



**CENTRUM STAVEBNÍHO INŽENÝRSTVÍ, a. s.**  
**CENTRE OF BUILDING CONSTRUCTION ENGINEERING,**  
**Joint Stock Company**  
 workplace Zlín, K Cihelně 304, 764 32 Zlín - Louky



Door and window testing laboratory, heat and acoustical engineering No. 1007.1, accredited by the Czech Accreditation Institute, o.p.s.

## Test Report No. 46/06

**Laboratory Measurement of Airborne Sound Insulation  
 according to ČSN EN ISO 140-3**

**Item tested: Fire resistant glass Pyrobel EI 90/35 EG**

Contract No: 663 653

Number of pages: 4  
 Number of copies: 4  
 Copy No.: 4

Customer: **IKATES, s.r.o., Tolstého 186, 415 03 Teplice**

Producer: **Glaverbel Czech a.s., Sklářská 450, 416 74 Teplice**  
**Glaverbel Oloví plant**

Sample accepted on: 12 January 2006

Tested on: 10 February 2006

Tested by the Building Acoustics Laboratory

Head of laboratory: Ing. Miroslav Figalla

Head of testing laboratory No. 1007.1:

Ing. Miroslav Figalla

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Date: 15 February 2006



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## 1. Test Job

The test has been performed on the basis of the order of January 11, 2006, contract No. 663 653.

## 2. Subject of Test

Determination of airborne sound insulation based on laboratory measurement results obtained by an engineering method. Conclusive tests.

**Element tested:** Fire resistant glass Pyrobel EI 90/35 EG, laminated glass of thickness overall 39 mm. Code designation of structure: 2/2/3/2/2:2/2/3/2/2:3,

where digit means the thickness of float glass,

/ fire resistant silicate layer,

: PVB foil.

Producer: Glaverbel Czech a.s., Sklářská 450, 416 74 Teplice, Glaverbel Oloví plant.

## 3. Test Sample

The Producer supplied a testing sample, dimensions 1,200 x 1,500 mm, on January 12, 2006.

The sample was installed into a measuring hole for vertical elements. Installation of the sample was performed by the staff of the testing laboratory.

## 4. Standards used and measuring equipment

### 4.1 Standards

- ČSN EN ISO 140-3. Acoustics – Measurement of sound insulation in buildings and of building elements. Part 3: Laboratory measurement of airborne sound insulation of building elements,
- ČSN EN ISO 717-1 Acoustics. Rating of sound insulation in buildings and of building elements. Part 1: Airborne sound insulation.

Related standards:

- ČSN EN 20140-2 Acoustics – Measurement of sound insulation in buildings and of building elements. Part 2: Determination, verification and application of precision data.
- ČSN 73 0532 Acoustics – Sound protection in buildings and related acoustic properties of building elements - Requirements.

### 4.2 Measuring equipment

- Norsonic RTA 840 analyzer M 07 2024
- B. K. measuring microphone M 07 2005

## 5. Testing Procedure

Measuring is performed in sound chambers meeting the requirements of the ČSN ISO 140-1 standard. The tested element is mounted between the source and receiving room into a measuring opening for vertical elements. A steady sound is generated in the source room with continuous spectrum in the 100 to 5000 Hz band. Mean sound levels of acoustic pressure are measured in the source and receiving room (in dB). Sound reduction index is determined by the relation

$$R = L_1 - L_2 + 10 \log \frac{S}{A} \quad (\text{dB}),$$

where  $L_1$  is the average sound pressure level in the source room,

$L_2$  .. average sound pressure level in the receiving room,  
 $S$  ... area of the test specimen in  $m^2$ ,  
 $A$  ... equivalent absorption area in the receiving room in  $m^2$ .

The size of the equivalent absorption area is determined from reverberation time measured according to the ČSN ISO 354 standard using the Sabine's formula

$$A = \frac{0,16 V}{T}$$

where  $V$  is the volume of the receiving room in  $m^3$ ,  
 $T$  ... reverberation time in the receiving room in seconds.

A single digit quantity, weighted sound reduction index  $R_w$  is determined from the values of sound reduction index  $R$  in third-octave bands 100 to 3150 Hz, using the reference curve and method according to ČSN EN ISO 717-1.

## 6. Deviations from standard testing methods

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## 7. Non-standardized methods employed

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## 8. Test Results

Weighted sound reduction index of measured fire resistant glass Pyrobel EI 90/35 EG:

$$R_w (C; C_{tr}) = 42 (-1; -4) \text{ dB.}$$

The course of sound insulation depend on the frequency and further measurement data are shown in standard measuring record on p. 4.

## 9. Measurement Uncertainty

Measurement uncertainty is to be expressed in accordance with ČSN EN 20140-2 using the indices of repeatability  $r$  and reproducibility  $R$  that are the values under which the absolute value of the difference of the results of tests performed under specified conditions will lie with the probability of 95 %. For a single-digit quantity  $R_w$ , the repeatability index  $r = 1$  dB, the reproducibility index  $R = 2$  dB.

In charge for the test: Ing. Miroslav Figalla

**Laboratory measurements of airborne sound insulation  
of building elements according to ČSN EN ISO 140-3**

 Reg. No.  
34/06

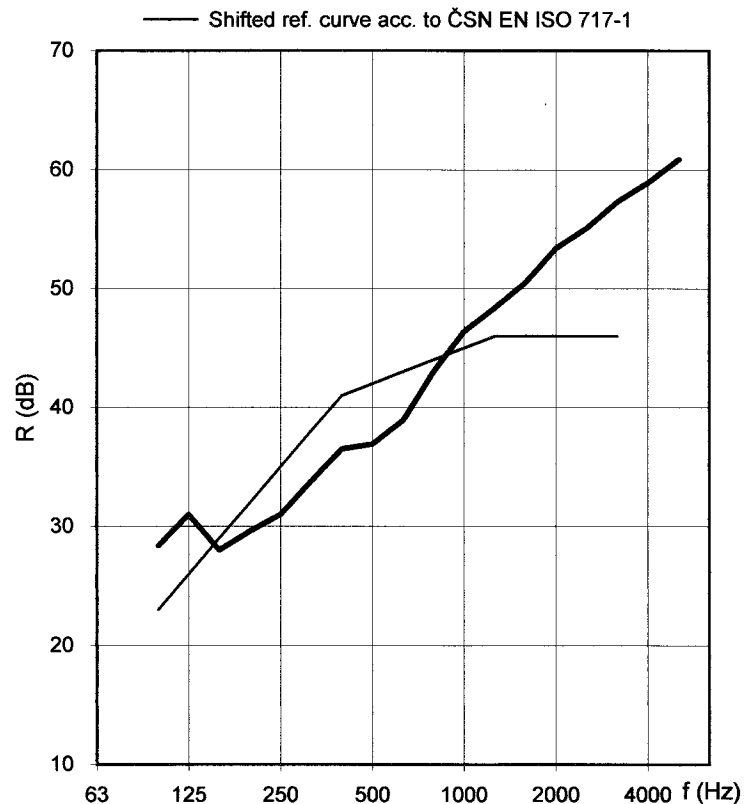
 Customer:  
IKATES, s.r.o.  
Tolstého 186  
415 03 Teplice

 Item: Fire resistant glass  
Test date: 10.02.2006  
Temperature: 19 °C  
Humidity: 47 %

Sample description: Fire resistant glass Pyrobel EI 90/35 EG, laminated glass of thickness overall 39 mm. Code designation of structure: 2/2/3/2/2:2/2/3/2/2:3, where digit means the thickness of float glass, / fire resistant silicate layer, : PVB foil.

Producer: Glaverbel Czech a.s., Sklářská 450, 416 74 Teplice, Glaverbel Oloví plant.  
Mass per unit: 94,9 kg/m<sup>2</sup>.  
Sample No.: 1/A/06.

Freq. Hz	R 1/3 oct. dB
100	28,4
125	31,0
160	28,0
200	29,6
250	31,0
315	33,8
400	36,5
500	36,9
630	38,9
800	43,0
1000	46,4
1250	48,4
1600	50,5
2000	53,4
2500	55,1
3150	57,3
4000	58,9
5000	60,9



Rating according to ČSN EN ISO 717-1:

 $R_w (C; C_{tr}) = 42 (-1; -4) \text{ dB}$ 

 Size: 1,8 m<sup>2</sup>

 Source room volume: 90 m<sup>3</sup>

 Receiving room volume: 70 m<sup>3</sup>

 Centrum stavebního inženýrství, a.s. Praha (Centre of Building  
Construction Engineering, joint-stock company, Prague), workplace Zlín

Date: 15 February 2006

Signature: