



Green-Tec Solutions sp. z o.o.

27 Kaczeńcowa street, 91-214 Lodz, Poland
tel.: +48 42 253 16 09 | fax: +48 42 253 16 99
mobile: +48 731 999 270
e-mail: sales@g-tec.pl | www.g-tec.pl
VAT number: PL9471976679



COMPANY TECHNICAL INSTRUCTION

System of foamed polystyrene boarding TYPE "JS" for monolithic rib-and-slab floors

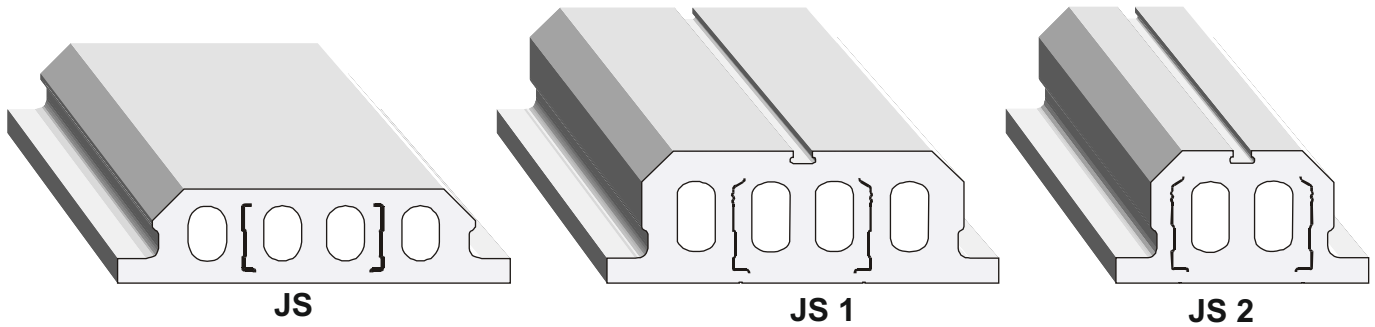
CE certificate according to PN-EN15037-4+A1:2013



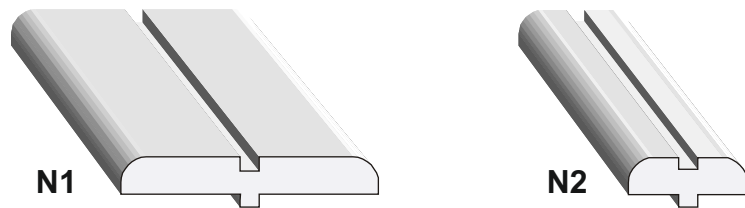
TRADITIONAL METHOD

INNOVATIVE TECHNOLOGY

The system of foamed polystyrene boarding type JS under monolithic rib-and-slab floor consist of boarding plates **JS, JS 1, JS 2,**



Which , when needed can be raised by cover plates **N1** or **N2**.



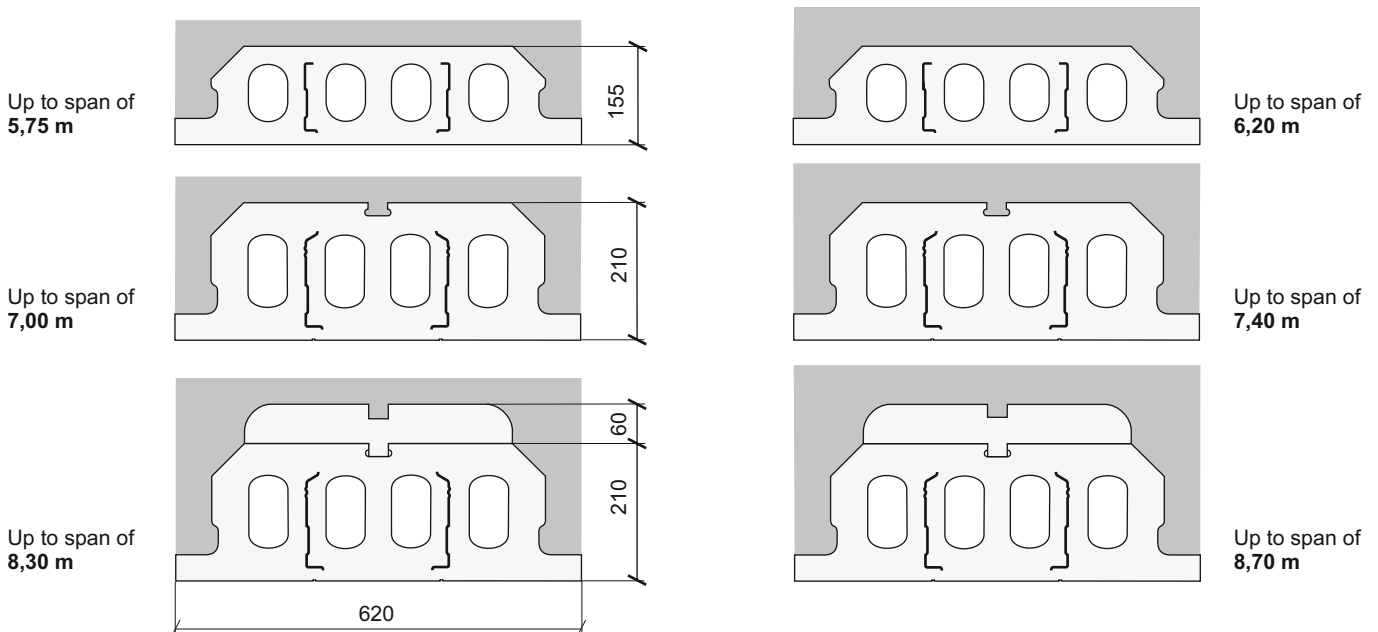
Depending on spans and loads the above system enables to make a monolithic rib-and-slab floor up to the span of **9.30 m** and with ceilings/roofs to even higher spans.

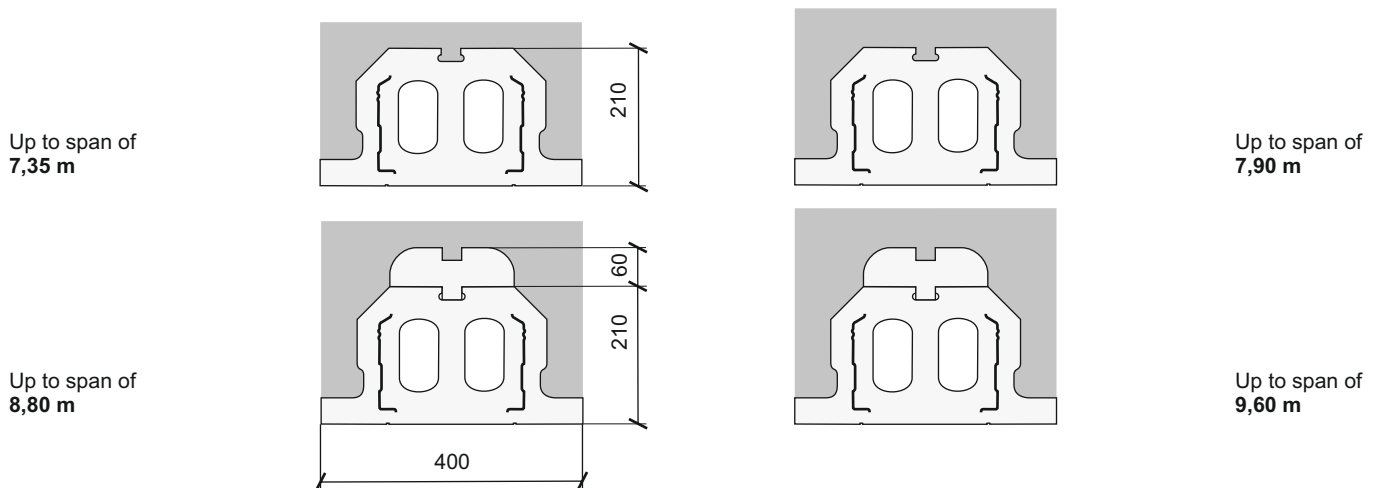
The floors/ceilings made on foamed polystyrene boarding plates type JS + with the approval of **ITB** number **AT - 1078/2008** have a very good thermal insulation ability which is very important particularly for floors/ceilings over unheated cellars or attics. The plates **JS** are at the same time a boarding (shuttering) and a filling of the ceiling/roof which reduces the time of execution. It should be also stressed that the small weight of this boarding/shuttering makes the assembly in the house much easier and the floor/ceiling weights relatively little and has a very good rigidity typical of monolithic constructions. At the assembling stage plates are a construction element transferring assembly loads but at the stage of operating they are a non-construction filling external loads are conveyed by beams and a concrete plate of the floor/ceiling.

Three kinds of boarding/shuttering plate and a foamed polystyrene cover plate enable designing:

1. Five types of floor/ceiling with a plate of super concrete **40 mm**.

2. Five types of floor/ceiling with a plate of super concrete **60 mm**.





The above spans have been calculated for a characteristic prolonged load exceeding the weight of the floor/ceiling $2,0 \text{ kN/m}^2$

Various heights of the ceilings and different spacing of the vault ribs give an ample freedom of architectural solutions and a possibility of application of these solutions in one family and multi-family buildings, in industrial buildings, in public buildings, in halls etc.

The characteristics of JS plate

- CE certificate according to PN-EN15037-4+A1:2013
- The plates are made of self extinguishing foamed polystyrene with a volume density 25 kg/m^3 with two reinforcing materials made of a steel sheet St08 with a thickness $0,9-0,7 \text{ mm}$.
- It does not contain harmful substances

Technical parameters of ceilings/roofs on boarding plates JS

- Spacing of roof ribs $a=400 \text{ mm} - 620 \text{ mm}$
- The height of roof construction in raw state $h=195 - 330 \text{ mm}$
- The span of the ceiling/roof (clear span of supports) Results from the destination of the ceiling/roof and depends on static loads. However it is not higher than 12 m .
- The thickness of super concrete plate $40 - 60 \text{ mm}$
- The weight of ceiling/roof in a raw condition:
 - Thickness of super concrete $40 \text{ mm} - 1,65 \text{ kN/m}^2 - 3,20 \text{ kN/m}^2$
 - Thickness of super concrete $60 \text{ mm} - 2,15 \text{ kN/m}^2 - 3,70 \text{ kN/m}^2$
- One should assume the fire resistance of the ceilings/roofs depending on covering main reinforcement bars in ribs with concrete according to the existing regulations.

- Heat transfer coefficient: $U=0.21-0.28 \text{ W/m}^2\text{K}$

Acoustic insulation ability should comply with the requirements specified in the standard PN 87/B-02151/032.

In order to satisfy the requirements mentioned in the above standard the finish of the floor/ceiling/roof should proceed in accordance with "The Catalogue of solutions for floors in housing and building industry"

- Static calculations of the floor/ceiling/roof should be carried out according to the standard PN-B-03264/99 considering floor and ceiling as free-supporting (free-standing) element.

The following conditions should be fulfilled:

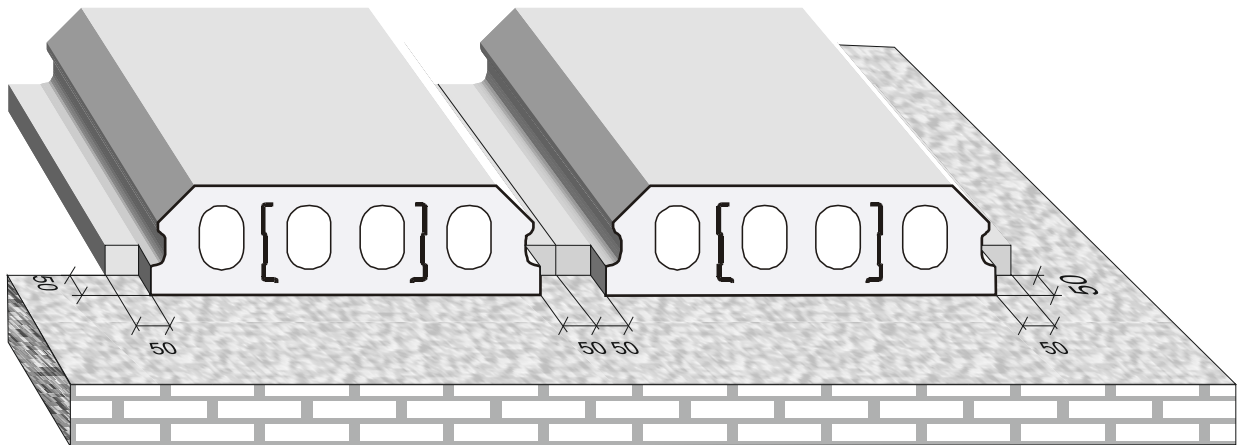
- the concrete employed should not worse than class B20
- main concrete reinforcement should be made of steel class A-III (mark 34 GS)
- stirrups steel class A-0 (mark ST0S-b)

Constructional calculations for floors/roofs where our plates we applied were made in Lodz Technical University. "Politechnika Lodzka"

Comparison of coasts of floor/roof construction in the foamed polystyrene system with other monolithic rib-and-slab floors with the same technical parameters demonstrates that the floor/ceiling/roof is on an average 20% cheaper.

1. Laying shuttering boards “JS”-type

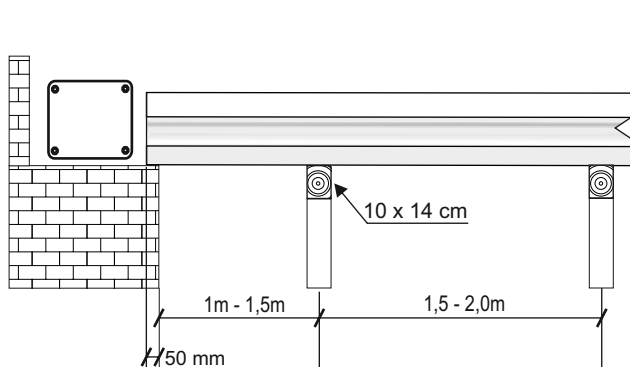
Plates can be supplied in segments 13m but they can also be cut to any ordered dimensions. In view of the small weight plates can be carried to any level without the necessity of additional devices. Boarding (shuttering) plates should be laid on steady supports the depth of floor joist bearing cannot be less than 50 mm. Steady supports (walls) before laying boarding (shuttering) plates should be made even and should be leveled with a layer of cement mortar. Lateral and lower elements of the plates (55mm 40mm thick) used as guards of floor/ceiling ribs should be cut out up to the depth of floor joist bearing on a steady support (50 mm X 50mm) Drawing 1. This manner of support for the plates results on the narrowing of floor/ceiling walling crib. When the conditions of strength demand walling cribs where the width is equal to the thickness of the support boarding (shuttering) plates rest on assembly supports made just near the wall / Drawing 3



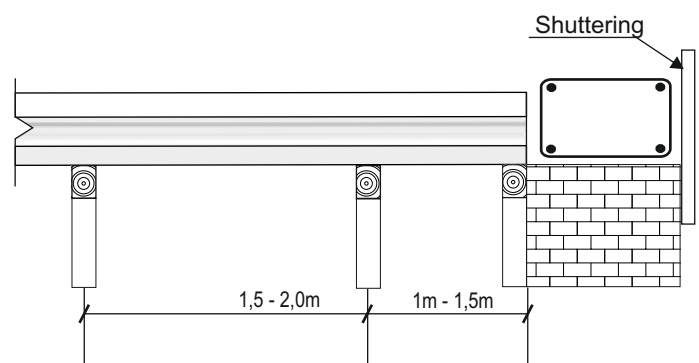
Drawing 1.

2. Assembly supports

Before laying boarding plates and placing them on the walls one should erect and level assembly support perpendicularly to the plates. Spacing should not be higher than 2,0 m (Drawing 2) Assembly support should be made on the whole length of boarding plates and the width of assembly support should not be lower than 100mm. The plates should be placed tightly , one next to the other , perpendicularly to the span of the floor/ceiling



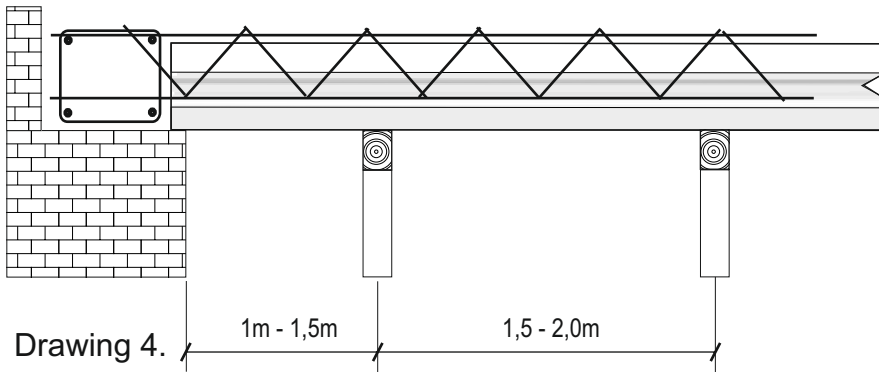
Drawing 2. Assembly support with the floor joist bearing (boarding plate JS support on a steady support 50mm)



Drawing 3. Assembly support immediately near the wall.

3. Reinforcing the floor/ceiling

Before reinforcing the floor/ceiling one should lay 2-3 boards on boarding/shuttering plates avoiding so a possible damage to the plates. The we start reinforcing the floor with constructing the walling crib Drawing 2 ,3 After that we reinforce the ribs and connect them with the reinforced walling crib. (Drawing 4)



Drawing 4.

The choice of walling crib reinforcement the choice of floor ribs and that of other elements should be made in accordance with individual designing documentation. Assuming that the beams will be made on the site the use of various stirrups depending on needs and destinations of the floors may be permissible. Laying beams between the plates is shown on the drawing (Drawing5) . The main floor/ceiling reinforcement should be made of steel class A-III mark 34 GS according to the standard PN-82/H-93215 or of steel class A-III mark ST3S-b-500 or ST3SY-b-500 fulfilling the requirements of ITB certificate number 994/94 Technical Approval ITB number AT-15-2305/96, Technical Approval ITB number AT-15-2498/97 or Technical approval ITB AT - 1078/2008. The steel reinforcement should be made of steel A-0 mark ST0S-b

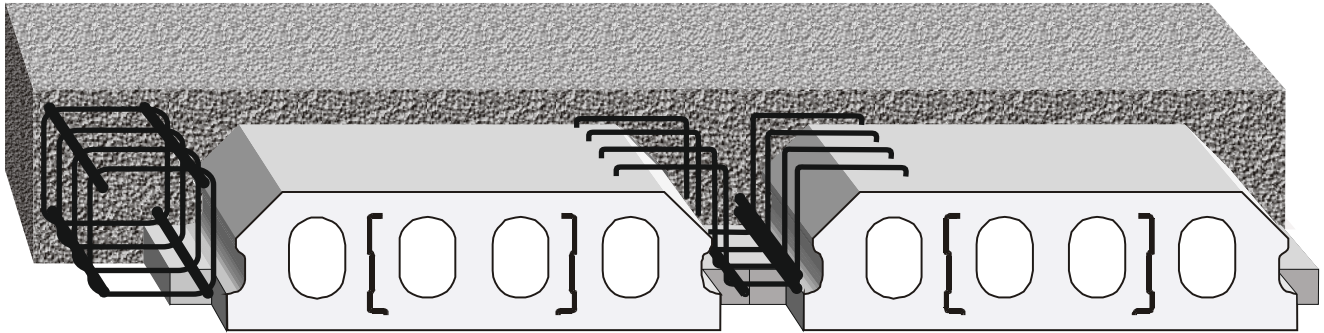
Type of shuttering/boarding		Thickness of super concrete		The shape of stirrups for all types.
		40	60	
JS		$h = 115$ $a = 20$	$h = 135$ $a = 40$	The stirrups should be made of steel class A-0, mark St0S-b, R 6
		$h = 170$ $a = 20$	$h = 190$ $a = 40$	
JS 1 JS 2		$h = 230$ $a = 20$	$h = 250$ $a = 40$	
JS 1 + N1 JS 2 + N2				

Drawing 5

4. Placing the concrete on the ceiling

The concrete mix is placed after the reinforcement assembly in the ribs in the super concrete plate in walling cribs and other elements provided for in the documentation. The concrete mix should be mechanically consolidated. The quality of concrete mix should correspond to the conditions given in the floor/ceiling documentation.

The concrete used for making the floors/ceiling should not be a class lower than B-20 which corresponds to the requirements of standard PN 88/B-06250. The placed concrete mix should be cured in the period of maturing in accordance with "Technical Conditions of Realization and Acceptance of Construction and Assembly Work."



5. Removal of assembly supports

Removal of boards for floor and ceiling elements , removal of assembly supports can take place only when the concrete achieves 70% of projected strength.

6. Technology of finishing

The finish of the floor/ceiling can be made by means of one of the following technologies :



Plastering and painting

We put a thin coat of glue mix on the floor/ceiling. Then we put a network of glass fibre or polypropylene mesh 4X3 mm or 4X4 mm. We press the network in the glue mix by means of a steel trowel. After the plaster dries up we put the paint.



Ceiling with decorative coffers.

We put a thin coat of glue mix (for foamed polystyrene) for grounding.
After drying we place decorative coffers on the glue for foamed polystyrene commonly used in trade.



Placing gypsum plates or suspension of ceilings.

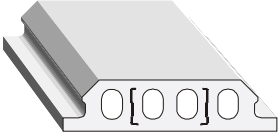
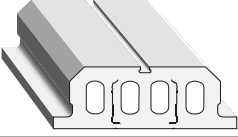
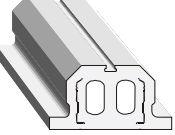
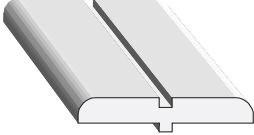
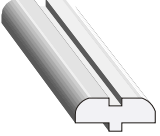

In the plate there are two light sections 0,99 mm which apart from making the plaster more rigid are designed for preliminary fixing by means of screws (for gypsum plates , suspended ceilings etc.)
Final fixing should be made with screws with expander pins to the rib of concrete plate in the place of contact of foamed polystyrene plates.

7. Conditions of transport and storing

The plate ought to be transported in a horizontal position maximum 10 pieces.

The subsoil (ground) in the place of storage should be dry and even.

The plates can be supplied in lengths 13 m or other according to the order.

	TYPE	DIMENSIONS (W x H)	CONCRETE CONSUM./100m ²
	SHORING BOARD "JS" TYPE	620x155mm	~6.40m ³ (4cm) ~8.40m ³ (6cm)
	SHORING BOARD "JS 1" TYPE	620x210mm	~7.35m ³ (4cm) ~9.35m ³ (6cm)
	SHORING BOARD "JS 2" TYPE	400x210mm	~9.31m ³ (4cm) ~11.31m ³ (6cm)
	EPS COVER PLATE "N1 TYPE"	405x595mm	JS1 + N1: ~9.34m ³ (4cm) ~11.34m ³ (6cm)
	EPS COVER PLATE "N2 TYPE"	190x595mm	JS2 + N2: ~12.50m ³ (4cm) ~14.50m ³ (6cm)
	EPS PLUG FOR "JS", "JS 1", "JS 2" SHORING BOARDS	JS, JS1 - 2pcs./board JS2 - 1pc./board	

The lengths of particular shoring boards are dependent on the customer's order. Above mentioned are net prices to which VAT has to be added if applicable.



Technologies of making ceilings with use of above listed boards, can be found in Technical Manual attached to every single batch of sold shoring boards.

All additional information regarding the shoring board can be obtained in the Marketing Department of Green-Tec Solutions company and/or company's website at www.g-tec.pl

PRIZES AND FAIR AWARDS

Golden Helmet Award - Polish Chamber of Commerce and Industry

Lodz Voivode's diploma awarded at 5th Building Industry Fair "Interbud"

- *Łódź, Poland, 26.02-01.03.1998*

Medal awarded at 5th Housing Building Materials and Interior Fittings Fair

- *Kielce, Poland, 26-29.03.1998*

Archeress statue awarded at 5th Ecological Building Industry Fair "Eko-Bud 98"

- *Bydgoszcz, Poland, 02.04.1998*

Distinction award at 7th International Building Industry Fair

- *Szczecin, Poland, 16-19.04.1998*

Diploma awarded at 11th International Building Industry Fair "Tarbud-Jesień 98"

- *Wrocław, Poland, 27-30.08.1998*

Distinction award at 6th Heating Methods and Protection Systems Fair

- *Drzonków, Poland, 24.09.1998*

Main Prize at 14th International Building Industry Fair "Oltarbud 98"

- *Olsztyn, Poland, 9-11.10.1998*

Medal for "The Best Product" at 6th Building, Interior Fittings and Property Protection Industries Fair "Gobud 99"

- *Gorzów Wielkopolski, Poland, 12-14.02.1999*

Honorary Award - Golden Mermaid - at Warsaw Building Industry Fair

- *Warsaw, Poland, 18.03.2000*

