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

L 1007.1

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

Test Report No. 37/06

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

Item tested: Fire resistant glass Pyrobel EI 120/53

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: 16 December 2005
Tested on: 6 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: 14 February 2006

CENTRUM STAVEBNÍHO INŽENÝRSTVÍ, a.s. pracoviště ZLÍN
Laboratoř otvorových výplní, stavební tepelné techniky a akustiky č.1007.1
AKREDITOVANÁ národním akreditačním orgánem

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 120/53, laminated glass of thickness overall 52 mm. Code designation of structure: 2/2/3/2/2:2/2/3/2/2:2/2/3/2/2,
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 December 16, 2005. 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

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

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 120/53:

$$\boldsymbol{R_w}\ (C;\ C_{tr}) = \mathbf{45}\ (-1;\ -4)\ \mathbf{dB.}$$

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. 25/06

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

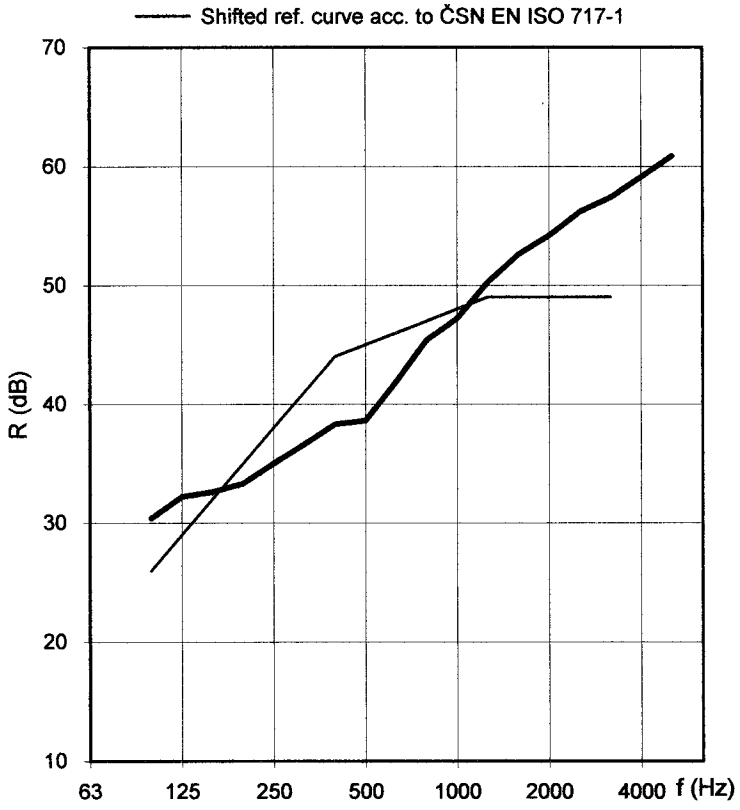
Item: Fire resistant glass
Test date: 06.02.2006
Temperature: 18 °C
Humidity: 37 %

Sample description: Fire resistant glass Pyrobel EI 120/53, laminated glass of thickness overall 52 mm. Code designation of structure: 2/2/3/2/2:2/2/3/2/2:2/2/3/2/2,
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: 113 kg/m^2.
Sample No.: 192/A/05.

Freq. Hz	R 1/3 oct. dB
100	30,4
125	32,2
160	32,6
200	33,3
250	35,0
315	36,6
400	38,3
500	38,6
630	41,9
800	45,4
1000	47,2
1250	50,3
1600	52,6
2000	54,2
2500	56,2
3150	57,4
4000	59,1
5000	60,9

Rating according to ČSN EN ISO 717-1:

R_w (C; C_{tr}) = 45 (-1; -4) dB



Size: 1,8 m^2
Source room volume: 90 m^3
Receiving room volume: 70 m^3

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

Date: 14 February 2006 Signature: