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DELTA Test Report

TEST Reg. no. 100

Laboratory measurement of sound reduction index for a GLASVÆGGE & -DØRE BY GLASSOLUTIONS 10 mm Planiclear partition wall

Performed for Scanglas A/S

DANAK 100/2153
Project no.: I101000

31 May 2016

DELTA
Venlighedsvej 4
2970 Hørsholm
Denmark

Tel. +45 72 19 40 00
Fax +45 72 19 40 01
www.delta.dk
VAT No. 12275110

Title
Laboratory measurement of sound reduction index for a GLASVÆGGE & -DØRE BY GLASSOLUTIONS 10 mm Planiclear partition wall

Journal no.	Project no.	Our ref.	Date of test
DANAK 100/2153	I101000	MBL/DH/ilk	1 April 2016

Client
Scanglas A/S
Saint-Gobain Denmark
Robert Jacobsens Vej 62A
2300 København S
Denmark

Client ref.
Birgitte Rom

Summary
Laboratory measurement of sound reduction index has been carried out per one-third octave according to the test method of EN ISO 10140:2010 part 1, 2, 4, and 5 for a GLASVÆGGE & -DØRE BY GLASSOLUTIONS 10 mm Planiclear partition wall.

Test results evaluated according to EN ISO 717-1:2013:

R_w (C; C_{tr}) = 32 (-2; -3) dB

The report contains a description of the test specimen, a description of the mounting in the laboratory and the test results.

Graph Sheet 1 shows the sound reduction index of every one-third octave band together with the shifted reference curve corresponding to the measured weighted sound reduction index.

Description of test rooms, test method, and evaluation method are found in the Appendix.

Remark
The test results apply only to the object tested.

DELTA, 31 May 2016

Mads Bolberg
Acoustics

1. Introduction

At the request of Scanglas A/S, laboratory measurement of the sound reduction index was carried out for a GLASVÆGGE & -DØRE BY GLASSOLUTIONS 10 mm Planiclear partition wall.

2. Description of the test object

The glass partition wall construction is based on approx. 2670 mm high 10 mm Planiclear glass elements placed in a perimeter frame of extruded aluminum. The aluminum profiles of the frame are designated H3104, H3105, and H3106.

The 10 mm thick glass elements are mounted in the frame between rubber sealings. The openings between glass elements are filled using clear silicone.

The total thickness of the wall including mounting profiles is approx. 25 mm and the weight approx. 25 kg/m².

Further details are shown on page 8 and 9 in drawings prepared by the client.

3. Mounting in the laboratory

The glass partition wall was mounted between two reverberation rooms in a 1.15 m concrete frame with a width of 3.70 m and a height of 2.69 m.

The wall was built using 4 glass elements. The approximately width of three of the elements is 935 mm, and the fourth is 860 mm. The elements were sealed with silicone, which was left to dry for at least 3 hours before measuring. Filler are applied at perimeter edges of the test wall.

The niche depth from the surface of the wall against the source room and the receiving room was approx. 445 mm and 680 mm.

The mounting was carried out by the client. Pictures of the mounting in the laboratory are shown on page 7.

4. Test method

The measurement was carried out according to the test method of EN ISO 10140:2010 part 1, 2, 4, and 5 “Acoustics - Laboratory measurement of sound insulation of building elements”.

The measurement was performed in Rooms 003 and 004, Building 355 at the Technical University of Denmark.

A brief description of the reverberant rooms and test procedures is found in the Appendix.

5. Instrumentation

The following instruments were used for the test:

Instrument	Type	A&V No.
Sound Level Meter / Analyser	Brüel & Kjær 2270	1498L
Measuring Microphone	Brüel & Kjær 4144	859L
Measuring Microphone	Brüel & Kjær 4144	1256L
Microphone Preamplifier	Brüel & Kjær 2619	853L
Microphone Preamplifier	Brüel & Kjær 2619	855L
Microphone Power Supply	Brüel & Kjær 2804	1585L
Microphone Power Supply	Brüel & Kjær 5935	1040L
Sound Level Calibrator	Brüel & Kjær 4231	1158L
Sensor for Temperature and Humidity	Ebro, EBI 20-TH1	1586L

6. Measurement conditions

Date of test: 1 April 2016.

Temperature and relative humidity in the test rooms during the measurement:

17 °C, 47 % RH

7. Test results

The sound reduction index, R, per one-third octave from 100 Hz to 5000 Hz is shown in tabular form and graphically on Graph Sheet 1.

Test results evaluated according to EN ISO 717-1:2013:

R_w (C; C_{tr}) = 32 (-2; -3) dB

Description of the evaluation method is found in the Appendix.

8. Measurement uncertainty

According to EN ISO 12999-1:2014 precision of laboratory measurements expressed as the reproducibility standard deviations are as follows (two-sided 95 % confidence level and k = 1.96).

Value	σ_{R95} (k =1.96, two-sided)
R_w	± 2.4 dB
R_w + C	± 2.5 dB
R_w + C_{tr}	± 2.9 dB

Laboratory measurement of sound reduction index according to EN ISO 10140:2010

Client: Scanglas A/S, Saint-Gobain Denmark,
Robert Jacobsens Vej 62A, 2300 København S, Denmark

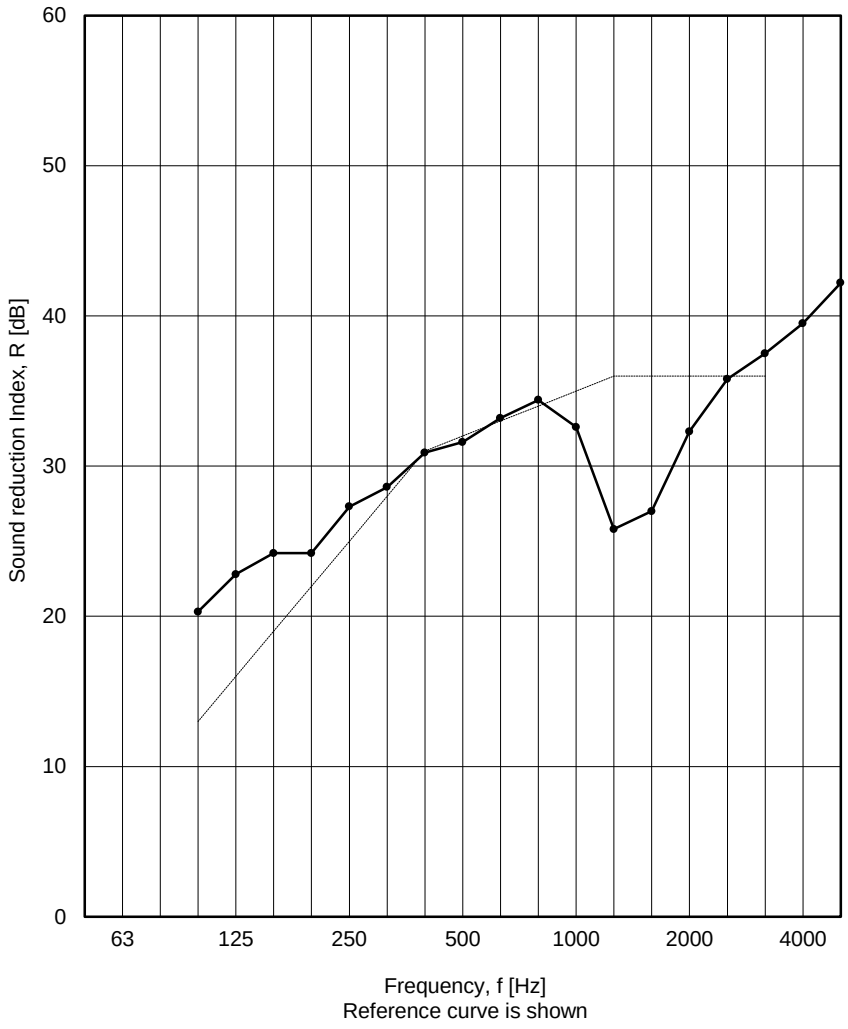
Date of test: 1 April 2016

Description of the test specimen: GLASVÆGGE & -DØRE BY GLASSOLUTIONS 10 mm Planiclear partition wall with a perimeter frame of extruded aluminium profiles. Description of the test object and the mounting in the laboratory appears in section 2 and 3 of the report.

Test specimen mounted by: Scanglas A/S

Area of test opening: 10.0 m^2
Mass per unit area: 25 kg/m^2
Air temperature: 17 °C
Air humidity: 47 % RH
Source room volume: 230 m^3
Receiving room volume: 215 m^3

Frequency f [Hz]	R One-third octave [dB]
100	20.3
125	22.8
145	24.2
200	24.2
250	27.3
315	28.6
400	30.9
500	31.6
630	33.2
800	34.4
1000	32.6
1250	25.8
1600	27.0
2000	32.3
2500	35.8
3150	37.5
4000	39.5
5000	42.2



Weighted sound reduction index according to EN ISO 717-1:2013:

R_w (C; C_{tr}) = 32 (-2; -3) dB

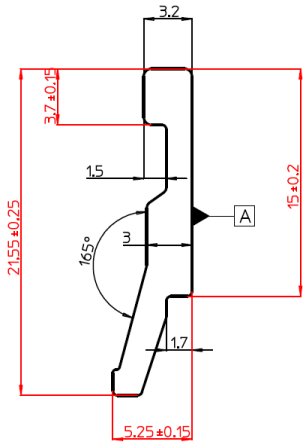
Evaluation based on laboratory measurement results obtained by an engineering method EN ISO 10140:2010 part 1, 2, 4 and 5.

DELTA, 31 May 2016

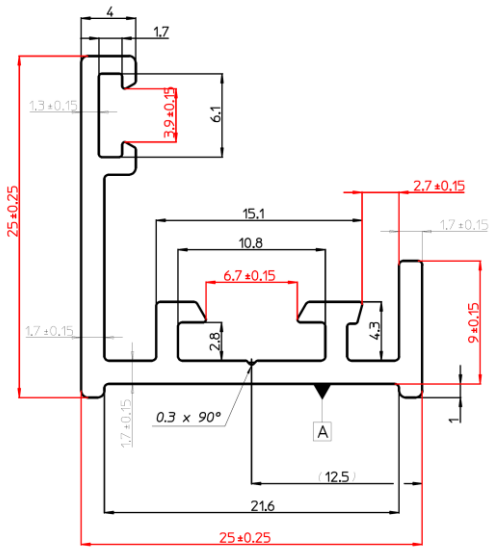
Mads Bolberg, Acoustics

Pictures of the mounting in the laboratory at the Technical University of Denmark

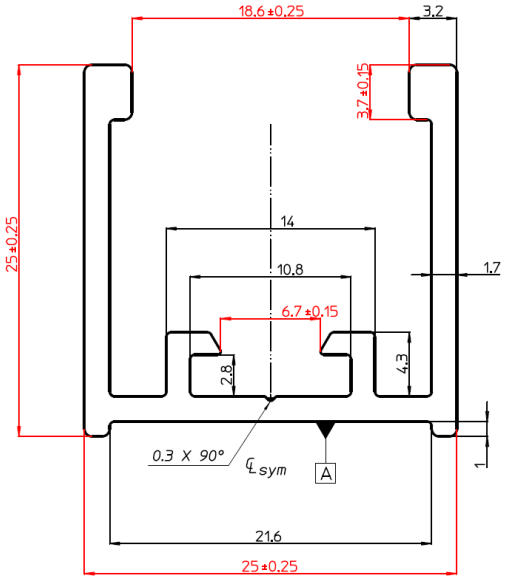
Sectional drawings of the mounting profile HK3104, HK3105, and HK3106



HK3104: Side profile



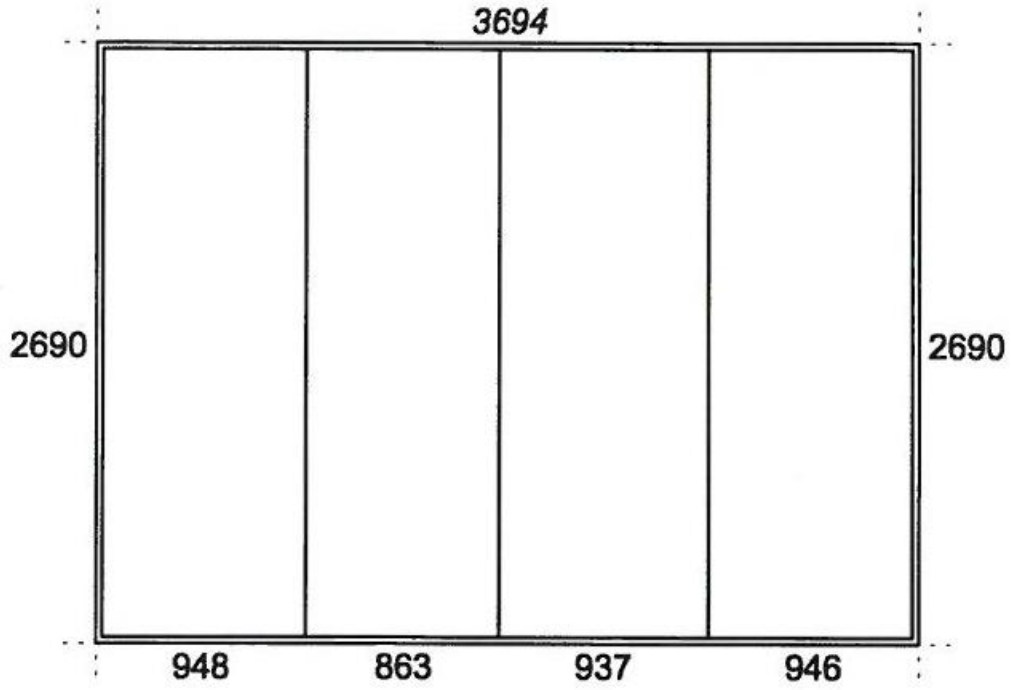
HK3105: Click profile



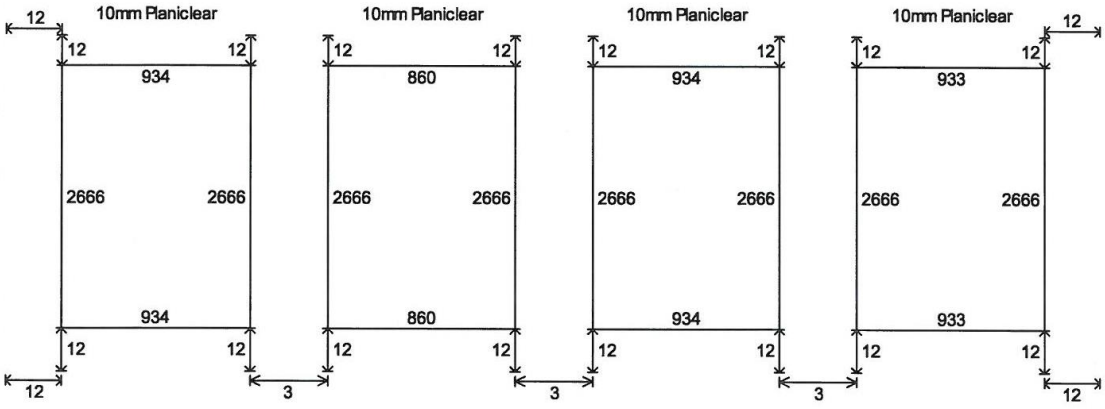
HK3106: U-profile

Drawings are prepared by the client and are not in scale.

Drawings of the test wall



Glass partition test wall in test opening including mounting profiles.



Size details of glass elements and spacing used in partition wall.

Drawings are prepared by the client and are not in scale.

Description of test rooms

When measuring the sound reduction index, R, according to EN ISO 10140:2010 part 1, 2, and 4, the test specimen is placed between a source room and a receiving room meeting the requirements of EN ISO 10140:2010 part 5.

Source room:	Volume approx. 230 m^3 Diffusing elements of concrete and of damped steel plate Reverberation time ≤ 8 s
Receiving room:	Volume approx. 215 m^3 Diffusing elements of concrete and of damped steel plate Reverberation time ≤ 7 s
Test opening:	3.70 m × 2.69 m in a concrete frame with depth 800 mm
Depth of test opening:	1.15 m
Total partition wall area:	30.9 m^2

Test method

Measurements of the sound reduction index, R, according to EN ISO 10140:2010.

Loudspeaker system:	Dodecahedron loudspeaker in two positions. Open loudspeaker in one corner position for measurement of reverberation time.
Microphone system:	Rotating (16 s/rotation). Radius 1.25 m. Integration time: 32 s for measurements of sound pressure levels. The reverberation time is measured in 6 microphone positions distributed on the microphone path.
Sound signal:	Equalized wideband pink noise.
Filters:	Frequency analyzer with one-third octave band filters with centre frequencies within the frequency range 100-5000 Hz.
Background noise:	The sound pressure level in the receiving room is corrected for background noise if affected.

Evaluation method

To evaluate the airborne sound insulation of the test specimen, the weighted sound reduction index, R_w, is used. The value is determined according to EN ISO 717-1:2013.

When determining the evaluation value, R_w, the measured results of the sound reduction index, R, per one-third octave from 100 Hz to 3150 Hz are compared with a reference curve. The reference curve is shifted in steps of 1 dB towards the measured curve until the sum of unfavourable deviations is as large as possible, but not more than 32.0 dB. An unfavourable deviation at a particular frequency occurs when the test result is less than the value of the reference curve. The evaluation value, R_w, is determined from the shifted reference curve as the value in dB at 500 Hz.

Additionally, the spectrum adaptation terms, C and C_{tr}, for A-weighted pink noise and A-weighted urban traffic noise are calculated. These adaptation terms are stated in the report in brackets after the R_w-value.