

## 1 SPECIFICATION OF SUBJECT OF TESTING

### 1.1 Specification of samples:

Heat-insulated boards from polystyrene foam with surface treatment intended for:  
- heat insulation of vertical walls of buildings

### 1.2 Product description:

Boards from polystyrene foam with surface treatment from clinker tile bands pursuant to ČSN EN 13 163.

### 1.3 Purpose of the product:

The panels are intended for heat insulation of buildings meeting the requirements for all applications pursuant to Article 4.2 and selected requirements declared by the manufacturer for specific use pursuant to Article 4.3, as specified in the compliance tables.

## 2 SAMPLING

**Sampling was performed by:** a representative of the Client, Mr. Jaroslav Režňák, according to the instruction of a representative of the Notified Body (Bc. Ladislav Vendl).

**Sample was delivered by:** a representative of the Client, Mr. Jaroslav Režňák

**Samples were delivered from 13 different production dates:** identification of the production date (I – XIII).

**Date of delivery of samples to the testing room:** 12.04.2010, 15.04.2010 and 06.05.2010  
(Accredited testing laboratories 1007.2, 1007.4 and 1007.7)

**Sampling method:** according to individual testing standards

## 3 TEST RESULTS

- Initial product type tests were carried out by the accredited testing laboratory for finishing building works No. 1007.2 between 19 April and 18 May 2010, in the premises of CSI a.s., branch office in Zlín, by the testing room of heat properties, structures and buildings, accredited laboratory No. 1007.4, between 6 and 10 May 2010 and by the fire technical laboratory, accredited laboratory No. 1007.7, on 20 May 2010, both in the premises of CSI a.s. in Prague.

The test results are included in the following documents:

- Test Report No. 041-010-063. Heat-insulating clinker lining-polystyrene with surface treatment, accredited testing laboratory No. 1007.2, CSI a.s., branch office Zlín
- Test Report No. 1906 – Determination of thermal conductivity coefficient of EPS boards, a part of the “Heat-insulating clinker lining-polystyrene with surface treatment”, accredited laboratory 1007.4, CSI a.s., Prague
- Technical Report – Calculation of the heat transfer coefficient of the “Heat-insulating clinker lining-polystyrene with surface treatment”, CSI a.s., Prague
- Report No. 15032 on fire and technical characteristics, accredited testing laboratory No. 1007.7, CSI a.s., Prague

For summary of the test results see the following tables.

**ALL APPLICATIONS**

4.2.1 – Thermal resistance  $R_{90/90}$  ( $m^2.K/W$ ) for  $l = 45$  mm  
 Thermal conductivity coefficient  $\lambda$  ( $W/mK$ )

Product	Declared threshold value/class		Ascertained levels in production dates:			
			I	II	III	IV
EPS a part of the heat-insulating clinker lining	$\lambda$	<b>0.034</b>	0.0319	0.0316	0.0317	0.0320
			Ascertained average value 0.032			
	$R_{90/90}$	<b>1.30</b>	Ascertained average value 1.40			

4.2.3 – Thickness  $T$  (Ascertained variance in (mm) from the nominal value of 62 mm)

Product	Declared threshold value/class	Ascertained variations from nominal level in production dates:			
		IV	V	VI	VII
Heat-insulating clinker lining	<b>T</b>	-2	-2	-2	-2

4.2.4 – Perpendicularity (variance in mm/m length/width)

Product	Declared threshold value/class	Ascertained variations in length/width in production dates:			
		IV	V	VI	VII
Heat-insulating clinker lining	<b>S2</b>	0	0	1	0





4.3.2 – Dimensional stability in determined conditions(change in length  $\Delta\epsilon_l$ , width  $\Delta\epsilon_b$  and thickness  $\Delta\epsilon_s$  in % at + 70°C for 48 hours)

Product	Declared threshold value/level	Ascertained changes in dimension in production dates:			
		I	II	III	IV
Heat-insulating clinker lining	<b>DS (70,-)1</b>	-0.3/-0.4/+0.5	-0.4/-0.4/+0.3	-0.3/-0.3/+0.3	-0.3/-0.3/+0.5
		Ascertained average value -0.3/-0.4/+0.4			

4.3.4 – Compressive stress at 10 % compression – (is not design value)  $\sigma_b$  (kPa)

Product	Declared threshold value/class	Ascertained values from different production dates:			
		I	IV	VI	VIII
Heat-insulating clinker lining	<b>CS(10) 300</b>	308	324	318	288
		Ascertained average value 310			

4.3.5 – Tensile strength perpendicular to the board plane

Product	Declared threshold value/class	Ascertained values from different production dates:			
		I	III	IV	V
Heat-insulating clinker lining	<b>TR 50/TR 400</b>	69/440 <sup>*)</sup>	67/560 <sup>*)</sup>	93/690 <sup>*)</sup>	78/530 <sup>*)</sup>
		Ascertained average value 77/540			

\*) values of EPS – a part of the heat-insulating clinker lining

4.3.9.1 – Long-term water absorptivity during partial immersion ( $\text{kg/m}^2$ )

Product	Declared threshold value/level	Ascertained values in production dates:			
		I	II	III	VIII
Heat-insulating clinker lining	<b>WL(P) 0.5</b>	0.40	0.49	0.37	0.34
		Ascertained average value 0.40			

## Long-term water absorptivity during complete immersion (%)

Product	Declared threshold value/level	Ascertained values in production dates:			
		I	II	III	VIII
Heat-insulating clinker lining	<b>WL(T) 5</b>	4.1	4.5	4.0	3.1
		Ascertained average value 4.1			

## 4 CONCLUSION

The Notifying Body 1390 confirms compliance of declared properties of the assessed product with the results of initial tests of the type according to ČSN EN 131 63 and ČSN EN 13 172.

## 5 VALIDITY OF THE INITIAL PRODUCT TYPE TEST

This Report on initial product type test is issued for specific variants of the product created during the manufacture provided that technological procedures and other production and technical documentation are complied with and provided that constant production quality is maintained. This Report is valid for the product in the rendering according to the provided documentation. The Report validity is not limited by time, or it shall remain valid until a moment when a change of some of the assessed properties occurs due to a change of the product specifications, termination of validity of existing technical documentation, change of technological procedure or material composition, and until a moment when a change of legal requirements for the product assessment occurs, or until a moment when another report is issued updating the list of manufactured variants with newly expressed numerical values of relevant technical parameters and physical quantities.



**6 DOCUMENTS USED FOR THE REPORT PREPARATION**

1. Request for performance of the Notified Body No. 0385/10/Z
2. Test Report No. 041-010-063. Heat-insulating clinker lining-polystyrene with surface treatment, accredited testing laboratory No. 1007.2, CSI a.s., branch office Zlín
3. Test Report No. 1906 – Determination of thermal conductivity coefficient of EPS boards, a part of the “Heat-insulating clinker lining-polystyrene with surface treatment”, accredited laboratory 1007.4, CSI a.s., Prague
4. Technical Report – Calculation of the heat transfer coefficient of the “Heat-insulating clinker lining-polystyrene with surface treatment”, CSI a.s., Prague
5. Report No. 15032 on fire and technical characteristics, accredited testing laboratory No. 1007.7, CSI a.s., Prague



4.2.5 – Flatness (variance from flatness  $S_{\max}$  in mm)

Product	Declared threshold value/class	Ascertained variations in flatness in production dates:			
		IV	V	VI	VII
Heat-insulating clinker lining	<b>P4</b>	1	1	1	1

4.2.7 and 4.3.6 – Bending strength  $\sigma_b$  (kPa)

Product	Declared threshold value/level	Ascertained levels in production dates:			
		VIII	X	XI	XII
Heat-insulating clinker lining	<b>BS 450</b>	455	484	410	480
		Ascertained average value			

## 4.2.8 – Reaction to fire

Product	Declared threshold value/class	Ascertained levels / classes:			
		VIII	X	XI	XII
Heat-insulating clinker lining	<b>E</b>	E			

Accredited Testing Laboratory No. 1007.7

## TEST REPORT No. 15032

### on Fire and Technical Characteristics

Our ref: PTL - 092/10	Number of pages: 1					
<b>Client:</b> CSI a.s., branch office Zlín, K Cihelně 304, 764 32 Zlín - Louky						
<b>TEST ITEM</b> <b>Name:</b> EPS from heat insulating clinker lining <b>Manufacturer:</b> Grynczewsky Styromat, Spolka Komandytowa, Augustówka 22C, 02-981 Warszawa <b>Composition:</b> EPS <b>Appearance:</b> while polystyrene, lining at the back; thickness: polystyrene 17 mm, polystyrene + lining about 60 mm						
<b>Date of receipt of the sample:</b> 6 May 2010 <b>Sampling:</b> The samples were delivered by the Client <b>Date of carrying of tests:</b> 20 May 2010						
<b>TEST METHOD:</b> ČSN EN ISO 11925 – 2 Annex A <b>Conditioning of samples:</b> according to ČSN EN ISO 13238, Article 4.2						
<b>MEASURED VALUES AND THE TEST RESULTS</b>						
<b>Sample No.</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>Ignition of the sample:</b>	no	no	no	no	no	no
<b>Reaching the mark [s]:</b>	no	no	no	no	no	no
<b>Ignition of the filter paper:</b>	no	no	no	no	no	no
<b>Observation during the test:</b> The test specimen were melting.						
<b>Conclusion:</b>  The test results relate to the behaviour of the test specimen of a product under the particular conditions of the test; they are not intended to be the sole criterion for assessing the potential fire hazard during the product use.  The results of tests related only to the subject of testing. The Report shall not be reproduced except in full without the written approval of the testing laboratory.  Responsible person: Vít Slaboch  Date 20 May 2010  Illegible signature Stamp: FIRE TECHNICAL LABORATORY, ACCREDITED TESTING LABORATORY No. 1007.7 Centrum stavebního inženýrství, a.s.						





**CENTRUM STAVEBNÍHO INŽENÝRSTVÍ A.S.**

(Centre of Civil Engineering)

Authorized Body No. 212

Accredited Testing Laboratory No. 1007.4

Testing of thermal properties of building materials, structures and buildings

Seat: 102 21 Praha 10, Pražská 16

## TEST REPORT

Round stamp:

ACCREDITED TESTING LABORATORY No. 1007.4

OF THERMAL PROPERTIES OF BUILDING MATERIALS, STRUCTURES AND BUILDINGS

CSI, a.s., Prague

Order No: 1042 – ZL 1062038  
Report No.: **1906**  
Number of copies: 3  
Copy No.: 2  
Pages: 3  
Place of measurement: Accredited Testing Laboratory Prague – No. 1007.4

**Client:**

CSI a.s. – branch office Zlín  
Department 602  
K Cihelně 304  
764 32 Zlín – Louky

**Manufacturer:**

I. GRYNCEWSKI STYROMAT  
SPOLKA KOMANDYTOWA  
Augustówka 22C, 02 981  
Warszaw

**Subject of testing:** Determination of heat conductivity of EPS boards forming a part of the “Heat-insulating clinker lining – polystyrene with surface treatment”.

Date of receipt of the samples: 6 May 2010

Date of the test assessment: 10 May 2010

Heat of the testing laboratory No. 1007.4: Ing. Jaroslav Šafránek, CSc.  
*Illegible signature*

Date of the report approval: 12 May 2010

Report No. 1906



Page 1 of 3





## 1. Test assignment

Based on an order by CSI a.s. – branch office Zlín the heat conductivity coefficient of EPS boards forming a part of “Heat-insulating clinker lining – polystyrene with surface treatment” was determined.

## 2. Description of the subject of testing

The subject of testing was determination of the heat conductivity coefficient.  
The measures values are specified in Part 5 – Ascertained results of measurement.

## 3. Delivery of samples

Samples of heat-insulating EPS boards, which form a part of the heat-insulation clinker lining were delivered to the testing laboratory of thermal properties of building materials, structures and buildings. The samples were delivered without the lining and were treated for the purposes of the measuring in the testing laboratory (surfaces were levelled and grinded). Delivered samples and their identification by the Client and identification of samples in the testing laboratory:

Sample EPS 300 x 300 mm	1/1062 038	51/10/1
Sample EPS 300 x 300 mm	2/1062 038	51/10/2
Sample EPS 300 x 300 mm	3/1062 038	51/10/3
Sample EPS 300 x 300 mm	4/1062 038	51/10/4

## 4. Identification of test procedures

The heat conductivity coefficient and thermal resistance were measured on the test equipment M 01 0121 according to the testing procedure No. 4.2 in compliance with ČSN EN 12 667 “Heat behaviour of construction materials and products – Determination of thermal resistance using the method of protected heating board and heat flow meter – Products with high and medium thermal resistance”.

## 5. Ascertained results of measurement

Prior to each measurement samples were conditioned under conditions laid down in the relevant ČSN EN. The conditions during measurement also complied with determined parameters.

Identification of sample in testing laboratory	Identification of sample by the Client	Mean temperature [ °C]	Heat conductivity coefficient $\Lambda$ [W/mK]	
			Measured value	Measurement uncertainty
51/10/1	1/1062 038	10.0	0.0319	$\pm 0.0011$
51/10/2	2/1062 038	10.0	0.0316	$\pm 0.0011$
51/10/3	3/1062 038	10.0	0.0317	$\pm 0.0011$
51/10/4	4/1062 038	10.0	0.0320	$\pm 0.0011$



### Measurement uncertainty:

The shown extended measurement uncertainty is the product of the standard measurement uncertainty and extension coefficient  $k = 2$ , which corresponds to coverage probability of about 95 % for normal distribution. Standard measurement uncertainty was determined in compliance with the document EA 4/02.

### Declaration:

The data on carried out tests relate only to the tested samples. The Report may not be duplicated except in full, and any modifications or amendments to the Report may be carried out only with the written consent of the Accredited Testing Laboratory No, 1007.4.

Prepared by:

Ing. Jan Šťastný

*Illegible signature*

Checked by:

Ing. Jaroslav Šafránek, CSc.

*Illegible signature*

Report distribution list:

Copy No. 1 and 2 – Client

Copy No. 3 – for the files of the testing laboratory

Stamp:

ACCREDITED TESTING LABORATORY No. 1007.4

OF THERMAL PROPERTIES OF BUILDING MATERIALS, STRUCTURES AND BUILDINGS

CSI, a.s., Pražská ul. 16, 102 21 Prague 10

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**CENTRUM STAVEBNÍHO INŽENÝRSTVÍ A.S.**

(Centre of Civil Engineering)

Authorized Body No. 212

Accredited Testing Laboratory No. 1007.4

Testing of thermal properties of building materials, structures and buildings

Seat: 102 21 Praha 10, Pražská 16

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## TECHNICAL REPORT

Order No: 1042 – ZL 1062038  
Number of copies: 3  
Copy No.: 2  
Pages: 3

**Client:**

CSI a.s. – branch office Zlín  
Department 602  
K Cihelně 304  
764 32 Zlín – Louky

**Manufacturer:**

I. GRYNCEWSKI STYROMAT  
SPOLKA KOMANDYTOWA  
Augustówka 22C, 02 981  
Warszaw

**Subject:** Calculation of the heat transfer coefficient of the “Heat-insulating clinker lining – polystyrene with surface treatment”.

Date of the test assessment: 19 May 2010

Heat of the testing laboratory No. 1007.4: Ing. Jaroslav Šafránek, CSc.  
*Illegible signature*

Date of approval: 12 May 2010

**Stamp:**

ACCREDITED TESTING LABORATORY No. 1007.4  
OF THERMAL PROPERTIES OF BUILDING MATERIALS, STRUCTURES AND BUILDINGS  
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## 1. Assignment

Based on an order by CSI a.s. – branch office Zlín the heat transfer coefficient “Heat-insulating clinker lining – polystyrene with surface treatment” was determined.

## 2. Data and computing procedure

Thermal conductivity of the used polystyrene foam for the purposes of the computation was determined by measurement; the results are shown in the Test Report No. 1906 prepared by the Accredited Testing Laboratory No. 1007.4 of CSI a.s. As regards the other materials, the values specified in ČSN 730540 – 3 were used. The computation was carried out according to ČSN EN ISO 6946 and ČSN EN ISO 10211.

## 3. Ascertained results

For the computation the following values of materials were used:

Material	Dimension [m]	$\Lambda$ [W/(mK)]	A [m <sup>2</sup> ]
Polystyrene	Thickness 0.045	0.032	
Clinker	Thickness 0.014	1.010	
Steel anchorage (d=5mm)	Diameter 0.005	17.0	0.196*10 <sup>-4</sup>
Plastic bushing	Thickness 0.04 Diameter 0.015 Wall 0.003	0.170	

Computed values of the heat transfer coefficient:

Heat-insulating lining without the effect of anchorage –  $U = 0.623 \text{ W/m}^2\text{K}$

Effect of anchorage  $\Delta U = 0.53 \text{ W/m}^2\text{K}$

**Corrected heat transfer coefficient**  $U_c = 0.676 \text{ W/m}^2\text{K}$

Prepared by:  
 Ing. Petr Školní  
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Checked by:  
 Ing. Jan Šťastný  
*Illegible signature*

Report distribution list: Copy No. 1 and 2 – Client  
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ACCREDITED TESTING LABORATORY No. 1007.4  
 OF THERMAL PROPERTIES OF BUILDING MATERIALS, STRUCTURES AND BUILDINGS  
 CSI, a.s., Pražská ul. 16, 102 21 Prague 10  
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Report No. 1906





**6.5 Determination of stability of dimensions and volume****ČSN EN 1604**

Stability of dimensions was assessed at test samples with dimensions of (200x200x60) mm.

Text conditions: temperature  $[70 \pm 2]^{\circ}\text{C}$   
time of exposure  $[48 \pm 1]$  hours

Before testing the samples were conditioned in laboratory environment at  $(23 \pm 5)^{\circ}\text{C}$  and  $(50 \pm 5)\% \text{RV}$  until a balanced state was achieved.

Sample No.	Constancy of dimensions [%]		
	Length variance $\Delta_{\square l}$	Width variance $\Delta_{\square b}$	Thickness variance $\Delta_{\square d}$
1-1	-0.3	-0.4	+0.5
2-2	-0.4	-0.4	+0.3
3-3	-0.3	-0.3	+0.3
4-11	-0.3	-0.3	+0.5
ø	-0.3	-0.4	+0.4

**6.6 Determination of tensile strength****ČSN EN 1607**

Vertical tensile strength to the board plane was determined on samples with tiles and samples from polystyrene after tiles removal.

Before testing the samples were conditioned at  $(23 \pm 5)^{\circ}\text{C}$  for at least 24 hours.

Samples with tiles with dimensions  
(70x70x60) mm

Sample No.	Compressive strength at 10 % deformation $O_{mt}$ [kPa]
1-1	69
2-3	67
3-4	93
4-5	78
ø	77

Samples of polystyrene after removal of tiles  
with dimensions (70x70x44) mm

Sample No.	Compressive strength at 10 % deformation $O_{mt}$ [kPa]
1-1	440
2-3	560
3-4	640
4-5	530
ø	540

Failures occurred with all samples at the joint between polystyrene and tiles.

**Centrum stavebního inženýrství a.s.**  
(Centre of Civil Engineering)

Testing laboratory of materials for  
finishing building works No. 1007.2  
accredited by Český institut pro akreditaci, o.p.s. (Czech Accreditation Institute)

K Cihelně 304, 764 32 Zlín – Louky

**TEST REPORT**

**No.: 041 – 010 – 063**

**Dated: 20 May 2010**

Order No. : 10 62 038  
Copies : 2  
Pages : 8

**Client:**

**I. GRYNCEWSKI STYROMAT  
SPOLKA KOMANDYTOWA  
Augustówka 22C  
02-981 Warszawa**

**Test subject (product):**

**Heat-insulating clinker lining**  
- polystyrene foam boards with surface finish from  
clinker tile bands

**Date of sample receipt: 12 and 15 April 2010**

**Date of testing: 19 April 2010 – 18 May 2010**

**Head of accredited**

**Testing laboratory: Ing. Petra Hrdinová**

Round stamp:

**CENTRUM STAVEBNÍHO INŽENÝRSTVÍ, a.s.**

Branch office ZLÍN

Testing laboratory of materials for finishing building works No. 1007.2

ACCREDITED by the National Accreditation Body

CSI, a.s., Zlín, Tel. 577 604 333, 577 604 335, Fax: 577 604 926





Under a Contract for Work No. 10 62 038 tests of heat-insulating boards from polystyrene foam boards with surface finish from clinker tiles were carried out for the Client I. GRYNCEWSKI STYROMAT SPOLKA KOMANDYTOWA, Augustówka 22C, 02-981 Warsaw.

## 1. TESTING METHODS USED

ČSN EN standards specified in the Quality Manual of the Accredited testing laboratory of materials for finishing building works No. 1007.2 were used for the assessment; in addition were used tests, which are marked as non-accredited.

Name of test	Standard
Dimensions determination	ČSN EN 822 ČSN EN 823
Perpendicularity determination	ČSN EN 824 non-accredited approach
Flatness determination	ČSN EN 825 non-accredited approach
Determination of compressive strength	ČSN EN 826
Determination of constancy of dimensions and volume	ČSN EN 1604
Determination of tenacity	ČSN EN 1607
Determination of water-absorptivity	ČSN EN 12087 Method 1A, 2A
Determination of bending strength	ČSN EN 12089, Method B
Determination of shear resistance of joints	ČSN EN 12090

## 2. SAMPLE FOR ASSESSMENT

Samples registered in the Book of received and disposed of test samples under No. 14/10/63 were delivered for the testing by a representative of the Client between 12 and 15 April 2010 in the quantity of 13 pieces.

## 3. TESTED MATERIAL

Heat-insulating boards from polystyrene foam boards with surface finish from clinker tiles, dimensions (631/504x690x60) mm and (1137/1011x690x60) mm, each collected by the manufacturer on a different production date. Edge of boards with tongue and groove and surface treatment, tile bands with dimensions of (240x70x14) mm.

The tested samples were identified also by the number of individual boards inserted after the serial number of the tested sample.

Boards with dimensions (631/504x690x60) mm – number 1 to 8.

Boards with dimensions (1137/1011x690x60) mm – number 11, 21 to 24.



#### 4. INFORMATION ON METROLOGICAL VERIFICATION AND CALIBRATION OF MEASURING INSTRUMENTS

The measuring instruments are verified and calibrated against the measuring instruments and etalons of CMI and AKL. Verification of the measuring instruments is documented in related documents of the Quality Manual of the Accredited Testing Laboratory No. 1007.2.

#### 5. NON-STANDARDIZED TESTING PROCEDURES USED

No non-standardized testing procedures were used.

#### 6. MEASUREMENT RESULTS

ČSN EN 822  
ČSN EN 823

##### 6.1 Determination of dimensions

Measurement of dimensions was carried out on whole boards.  
Before testing the samples were conditioned at  $(23 \pm 5)^\circ\text{C}$ .

Sample No.	Length	Width	Thickness
	[mm]	[mm]	[mm]
1-4	631/504	673	60
2-5	631/504	673	60
3-6	631/504	673	60
4-7	631/504	673	60

Sample No.	Length	Width
	[mm]	[mm]
1-11	1137/1011	673
2-21	1137/1011	673
3-22	1137/1011	673
4-24	1137/1011	673





## 6.2 Perpendicularity determination

ČSN EN 824

Non-accredited procedure

Measurement of perpendicularity was carried out on whole boards.  
Before testing the samples were conditioned at  $(23 \pm 5)^\circ\text{C}$ .

Sample No.	Deviation from perpendicularity in the direction of:						Maximum straightness deviation
	Length and width					Thickness	
	S <sub>b1</sub>	S <sub>b2</sub>	S <sub>b3</sub>	S <sub>b4</sub>	S <sub>b5</sub>	S <sub>b6</sub>	a <sub>max</sub>
	[mm/m]					[mm]	[mm]
1-4	0	0	0	0	0	0	0
2-5	0	0	0	0	0	0	0
3-6	0	0	1	0	1	0	0
4-7	0	0	0	0	0	0	0

## 6.3 Flatness determination

ČSN EN 825

Non-accredited procedure

Measurement of flatness was carried out on whole boards.  
Before testing the samples were conditioned at  $(23 \pm 5)^\circ\text{C}$ .

Sample No.	Flatness deviation $S_{\max}$ [mm]
1-4	1
2-5	1
3-6	1
4-7	1

## 6.4 Determination of compressive strength

ČSN EN 826

Compressive strength was determined at 10 % deformation of the samples with dimensions of  $(70 \times 70 \times 60)$ . Before testing the samples were conditioned at  $(23 \pm 5)^\circ\text{C}$ .  
10 % deformation was determined from a polystyrene layer with a width of (45 mm).

Sample No.	Compressive strength at 10 % deformation $\sigma_{10}$ [kPa]
1-4	308
2-5	324
3-6	318
4-7	288
Ø	310



**6.5 Determination of stability of dimensions and volume****ČSN EN 1604**

Stability of dimensions was assessed at test samples with dimensions of (200x200x60) mm.

Text conditions: temperature  $[70 \pm 2]^{\circ}\text{C}$   
time of exposure  $[48 \pm 1]$  hours

Before testing the samples were conditioned in laboratory environment at  $(23 \pm 5)^{\circ}\text{C}$  and  $(50 \pm 5)\%$ RV until a balanced state was achieved.

Sample No.	Constancy of dimensions [%]		
	Length variance $\Delta_{\square l}$	Width variance $\Delta_{\square b}$	Thickness variance $\Delta_{\square d}$
1-1	-0.3	-0.4	+0.5
2-2	-0.4	-0.4	+0.3
3-3	-0.3	-0.3	+0.3
4-11	-0.3	-0.3	+0.5
ø	-0.3	-0.4	+0.4

**6.6 Determination of tensile strength****ČSN EN 1607**

Vertical tensile strength to the board plane was determined on samples with tiles and samples from polystyrene after tiles removal.

Before testing the samples were conditioned at  $(23 \pm 5)^{\circ}\text{C}$  for at least 24 hours.

Samples with tiles with dimensions  
(70x70x60) mm

Sample No.	Compressive strength at 10 % deformation $O_{mt}$ [kPa]
1-1	69
2-3	67
3-4	93
4-5	78
ø	77

Samples of polystyrene after removal of tiles  
with dimensions (70x70x44) mm

Sample No.	Compressive strength at 10 % deformation $O_{mt}$ [kPa]
1-1	440
2-3	560
3-4	640
4-5	530
ø	540

Failures occurred with all samples at the joint between polystyrene and tiles.



## 6.8 Determination of bending strength

ČSN EN 12089  
Method B

Bending strength was determined by measuring the power acting through a loading blade in vertical direction on the tested object with dimensions of (350x150x60) mm suspended on two supports.

Before testing the samples were conditioned at (23±5)°C for at least 24 hours.

Samples tested with tiles on the bottom part of the sample

Sample No.	Strength [kPa]
1-11	455
2-22	484
3-23	410
4-24	480
ø	457

Samples tested with tiles on the upper part of the sample

Sample No.	Strength [kPa]
1-11	1130
2-22	1180
3-23	1030
4-24	1030
ø	1090

Failures occurred with all samples in the EPS layer.

## 6.9 Determination of sheer resistance of joints

ČSN EN 12090

Single sample configuration was used during the testing.

Before testing the samples were conditioned at (23±5)°C for at least 24 hours.

Samples with dimensions of (250x250x50) mm cut out from the boards together with tiles.

Measurement No.	Sheer resistance $\tau$ [kPa]
1-2	88
2-11	90
3-22	88
4-24	82
ø	87

Failures occurred with all samples in the joint between polystyrene and tiles.

Samples with dimensions of (250x250x44) mm cut out from the polystyrene after tiles removal.

Measurement No.	Sheer resistance $\tau$ [kPa]	Sheer module G [kPa]
1-2	280	5100
2-11	250	3900
3-22	270	4500
4-24	220	4300
$\sigma$	60	4500

## 7. LABORATORY DECLARATION

The test results refer only to the tested product.

The Test Report may not be duplicated except in full without the written consent of the testing laboratory.

The Client ordering the tests has a right to submit comments on the test results specified in this Report of the Accredited Testing Laboratory No. 1007.1 to CSI Zlín within 15 days of the Report delivery.

Person in charge of the technical aspect of the Report: Ing. Petra Hrdinová

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Zlín, dated 20 May 2010

Round stamp:

CENTRUM STAVEBNÍHO INŽENÝRSTVÍ, a.s

Branch office ZLÍN

Testing laboratory of materials for finishing building works No. 1007.2

ACCREDITED by the National Accreditation Body

*Illegible signature*

Ing. Petra Hrdinová

Head of Accredited testing

laboratory No. 1007.2

