quadro fastening elements. Between the Quadro fastening element and the panel bearing profile an accompanying factory-installed Neoprene plate must be arranged. The starting torque for the self-locking nut amounts to  $2,5 \text{ Nm} \pm 10 \%$ . A washer must be fixed at the slide points. The façade panels with the panel bearing profiles must be fixed to the subconstruction in order to avoid bending.

The joints between the façade panels must stay open.

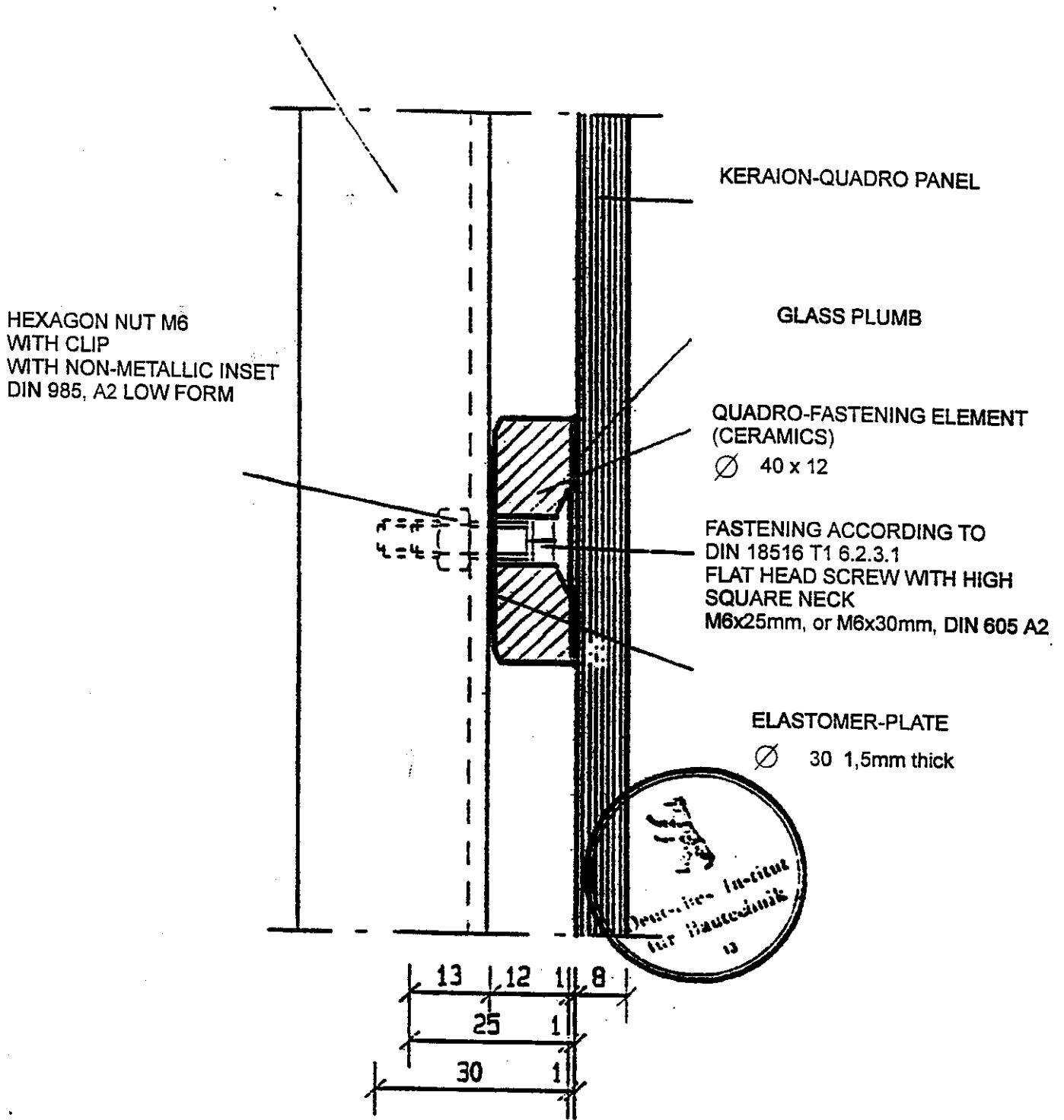
Damaged façade panels must not be installed.

By order  
Klein

(Official stamp of the Deutsches Institut für Bautechnik, certified by Kamanzi-Fechner)

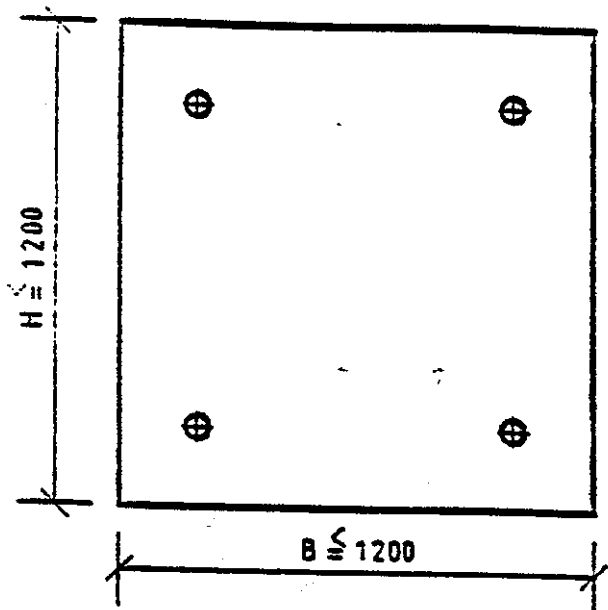


ALUMINIUM-PANEL BEARING PROFILE  
AlMgSi 0,5 F 22

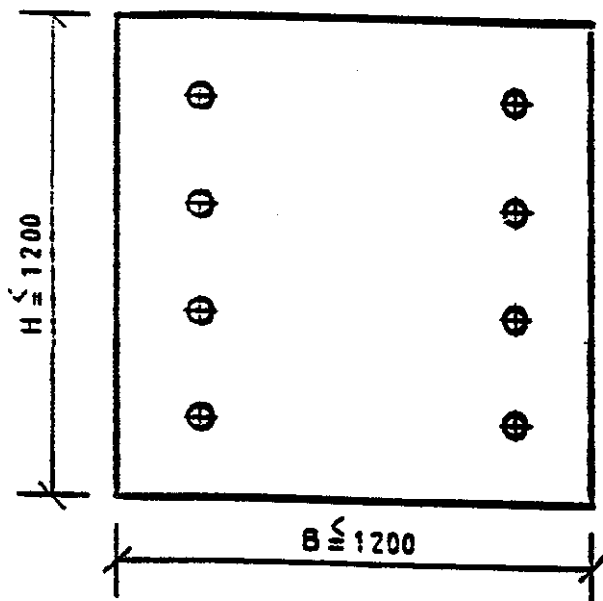


<p>TechnoCeram Agrob-Buchtal-Keramik GmbH 92519 Schwarzenfeld</p>	<p>KerAion-Quadro-facade panel with Quadro-fastening elements and panel bearing profile</p>	<p><b>ENCLOSURE 1</b> referring to the general approval of the building authority Nr. Z-33.1-27 of December 4, 1997</p>
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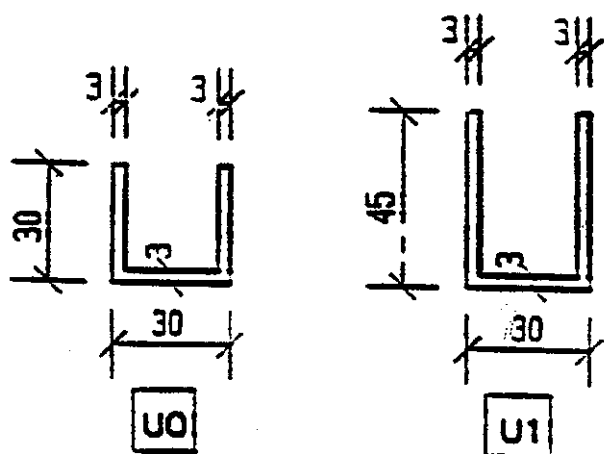
### 4-POINT-FASTENING



### 8-POINT-FASTENING



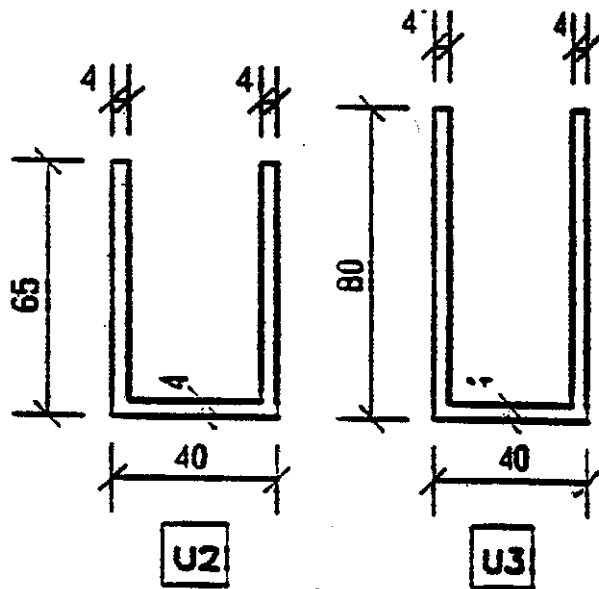
### PANEL BEARING PROFILES



$A=252\text{mm}^2$   
 $I_x=22927\text{mm}^4$   
 $I_y=36396\text{mm}^4$

$A=342\text{mm}^2$   
 $I_x=70684\text{mm}^4$   
 $I_y=52866\text{mm}^4$

### 4-POINT-BEARING



$A=648\text{mm}^2$   
 $I_x=278806\text{mm}^4$   
 $I_y=180096\text{mm}^4$

$A=768\text{mm}^2$   
 $I_x=495531\text{mm}^4$   
 $I_y=219136\text{mm}^4$

### 8-POINT-BEARING

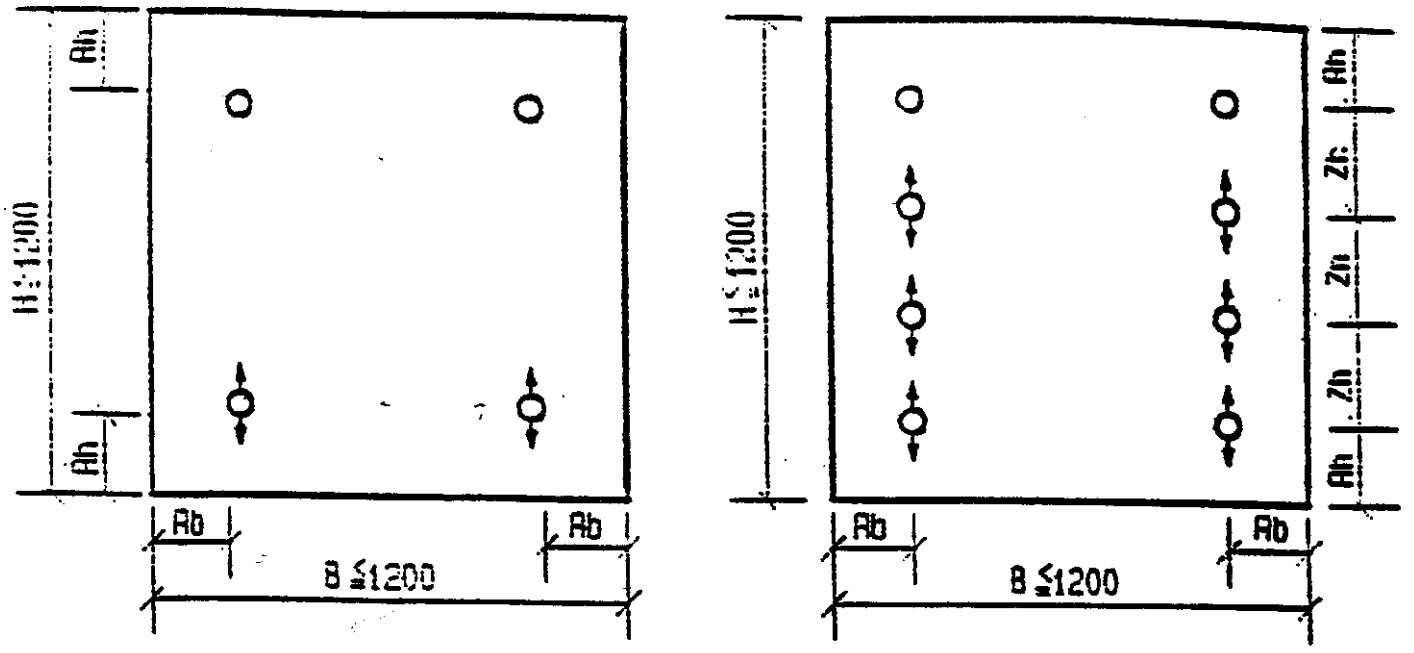


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 Agrob-Buchtal-Keramik GmbH  
 92519 Schwarzenfeld

Positioning of the Quadro-  
 fastening elements  
 Panel bearing profile-types

**ENCLOSURE 2**  
 referring to the general  
 approval of the building authority  
 Nr. Z-33.1-27  
 of December 4, 1997

**LOCATION OF THE QUADRO-ELEMENTS ON THE PANEL BEARING PROFILE**

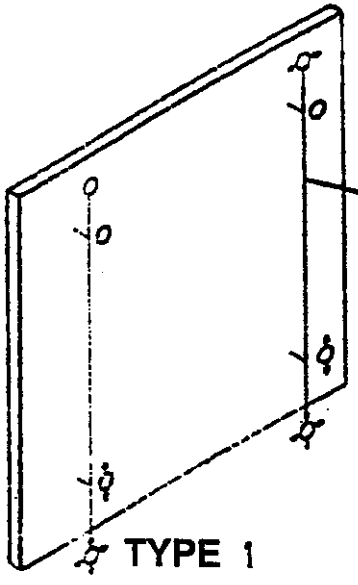


- no displacement
- ↕ single-axially displaceable
- ↕↔ bi-axially displaceable

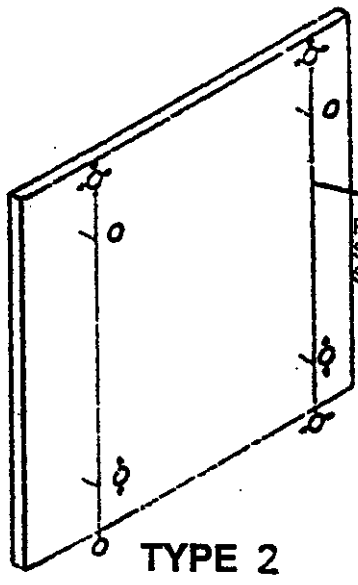
B=PANEL WIDTH  
 H=PANEL HEIGHT  
 Rb=BOUNDARY DISTANCE FOR PANEL WIDTH  
 Rh=BOUNDARY DISTANCE FOR PANEL HEIGHT  
 Zh=INTERMEDIATE DISTANCE FOR PANEL HEIGHT

**CONNECTION PANEL BEARING PROFILE WITH PANEL AND SUBCONSTRUCTION**

**ISOMETRY-GRAPH**



PANEL BEARING PROFILE:  
 SIMPLY SYMMETRICAL  
 STIFFNESS SEE ENCLOSURE 2

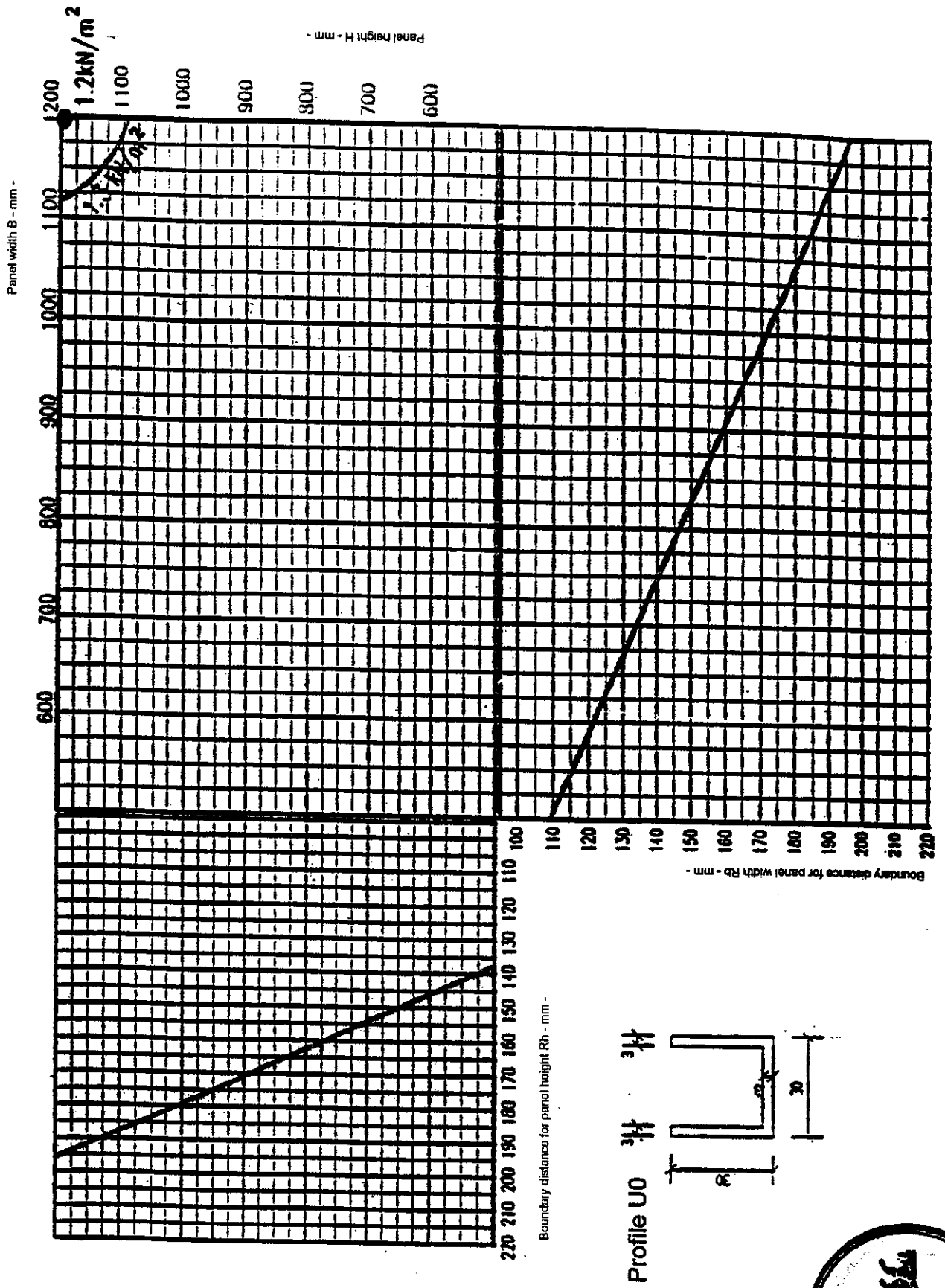


PANEL BEARING PROFILE:  
 SIMPLY SYMMETRICAL  
 STIFFNESS SEE ENCLOSURE 1



<p>TechnoCeram                  Agrob-Buchtal-Keramik GmbH                  92519 Schwarzenfeld</p>	<p>Location of the Quadro-elements on the panel bearing profiles                  Connection panel bearing profile with facade panel and subconstruction</p>	<p><b>ENCLOSURE 3</b>                  referring to the general approval of the building authority Nr. Z-33.1-27 of December 4, 1997</p>
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KERAION-Facade System Quadro 4Pt.-fastening with panel bearing profile U0  
 permitted wind load for normal range - determined by wind pressure load

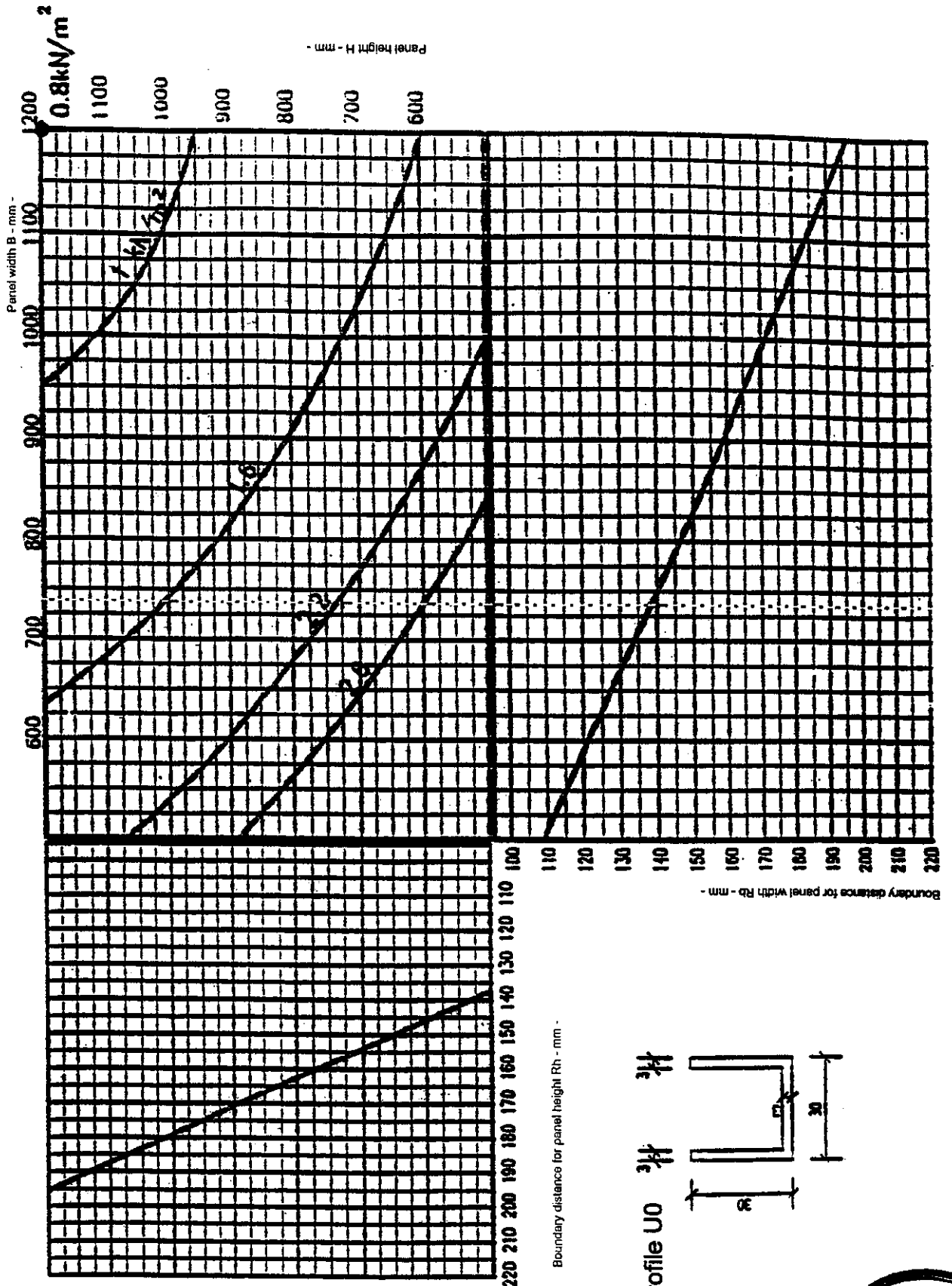


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Permitted wind load for normal range  
 4-Pt.-fastening with panel bearing profile U0

**ENCLOSURE 4.1**  
 referring to the general approval of the building authority Nr. Z-33.1-27 of December 4, 1997

KERAION-Facade System Quadro 4Pt.-fastening with panel bearing profile U0  
 permitted wind load for boundary range - determined by wind suction force



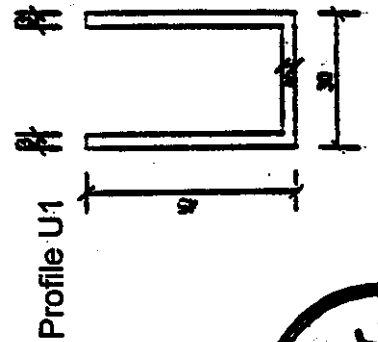
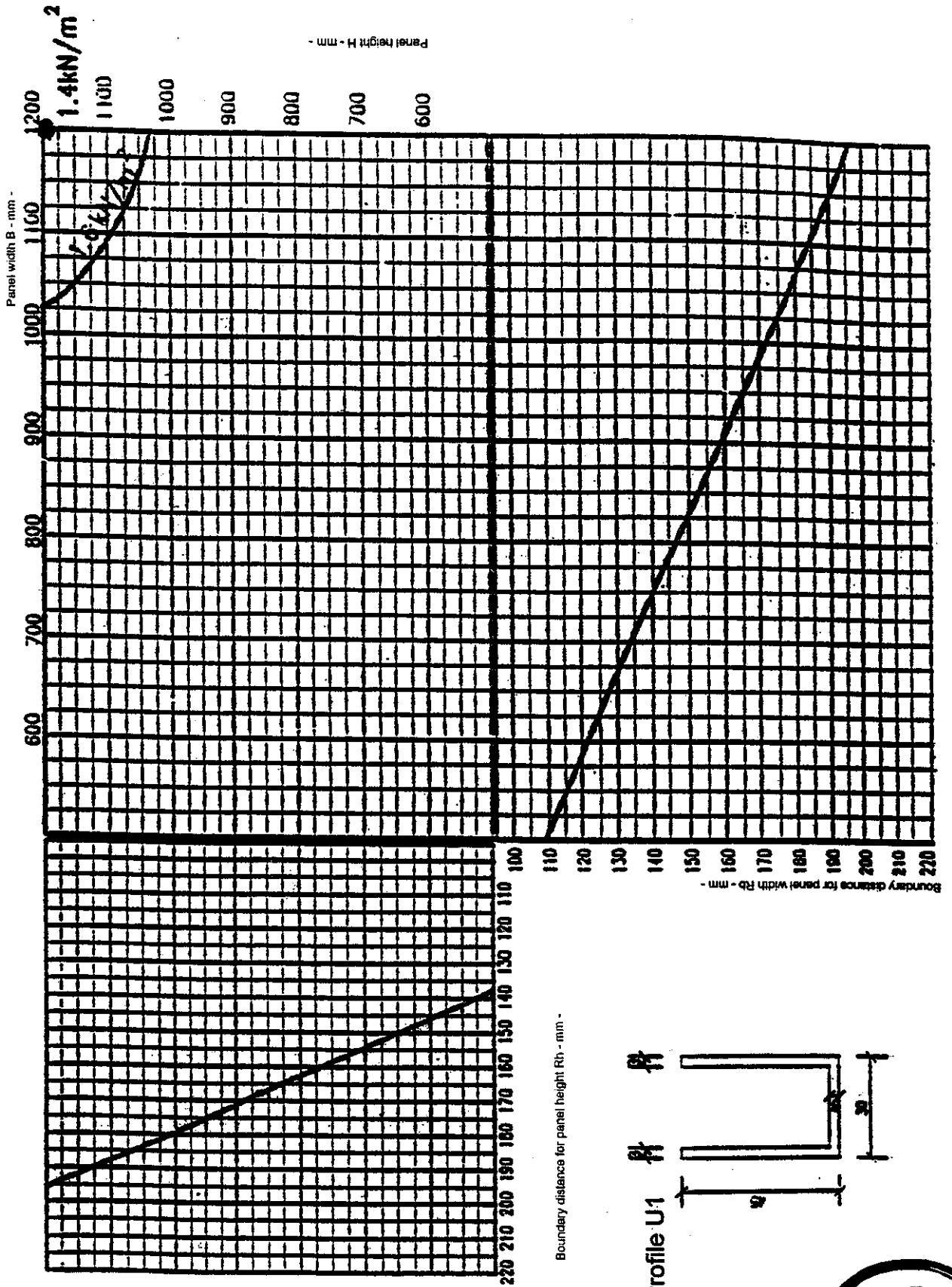
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 Agrob-Buchtal-Keramik GmbH  
 92519 Schwarzenfeld

Permitted wind load for  
 boundary range  
 4-Pt.-fastening with  
 panel bearing profile U0

**ENCLOSURE 4.2**  
 referring to the general  
 approval of the building authority  
 Nr. Z-33.1-27  
 of December 4, 1997



**KERAION-Facade System Quadro 4Pt.-fastening with panel bearing profile U1**  
 permitted wind load for normal range - determined by wind pressure load

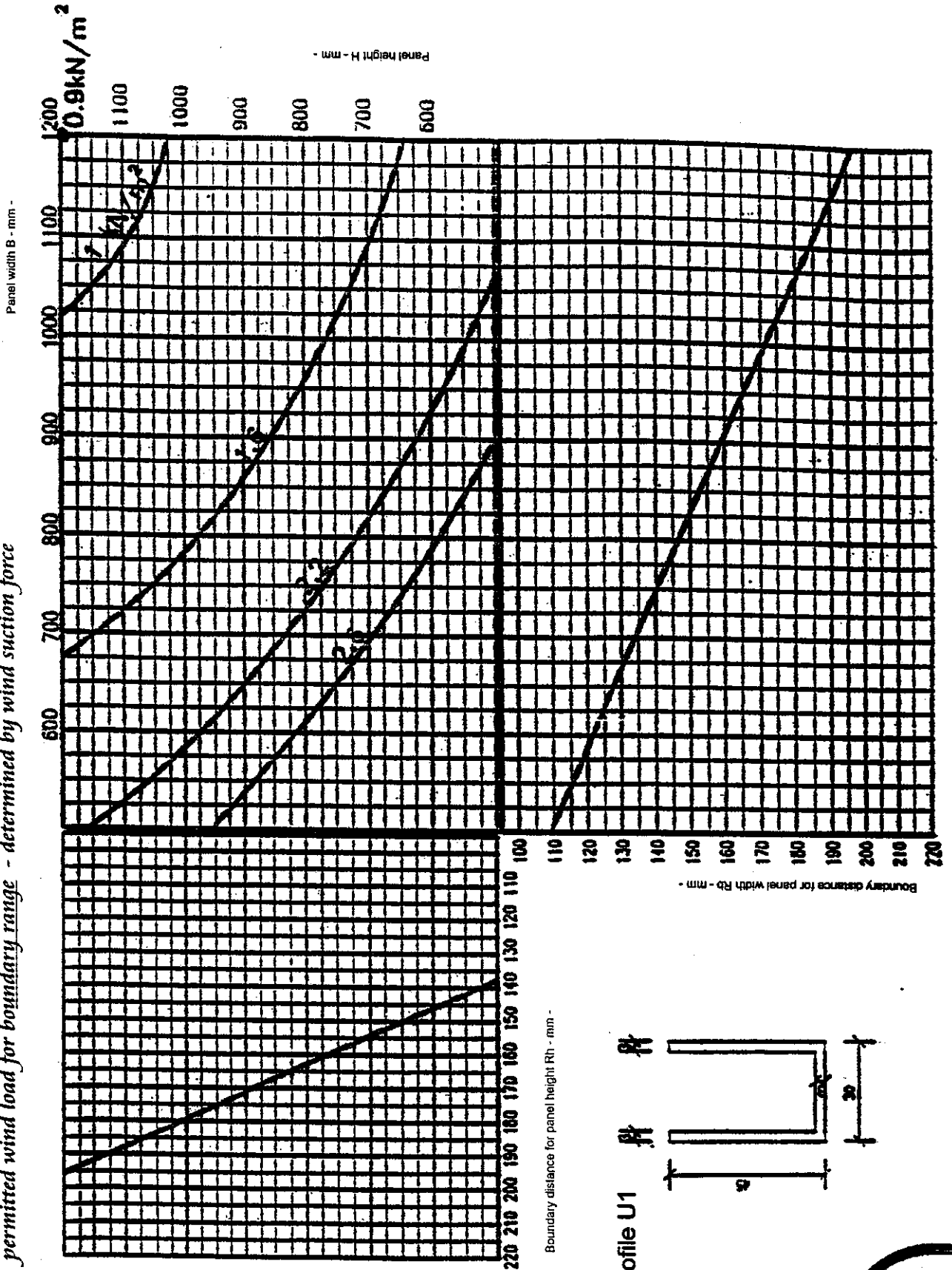


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Permitted wind load for normal range  
 4-Pt.-fastening with panel bearing profile U1

**ENCLOSURE 4.3**  
 referring to the general approval of the building authority Nr. Z-33.1-27 of December 4, 1997

**KERAION-Facade System Quadro 4Pt.-fastening with panel bearing profile U1**  
 permitted wind load for boundary range - determined by wind suction force



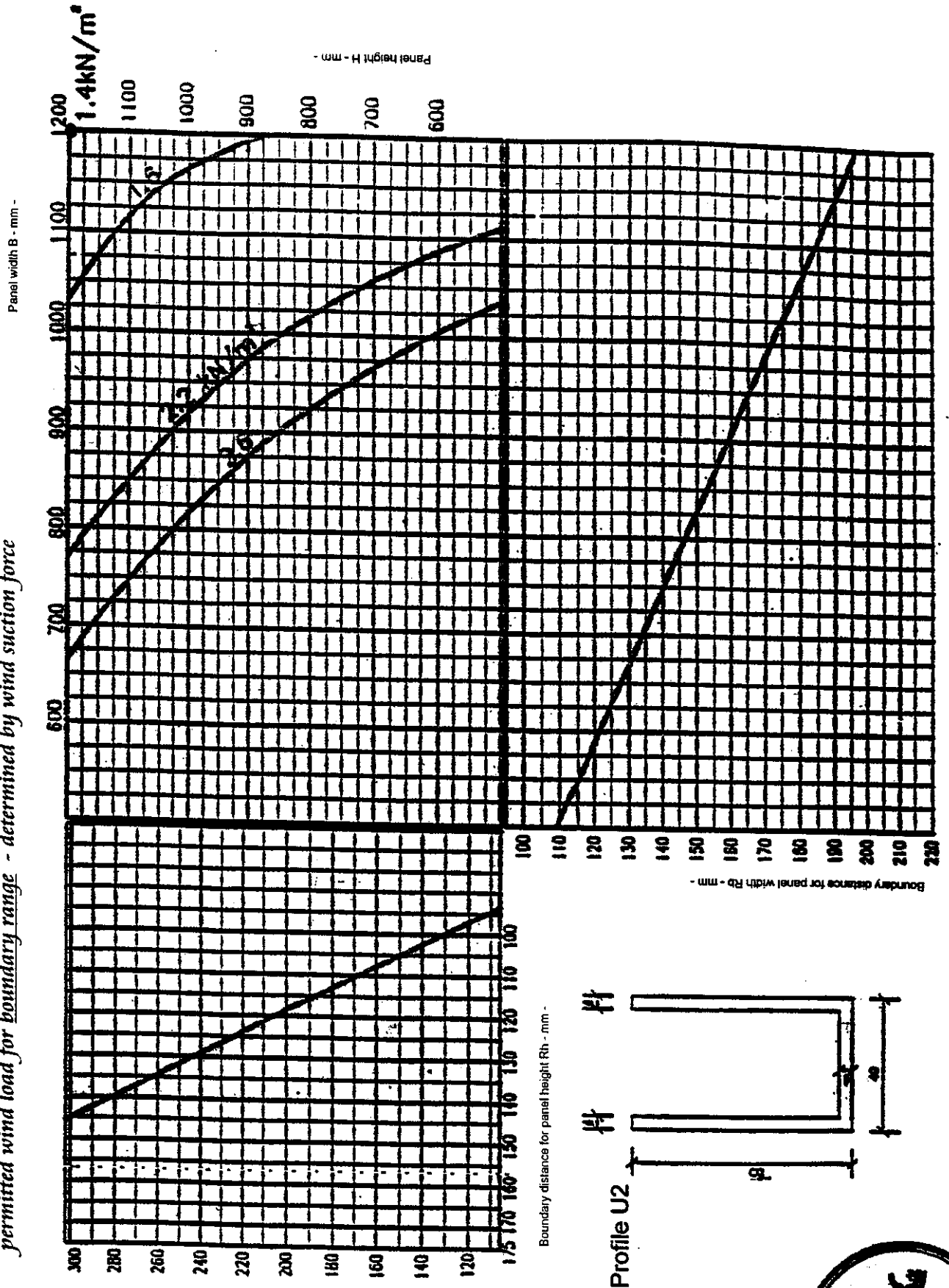
TechnoCeram  
 Agrob-Buchtal-Keramik GmbH  
 92519 Schwarzenfeld

Permitted wind load for boundary range  
 4-Pt.-fastening with panel bearing profile U1

**ENCLOSURE 4.4**  
 referring to the general approval of the building authority  
 Nr. Z-33.1-27  
 of December 4, 1997



**KERAION-Facade System Quadro 8Pt.-fastening with panel bearing profile U2**  
 permitted wind load for boundary range - determined by wind suction force



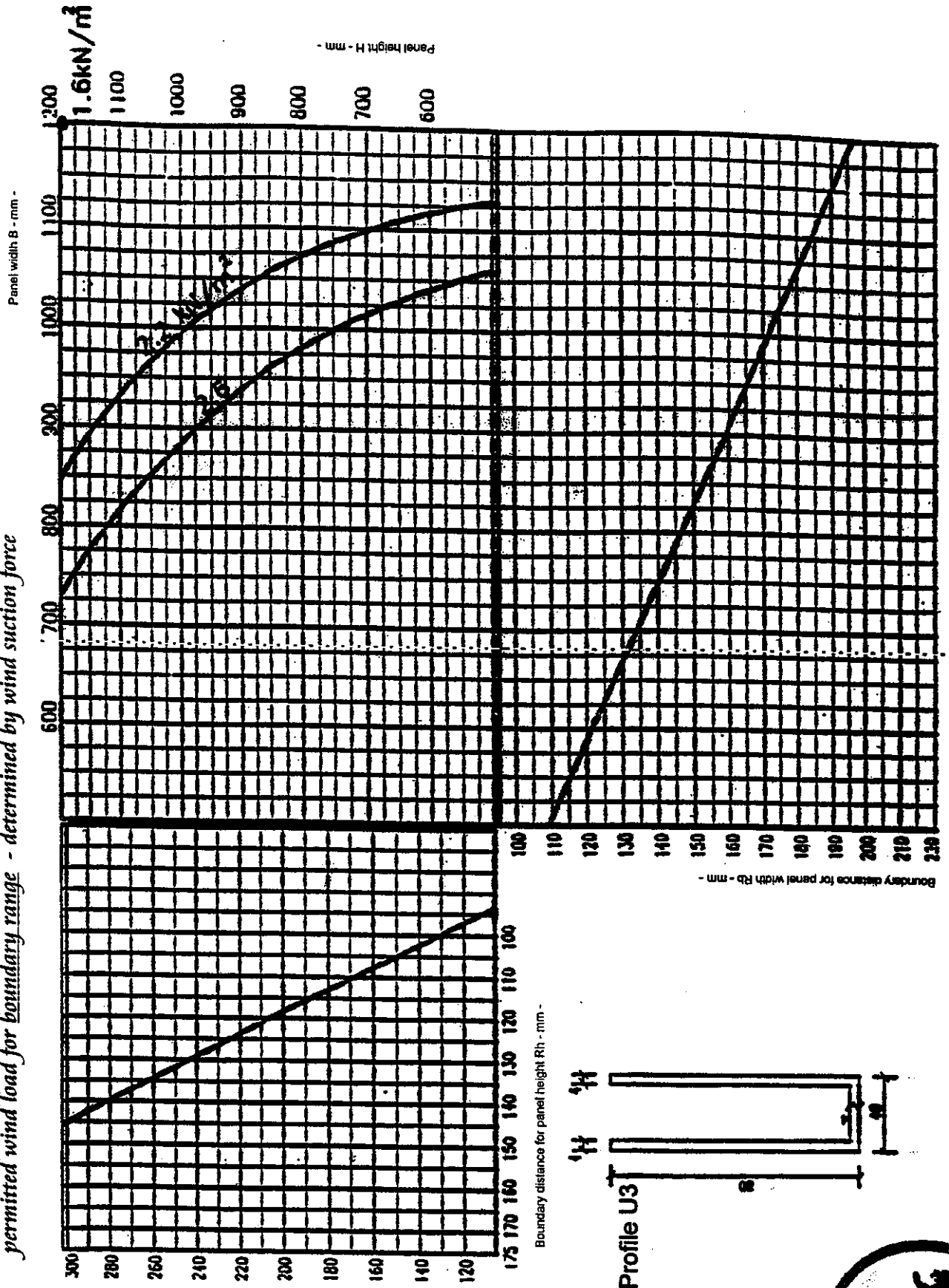
TechnoCeram  
 Agrob-Buchtal-Keramik GmbH  
 92519 Schwarzenfeld

Permitted wind load for boundary range  
 8-Pt.-fastening with panel bearing profile U2

**ENCLOSURE 4.5**  
 referring to the general approval of the building authority Nr. Z-33.1-27 of December 4, 1997



KERAION-Facade System Quadro 8Pt.-fastening with panel bearing profile U3  
 permitted wind load for boundary range - determined by wind suction force

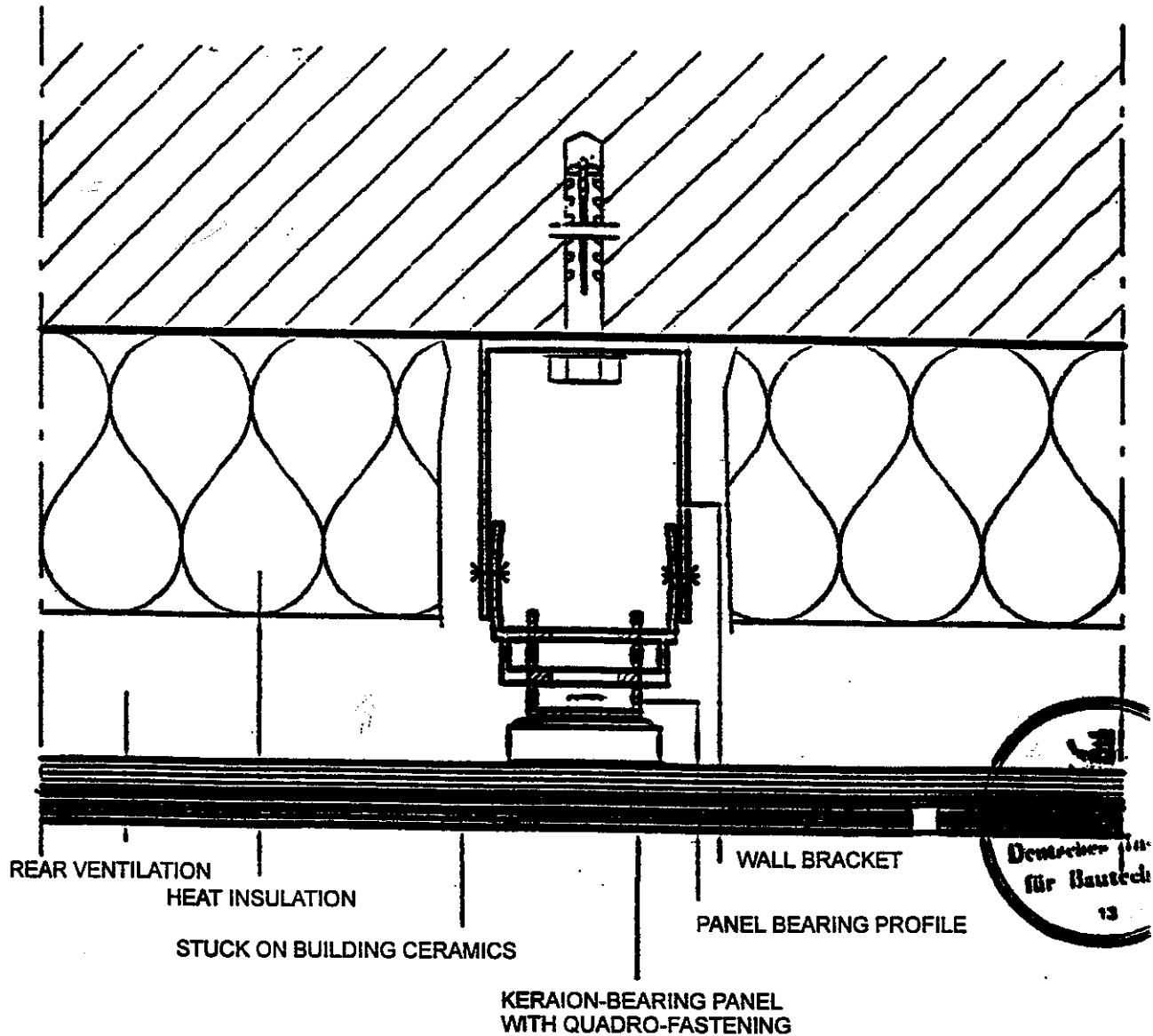


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Permitted wind load for boundary range  
 8-Pt.-fastening with panel bearing profile U3

ENCLOSURE 4.6  
 referring to the general approval of the building authority  
 Nr. Z-33.1-27  
 of December 4, 1997

# HORIZONTAL CUT

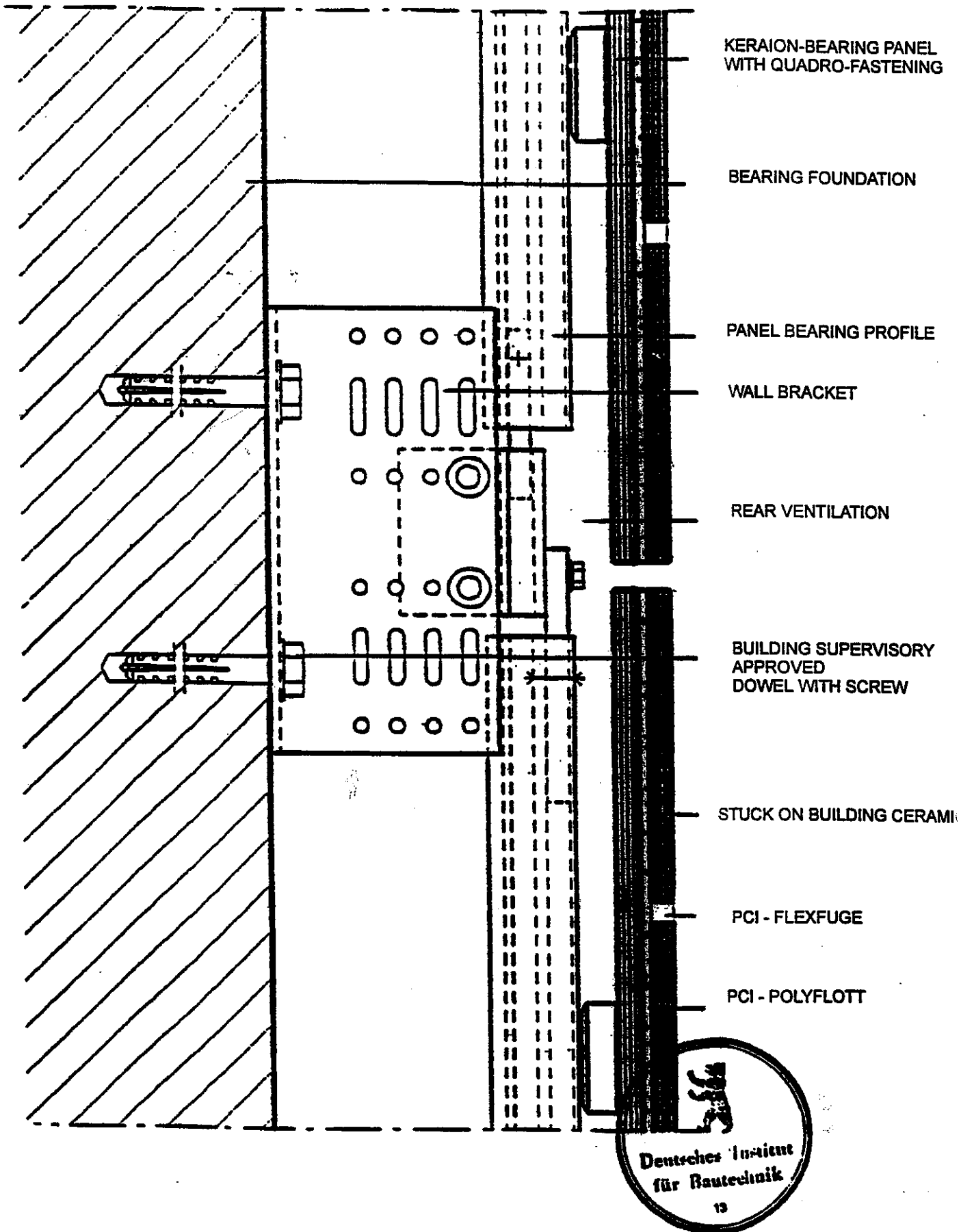


TechnoCeram  
Agrob-Buchtal-Keramik GmbH  
92519 Schwarzenfeld

Suspended, rear-ventilated  
ceramic-facade KerAion-Plus  
Top layer with ceramic  
panels; horizontal cut

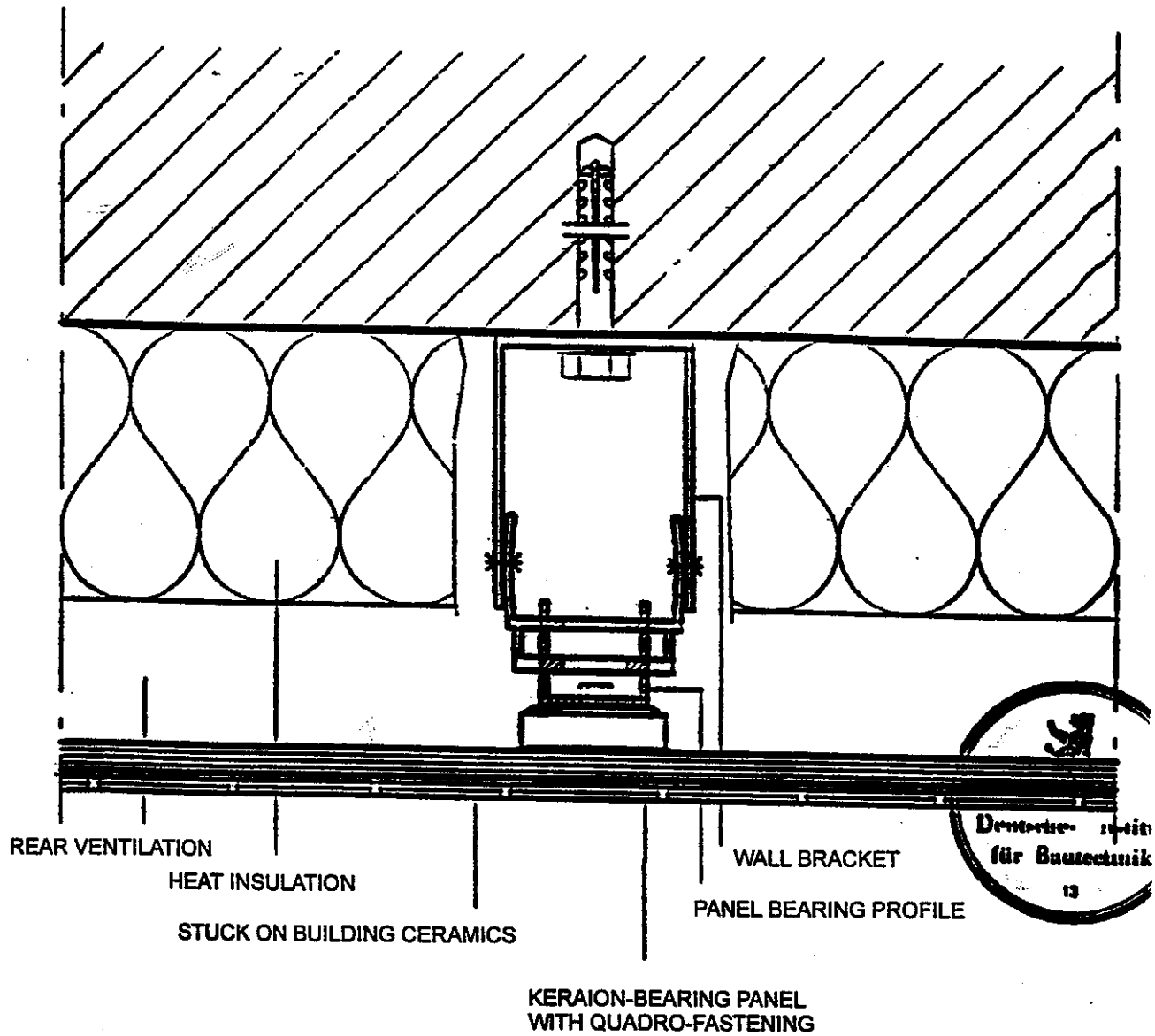
**ENCLOSURE 5.1**  
referring to the general  
approval of the building authority  
Nr. Z-33.1-27  
of December 4, 1997

# VERTICAL CUT



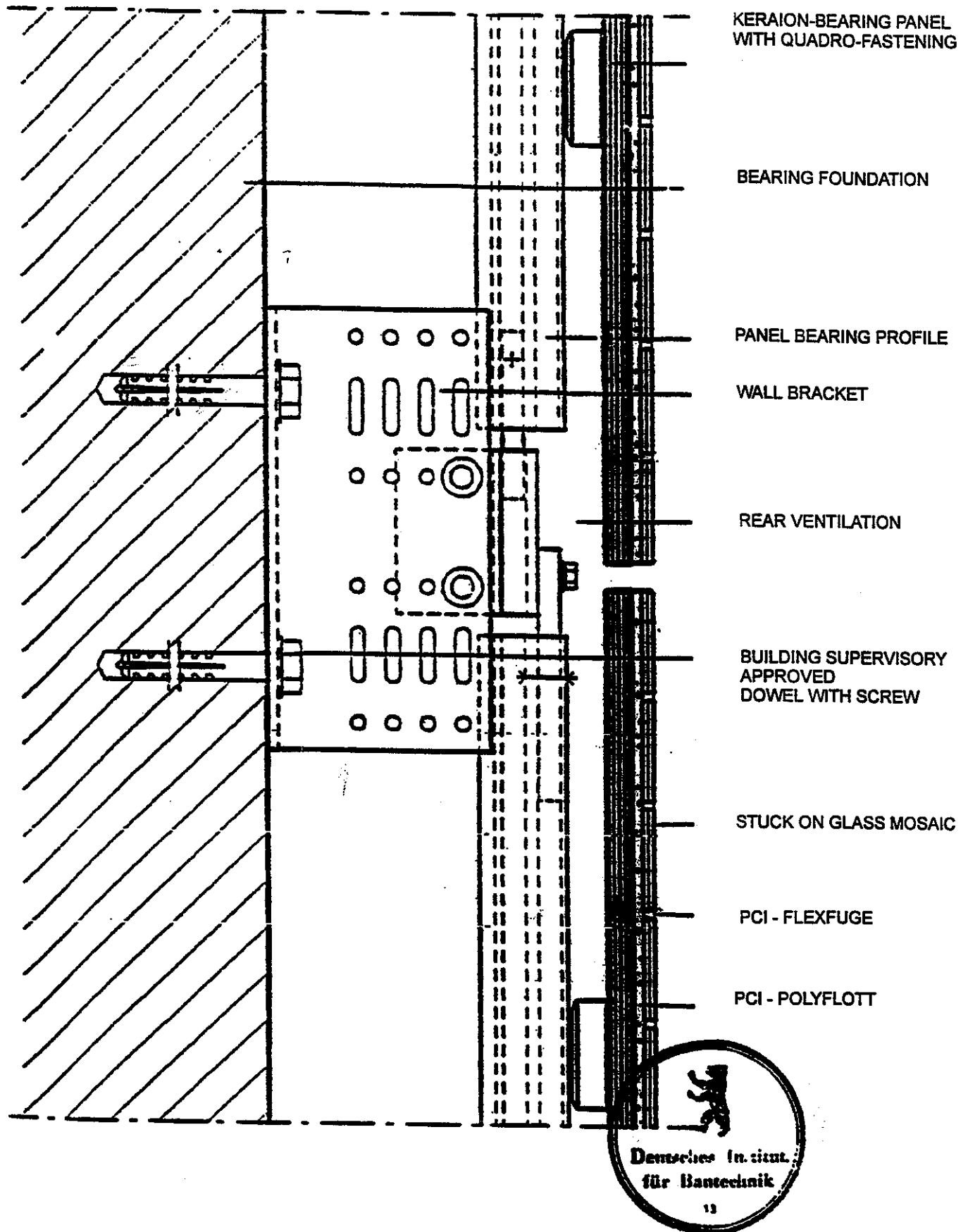
<p>TechnoCeram Agrob-Buchtal-Keramik GmbH 92519 Schwarzenfeld</p>	<p>Suspended, rear-ventilated ceramic-facade KerAion-Plus  Top layer with ceramic panels; vertical cut</p>	<p><b>ENCLOSURE 5.2</b> referring to the general approval of the building authority Nr. Z-33.1-27 of December 4, 1997</p>
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# HORIZONTAL CUT



<p>TechnoCeram Agrob-Buchtal-Keramik GmbH</p> <p>92519 Schwarzenfeld</p>	<p>Suspended, rear-ventilated ceramic-facade KerAion-Plus</p> <p>Top layer with glass mosaic; horizontal cut</p>	<p><b>ENCLOSURE 5.3</b> referring to the general approval of the building authority Nr. Z-33.1-27 of December 4, 1997</p>
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# VERTICAL CUT



TechnoCeram  
 Agrob-Buchtal-Keramik GmbH  
 92519 Schwarzenfeld

Suspended, rear-ventilated  
 ceramic-facade KerAion-Plus  
 Top layer with glass mosaic;  
 vertical cut

**ENCLOSURE 5.4**  
 referring to the general  
 approval of the building authority  
 Nr. Z-33.1-27  
 of December 4, 1997