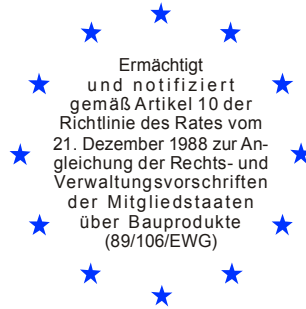


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DIBt

Mitglied der EOTA

European Technical Approval

ETA-05/0001

English translation prepared by DIBt

Handelsbezeichnung <i>Trade name</i>	Euromac 2 <i>Euromac 2</i>
Zulassungsinhaber <i>Holder of approval</i>	EUROMAC 2 Parc Industriel de Furst BP B.P. 22 57730 Folschviller FRANKREICH
Zulassungsgegenstand und Verwendungszweck	Nicht lasttragender verlorener Schalungsbausatz "EUROMAC 2" bestehend aus EPS-Schalungselementen
<i>Generic type and use of construction product</i>	<i>Non-load bearing permanent shuttering kit "Euromac 2" based on shuttering elements of EPS</i>
Geltungsdauer vom <i>Validity from</i> bis <i>to</i>	16. Februar 2005 16. Februar 2010
Herstellwerk <i>Manufacturing plant</i>	EUROMAC 2 Parc Industriel de Furst BP B.P. 22 57730 Folschviller FRANKREICH

Diese europäische
technische Zulassung umfasst
*This European Technical Approval
contains*

21 Seiten einschließlich 9 Anhänge
21 pages including 9 annexes



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I LEGAL BASES AND GENERAL CONDITIONS

- 1 This European Technical Approval is issued by Deutsches Institut für Bautechnik in accordance with:
 - Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products¹, amended by the Council Directive 93/68/EEC of 22 July 1993²;
 - *Gesetz über das In-Verkehr-Bringen von und den freien Warenverkehr mit Bauprodukten zur Umsetzung der Richtlinie 89/106/EWG des Rates vom 21. Dezember 1988 zur Angleichung der Rechts- und Verwaltungsvorschriften der Mitgliedstaaten über Bauprodukte und anderer Rechtsakte der Europäischen Gemeinschaften (Bauproduktengesetz - BauPG) vom 28. April 1998³;*
 - Common Procedural Rules for Requesting, Preparing and the Granting of European Technical Approvals set out in the Annex of Commission Decision 94/23/EC⁴;
 - Guideline for European Technical Approval of "Non load-bearing permanent shuttering kits/systems based on hollow blocks or panels of insulating materials and sometimes concrete", ETAG 009, edition June 2002.
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1 Official Journal of the European Communities N° L 40, 11.02.1989, p. 12

2 Official Journal of the European Communities N° L 220, 30.08.1993, p. 1

3 *Bundesgesetzblatt I, p. 812, zuletzt geändert durch Gesetz ('last amended by law on') vom 15.12.2001, Bundesgesetzblatt I, p. 3762*

4 Official Journal of the European Communities N° L 17, 20.01.1994, p. 34

II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

1 Definition of product and intended use

1.1 Definition of product

The shuttering system "EUROMAC 2" is a non-load-bearing permanent shuttering kit based on shuttering elements (see Annex 1 and 2) and accessory parts (see Annex 3) applicable as formwork for plain and reinforced concrete walls cast in-situ. The accessory parts are end leaves, lintel bottom leaves and capsules.

1.1.1 Shuttering elements

The shuttering elements consist of one-layered expanded polystyrene (EPS) leaves which are prefabricated in connection with ladders of steel. The ladders consist of two flat steels fastened in a distance of 150 mm (see h in Annex 1 and 2) by spot welding with spacers of steel wire. The ladders are placed together with the pre-expanded polystyrene granulate in a vertical distance of 150 mm (see h in Annex 1 and 2) in steel moulds. After the final expanding of the polystyrene granulate a non-reversible connection between the two shuttering leaves and the steel ladders is achieved, that means the shuttering elements are finished industrially. Before delivering on site on the outer surfaces of the outer shuttering leave a coating against UV radiation is applied.

The upper and lower surfaces of the shuttering leaves are castellated and the vertical mating surfaces are tongue and groove to form a tight fit when joined together. The outer surfaces have tapered grooves running vertically and are offset on opposite faces to ensure uniform concrete thickness and mechanical fixing of the shuttering leaves to the concrete. They also form locks for end stops and lintel elements. The dimensions of the elements range from 1000 mm to 1750 mm length and from 200 mm to 600 mm height.

The thickness of the inner shuttering leaf in all cases is 45 mm and the thickness of the outer shuttering leaf ranges from 45 to 245 mm. The clear span (b_{\min} in Annex 1 and 2) of the space for the concrete core in most cases is 145 mm with associated maximum span (b_{\max} in Annex 1 and 2) of 160 mm. There is only one element with a clear span of the concrete core of 195 mm (b_{\min} in Annex 1 and 2) and the associated maximum span of 210 mm (b_{\max} in Annex 1 and 2).

Special elements are also part of the system as angular and end elements (see Annex 2) which are produced in the same manner as described above.

1.1.2 Accessory parts

1.1.2.1 End leaves

End leaves are inserted in the gaps between the shuttering leaves at the end of the shuttering elements at openings of the wall.

1.1.2.2 Lintel bottom leaves

Lintel bottom leaves can be inserted in the gaps between the shuttering leaves and form the bottom of a shuttering of a lintel. Before concreting the leaves have to be supported .

1.1.2.3 Capsule

The capsule according to Annex 3 are made of plastic. They protect the cutting edges of the flat steels against corrosion and personal injury during construction.

1.2 Intended use

The kit is intended to be used for construction of internal walls as well as external walls above or below ground which are load-bearing (structural) or non load-bearing (non structural), including those which are subjected to fire regulations.

When using this type of construction below ground a waterproofing according to applicable national rules shall be provided depending on whether ground water not exerting pressure or ground water exerting pressure is to be dealt with. The waterproofing shall be protected from mechanical damage by a smash-resistant protective layer.

The provisions made in this ETA are based on an assumed intended working life of the shuttering kit of at least 50 years, provided that the shuttering system in end use conditions is subjected to an appropriate use and maintenance.

The indications given on the working life cannot be interpreted as a guarantee given by the manufacturer or the approval body. They are to be regarded only as a means for the specifiers to choose the appropriate criteria for shuttering kits in relation to the expected economically reasonable working life of the works.

2 Characteristics of products and methods of verification

2.1 Characteristics of products

2.1.1 Shuttering elements

The shuttering elements correspond to the information and drawings given in the Annexes 1 to 3. The characteristic data of the standard and special shuttering elements are given in the tables of Annex 1 and 2. The kit consists of the following shuttering elements:

- standard shuttering elements (Annex 1)
- end shuttering elements (Annex 2)
- corner shuttering elements (Annex 2)

For the shuttering leaves expanded polystyrene

EPS-EN 13163-T1-L1-W2-S2-P4-DS(70,-)3-BS200-DS(N)5-TR100 made of polystyrene particle foam according to EN 13163 is used.

The material characteristics, dimensions and tolerances of the shuttering elements not indicated in Annex 1 are given in the technical documentation⁵ of the ETA.

2.1.2 Accessory parts

2.1.2.1 End leaves

End leaves are made of the same form and EPS material as the shuttering leaves with a thickness of 70 mm. There are two length of end leaves in dependence of the thickness of concrete core, 160 mm and 210 mm (see Annex 3). The vertical mating surfaces are tongue and groove.

2.1.2.2 Lintel bottom leaves

Lintel bottom leaves are made of the same EPS material as the shuttering leaves with a thickness of 50 mm. There are only lintel bottom leaves for the shuttering elements with b_{max} (see Annex 1) of 160 mm. Their width is 160 mm and their length 1 m (see Annex 3). Their vertical surfaces in length direction are shaped alternatively to the inner surfaces of the shuttering leaves.

2.1.2.3 Capsule

The capsule according to Annex 3 are made of plastic.

⁵ The technical documentation of the ETA is deposited at DIBt and, as far as relevant for the tasks of the approved bodies involved in the attestation of conformity procedure, is handed over to the approved bodies.

2.2 Methods of verification

2.2.1 General

The assessment of the fitness of the shuttering system for the intended use has been made in compliance with ETAG 009, Guideline for European Technical Approval of "Non load-bearing permanent shuttering kits/systems based on shuttering elements or blocks of insulating materials and sometimes concrete", edition June 2002.

The ETA is issued for the shuttering kit "EUROMAC 2" on the basis of agreed information, deposited with Deutsches Institut für Bautechnik (DIBt), which identifies the shuttering kit that has been assessed and evaluated. Changes to the production process, the kit or the components which could result in this deposited information being incorrect, shall be notified to DIBt before the changes are introduced. DIBt will decide whether or not such changes affect the ETA and consequently the validity of the CE marking on the basis of the ETA, and, if so, whether further assessment and/or alterations to the ETA shall be necessary.

2.2.2 ER 1 Mechanical resistance and stability

2.2.2.1 Resulting structural pattern

In end use conditions walls made with shuttering elements "EUROMAC 2" are walls of continuous type according to ETAG 009, paragraph 2.2.

2.2.2.2 Efficiency of filling

Considering the instructions of chapter 4.2 and the installation guide of the ETA applicant the efficient filling of the shuttering without bursting voids or any uncovered reinforcement in the concrete core is possible.

The requirements according to ETAG 009, chapter 6.1.2 are met satisfactory.

2.2.2.3 Possibility of steel reinforcement

The instructions in the installation guide of the ETA applicant are appropriate to install steel reinforcement for walls according to EN 1992-1-1 or corresponding national rules.

The requirements according to ETAG 009, chapter 6.1.3 are met satisfactory.

2.2.3 ER 2 Safety in case of fire

2.2.3.1 Reaction to fire

Euroclass F, no performance determined

2.2.3.2 Resistance to fire

Since the minimum thickness of the continuous concrete core can be rounded up to 150 mm the fire resistance class of walls with a minimum concrete strength C16/20 according to table 1 of Annex C of ETAG 009 is REI 120.

2.2.4 ER 3 Hygiene, health and the environment

2.2.4.1 Release of dangerous substances

According to the manufacturer's declaration the shuttering elements "EUROMAC 2" taking account of the EU database⁶ does not contain any dangerous substances.

In addition to the specific clauses relating to dangerous substances contained in this European Technical Approval, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the EC Construction Products Directive, these requirements need also to be complied with, when and where they apply.

2.2.4.2 Water vapour permeability

The tabulated design value of water vapour diffusion resistance coefficient of expanded polystyrene (EPS), according to EN 12 524⁷, is $\mu = 60$.

The values for the water vapour diffusion resistance of concrete in dependence of density and type are tabulated in EN 12 524.

⁶ Notes are stated in Guidance Paper H: "A harmonized approach relating to dangerous substances under the Construction Products Directive", Brussels, 18 February 2000

⁷ EN 12524:2000 Building materials and products - Hygrothermal properties - Tabulated design values

2.2.5 ER 4 Safety in use

2.2.5.1 Bond strength between the shuttering leaves and the concrete core

The expanded polystyrene is bonded to the concrete by mechanical interlocking of the dovetail sections running vertically in the inner surfaces of the shuttering leaves over the whole element height with a horizontal distance of 5 cm. Since the width of the dovetail sections is 15 mm the effective area for transmission of tensile forces is $0,015 \cdot 1 \cdot 20 \text{ m}^2 = 0,3 \text{ m}^2$. This is more than 20% of the whole area of the shuttering leaves and leads to the effective bond strength of $0,03 \text{ N/mm}^2$ what is sufficient to meet the requirements in ETAG 004, chapter 6.1.4.1.3 .

The requirements according to ETAG 009, chapter 6.4.1.3 are met satisfactory.

2.2.5.2 Resistance to filling pressure

The fitness of the ladders and polystyrene cover of the flat bars of the ladders for the intended use in relation to resistance to filling pressure have been determined by testing of the finished shuttering elements with a pneumatic jack. The material for the shuttering leaves was in accordance with 2.1.1. The minimum value of this failure pressure was at 0.09 N/mm^2 .

The requirements according to ETAG 009, chapter 6.4.2 are met satisfactory.

2.2.5.3 Safety against personal injury by contact

As delivered on site the shuttering elements do not have sharp or cutting edges. At door or window openings some elements may have to be curtailed. Immediately after cutting the elements the plastic capsule has to be put over the cutting edges of the flat steels.

Because of the soft surface of the shuttering leaves there is no risk of abrasion or of cutting to people.

The requirements according to ETAG 009, chapter 6.4.3 are met satisfactory.

2.2.6 ER 5 Protection against noise

2.2.6.1 Airborne sound Insulation

The "No performance determined" option in ETAG 009, table 3 is used.

2.2.6.2 Sound absorption

The "No performance determined" option in ETAG 009, table 3 is used.

2.2.7 ER 6 Energy economy and heat retention

2.2.7.1 Thermal resistance

The nominal value of the thermal resistance R provided by elements in end use conditions (with concrete infill) is calculated in accordance with EN ISO 6946⁸ from the nominal value of the thermal resistance of the shuttering leaves R_{DI} according to EN 13163, chapter 4.2.1, and the thermal resistance of the concrete core R_{DC} (can be calculated by using values of thermal conductivity in dependence on density tabulated in EN 12524) .

$$R = R_{DI} + R_{DC} - \Delta R \quad [\text{m}^2\text{K/W}]$$

Because of the influence of the steel ladders this value has to be reduced in dependence of the wall section as given in the following table.

8

EN ISO 6946:1996

Building components and building elements - Thermal resistance and thermal transmittance - Calculation method

Type of shuttering element according to Annex 1	Thickness of the internal shuttering leaf (mm)	Thickness of Concrete core (mm)	Thickness of the external shuttering leaf (mm)	Total thickness (mm)	Reduction of the thermal resistance of the wall $\frac{\Delta R}{R_{DI} + R_{DC}} * 100$ caused by the structure of the shuttering leaves and the ladders [%]
M 121	45	210	45	300	12
Jumbo M175, M20, M100, PM 100	45	160	45	250	12
Jumbo M175+1, M20+1, M100+1	45	160	95	300	8
Jumbo M175+2, M20+2, M100+2	45	160	145	350	6
Jumbo M175+3, M20+3, M100+3	45	160	195	400	4,5
Jumbo M175+4, M20+4, M100+4	45	160	245	450	4

2.2.7.2 Thermal inertia

The values for heat capacity of concrete and expanded polystyrene are tabulated in EN 12 524.

2.2.8 Aspects of durability and servicability

2.2.8.1 Resistance to deterioration

Physical agent

As given in the designation code of the EPS material used (see 2.1.1) the dimensions of the shuttering leaves do not differ more than 3% after exposing them for 48 h at 70°C (DS(70,-)3).

The requirements according to ETAG 009, chapter 6.7.1.1 are met satisfactory.

Chemical agent

During construction the plastic capsule according to Annex 3 are to protect the cutting edges of the flat steels from corrosion. The ladders made of steel are only necessary for the resistance to concrete pressure. After hardening of the concrete the bond between concrete and shuttering leaves is given by the dovetail sections running vertically on the inner surfaces of shuttering leaves (see 2.2.5.1).

Therefore the requirement "corrosion protection" according to ETAG 009, chapter 6.7.1.2 is met satisfactory.

Biological agent

The application of EPS as insulating material for decades has shown that it sufficiently protects against fungi, bacteria, algae and insects.

EPS does not provide a food value and in general it does not contain voids suitable for habitation by vermin.

The requirements according to ETAG 009, chapter 6.7.1.3 are met satisfactory.

2.2.8.2 Resistance to normal use damage

Incorporation of ducts

The instructions in the installation guide of the ETA applicant are appropriate to install horizontally passing ducts on site.

Fixing of objects

Fixing of objects in the shuttering leaves is not possible, the part of fixings which is significant for the mechanical resistance shall be in the concrete.

3 Evaluation of conformity and CE marking

3.1 Attestation of conformity

The European Commission according to her decision on the procedure of attestation of conformity 98/279/EC of 05 December 1997 (Official Journal of the European Communities N° L 127, 24.04.1998) amended by the decision 2001/596/EC has laid down for this type of material system 2+ for the procedure of attestation of conformity (AoC) (Annex III, clause 2(ii) second possibility of Directive 89/106/EEC) for shuttering systems.

a) Tasks for the manufacturer:

1. initial type-testing of the product,
2. factory production control,
3. further testing of samples taken at the factory by the manufacturer in accordance with a prescribed test plan⁹.

b) Tasks for the approved body:

4. Certification of the factory production control on the basis of:
 - initial inspection of factory and of factory production control,
 - continuous surveillance, assessment and approval of factory production control.

3.2 Responsibilities

3.2.1 Tasks for the manufacturer

3.2.1.1 Initial type-testing of the product

For initial type-testing the results of the tests performed as part of the assessment for the European technical approval may be used unless there are changes to the product, in the production line or plant. In such cases the necessary initial type-testing has to be agreed between DIBt and the manufacturer involved.

3.2.1.2 Factory production control

The manufacturer has a factory production control system at the plant and exercises permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer are documented in a systematic manner in the form of written policies and procedures. The production control system ensures that the product is in conformity with the European technical approval.

The manufacturer shall only use raw materials supplied with the relevant inspection documents as laid down in the prescribed test plan⁹. The incoming raw materials shall be subject to controls and tests by the manufacturer before acceptance.

The shuttering elements or parts of these elements shall be subject to the following tests:

- Shuttering leaves (material properties according to EN 13163)
- Shuttering elements (sectional dimensions of spacers and flat steels, horizontal distance of the spacers in the ladders, resistance to pressure of the finished shuttering element according to 2.2.5.3, thickness of polystyrene cover of the flat steels, dimensions of the shuttering elements, tight fit of the vertical and horizontal joints between the shuttering elements)
- Visual control of correct assemblage and of completeness of the shuttering element.

⁹ The prescribed test plan has been deposited at DIBt and is handed over only to the approved bodies involved in the conformity attestation procedure.

The frequency of controls and tests conducted during production and on the assembled shuttering element is laid down in the prescribed test plan⁹.

The results of factory production control are recorded and evaluated. The records include at least the following information:

- Designation of the product, basic material and components;
- type of control or testing;
- date of manufacture of the product and date of testing of the product or basic material and components;
- result of control and testing and, if appropriate, comparison with requirements;
- signature of person responsible for factory production control.

The records shall be presented to the approved body involved in the continuous surveillance. On request they shall be presented to DIBt.

Details as to extent, type and frequency of testing and controls to be performed within the factory production control shall correspond to the prescribed test plan⁹ which is part of the technical documentation of this European technical approval.

3.2.2 Tasks for the approved body

3.2.2.1 Initial inspection of factory and of factory production control

The approved body shall ascertain that, in accordance with the prescribed test plan⁹, the factory, in particular staff and equipment, and the factory production control are suitable to ensure a continuous and orderly manufacturing of shuttering elements with the specifications mentioned in 2.1 as well as in the Annexes to the European technical approval, in accordance with the prescribed test plan⁹.

3.2.2.2 Continuous surveillance

The approved body shall visit the factory at least once a year for surveillance. It has to be verified that the system of factory production control and the specified automated manufacturing process are maintained taking account of the prescribed test plan⁹.

Continuous surveillance and assessment of factory production control have to be performed according to the prescribed test plan⁹.

The results of product certification and continuous surveillance shall be made available on demand by the approved body, respectively, to DIBt.

In cases where the provisions of the European technical approval and the prescribed test plan⁹ are no longer fulfilled the conformity certificate shall be withdrawn.

3.3 CE marking

The CE marking shall be affixed on every second shuttering element and/or on the accompanying documents. The initials "CE" shall be followed by the identification number of the certification body and shall be accompanied by the following information:

- name or identifying mark of producer and manufacturing plant;
- the last two digits of the year in which the CE marking was affixed;
- number of the EC certificate of conformity;
- number of the European technical approval;
- Euroclass F according to EN 13501-1
- protection against noise "no performance determined"
- the nominal values of thermal resistance R_{DI} of the shuttering leaves according to EN 13163:2001-10, chapter 4.2.1

4 Assumption under which the fitness of the product for the intended use was favourably assessed

4.1 Manufacturing

The shuttering elements are manufactured in accordance with the provisions of the European technical approval using the automated manufacturing process as identified during the inspection of the plant by DIBt and the approved body and laid down in the technical documentation.

4.2 Application

4.2.1 General

The manufacturer shall ensure that the requirements in accordance with sections 1, 2, and 4 are made known to those involved in planning and execution. The installation guide is deposited at DIBt and shall be present at every construction site. If the manufacturer's instructions contain other specifications than those stated here, the specifications of the ETA shall apply.

After installation of the shuttering elements (see 4.2.2) the site-mixed or ready mixed concrete is brought in and compacted.

In end use conditions concrete walls of continuous type¹⁰ of plain or reinforced concrete according to EN 1992-1-1 or corresponding national rules will be formed.

For structural design dimensions and weights given in Annex 8 have to be used.

In end use conditions the EPS-shuttering leaves are the main part of the thermal insulation of the walls.

4.2.2 Installation of the shuttering elements

The shuttering elements are put together on site in layers without adhesive. To receive stable floor high formworks the vertical joints between two elements of one layer have to be shifted of at least a quarter of the element length to the vertical joints of the previous and next layer (see Annex 4).

First of all two layers of the entire floor plan are to be interlocked according to the installation guide of the manufacturer.

Afterwards leveling to the subsoil is performed (foundation, bottom plate, ceiling). Voids between the shuttering leaves and the uneven subsoil are to be sealed with PU foam before concreting.

Subsequently, according to the installation guide of the manufacturer, the walls are to be interlocked to floor height, leveled and fastened to the scaffolding supports.

The scaffolding supports are to be arranged at a distance of 1.20 m to 1.50 m at the most, to be connected over the entire wall height with the shuttering elements and to be fastened to the floor. Metal webs which are visible after cutting the elements in the door and window area are to be covered with plastic capsule according to Annex 8.

The necessary reinforcement according to static calculation also shall be installed in an appropriate way. Rectangular wall corners are to be formed according to Annex 5, wall junctions according to Annex 6 and wall corners of arbitrary angle according Annex 7,

4.2.3 Concreting

For the production of normal concrete EN 206-1:2001-07 shall apply. The consistency of concrete on compacting by shaking shall be within the lower consistency range F3 and on compacting by poking within the upper consistency range F3. The maximum aggregate size shall be at least 8 mm and shall not exceed 16 mm. The concrete shall have rapid or middle strength development according to EN 206-1:2001-07, table 12.

Placing the concrete shall be performed only by persons who were instructed in the works and in the proper handling of the shuttering system.

¹⁰ see ETAG 009 chapter 2.2

The maximum filling height amounts to 1 m at a concreting velocity of 3 m/h.

If equivalent national rules are not available the following instructions shall be considered:

Horizontal day joints are to be arranged preferably at the height of the floor. In the case these can not be avoided vertical composite reinforcement bars has to be installed. The composite reinforcement shall comply the following requirements:

- two adjacent composite reinforcement bars shall not be situated in the same plane parallel to the surface of the wall,
- the distance between two composite reinforcement bars in wall direction shall be at least 10 cm and not larger than 50 cm,
- the total section area of the composite reinforcement bars shall not be minor than 1/2000 of the section area of the concrete,
- anchorage length of the composite reinforcement bars on both sides of the day joint at least shall be 20 cm

Before the further placing of concrete, cement laitance and detached / loose concrete shall be removed and the day joints shall be sufficiently pre-wetted. At the time of concreting the surface of the older concrete shall be slightly moist, so that the cement paste of the newly brought in concrete can combine well with the older concrete.

If no day joint is planned, placing of concrete in layers may only be interrupted until the concrete layer brought in last is not solidified yet so that a good and even bond is still possible between the two concrete layers. When using internal vibrators the vibrating cylinder shall still penetrate into the already compacted lower concrete layer.

The concrete may fall freely only up to a height of 2 m, beyond that the concrete shall be cohered by discharge pipes or concreting tubes with a diameter of 100 mm at the most and shall be led shortly before the place of installation.

Cones from pouring are to be avoided by short distances of the places of fill in.

Planning shall allow for sufficient spaces in the reinforcement for discharge pipes or concreting tubes.

After concreting the walls may not deviate from the plumb line more than 5 mm per running meter wall height.

The ceiling may only be placed on walls made of shuttering elements if a sufficient strength of the infill concrete exists.

4.2.4 Ducts crossing and situated inside the wall

Horizontally passing ducts are to be installed according to the installation guide of the ETA applicant and are to be taken into account when designing the wall.

Horizontal ducts situated inside the wall cores are to be avoided. If absolutely necessary, these are to be taken into account when designing the wall.

Also vertical ducts in the concrete core shall be considered, if their diameter exceeds 1/6 of the thickness of the concrete core and the distance of the pipes is less than 2 m.

4.2.5 Reworking and finishes

Walls of the type "EUROMAC 2" are to be protected by finishes. Finishes are not part of the kit and therefore not considered in this ETA. Preferably for external surfaces the used rendering systems should meet the requirement of ETAG 004¹¹. The execution of the rendering shall be performed according to applicable national rules.

4.2.6 Fixing of objects

Fixing of objects in the shuttering leaves is not possible, the part of fixings which is significant for the mechanical resistance shall be in the concrete. The influence of the fixing to the reduction of the thermal resistance has to be considered according to EN ISO 6946.

5 Recommendations

5.1 Recommendations on packaging, transport and storage

The shuttering elements have to be protected against damage, soiling and intensive action of water during transport and storage. If necessary the elements has to be covered.

5.2 Recommendations on use, maintenance and repair

Regular checks should be carried out on render finishes to ensure that any damage is detected and repaired as soon as possible.

Concerning recommendations on use, maintenance and repair ETAG 009, section 7.5 shall apply.

Dipl.-Ing. Erich Jasch

Beglaubigt:

Dr.-Ing. Alex