Acoustic Report on

Glass Facades for Rothschild 48, Tel Aviv Hotel

Façade type: West façade EWS-01, EWS-08

Date: July 2017

1.0 SCOPE

The scope of the present report is to predict the theoretical level of sound insulation attainable with the proposed system and to demonstrate compliance with the project specification Section 084413 – Exterior Interior Wall systems (EWS-IWS) dated 15.03.2016.

The acoustic report was issued in collaboration with by Pro. Tecno. Srl.

2.0 SOUND INSULATION PERFORMANCES TO BE ACHIEVED

Reported below is an extract of the project specification Section 084413 – Exterior Interior Wall systems (EWS-IWS) dated 29.11.2016, Clause 1.5 Performance Requirements, Section K Acoustic Performance:

K. Acoustic performance:

1. Outdoor-Indoor Sound Transmission: As provided by Acoustic Consultant and not less than R_w'=35db, Refer to Acoustic report
2. Indoor-Indoor Sound Transmission between different units: As provided by Acoustic Consultant and not less than R_w'=47db, refer to Acoustic report. This applies to IWS6 and IWS4+IWS5 considered together.
3. Flanking between different floors: As provided by Acoustic Consultant and not less than R_w'=48db, refer to Acoustic report
4. Flanking between different rooms in the same floor: As provided by Acoustic Consultant and not less than R_w'=48db, refer to Acoustic report

The project specification indicates that the external façade sound insulation to be achieved is an weighted apparent sound reduction index of R'_w 35 dB.

As far as flanking noise transmission via the common curtain walling is concerned, the only case which is relevant for this type of façade is the flanking between different floors and the weighted apparent sound reduction index to be maintained between vertically separated bedrooms equates to R'_w 48 dB.

3.0 DESCRIPTION OF THE EWS-01 FACADE TO BE EVALUATED

The EWS-01 facades are composed of single glazed elements of external stratified glass consisting of 10 mm glass/1.52 mm SGP/10 mm glass/1.52 mm SGP/10 mm glass, overall thickness 33 mm. The estimated weighted sound reduction index of this element is R_w 42 dB.

This type of façade will be installed in the zones indicated in the following location drawing, Figure 1:

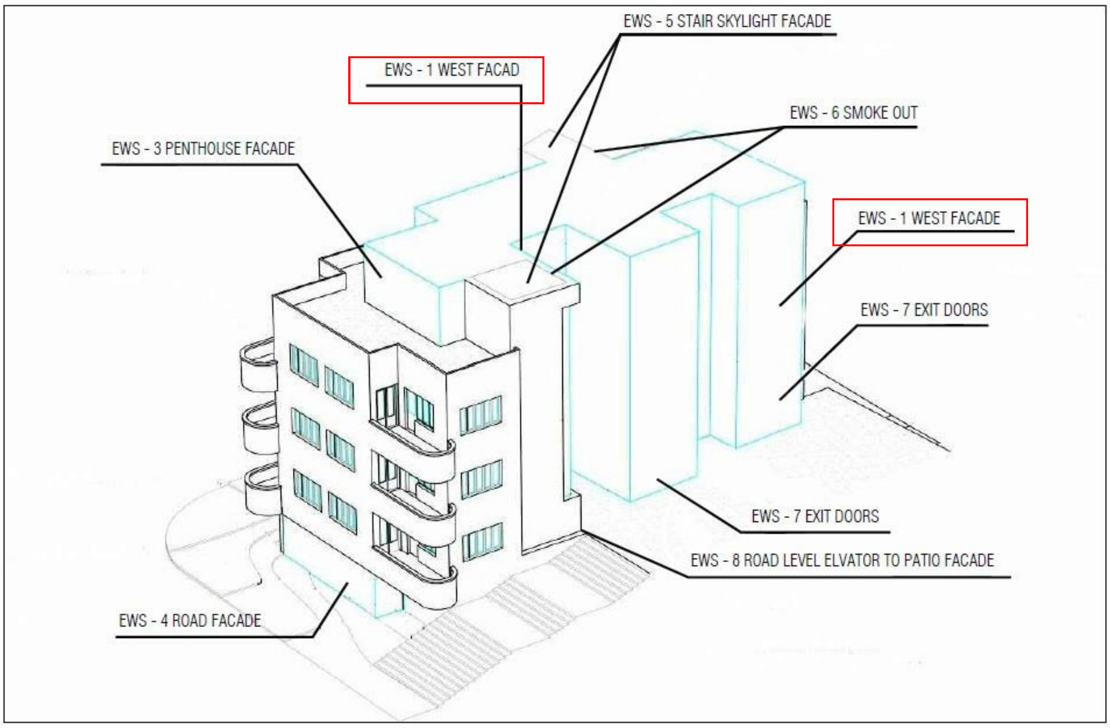


Figure 1:
Façade location drawing

A typical vertical section of the Type EWS-01 full-height glazed facade is shown in the following Figure 2:

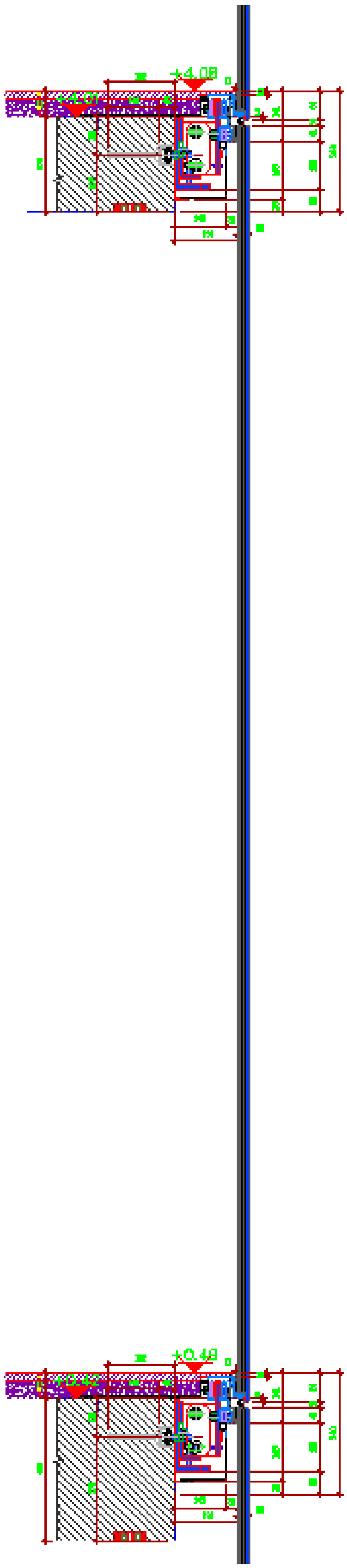


Figure 2:

Typical vertical section of the EWS-01 facade

Reported in the following Figure 3 is the detail at the intersection with the intermediate floor slab:

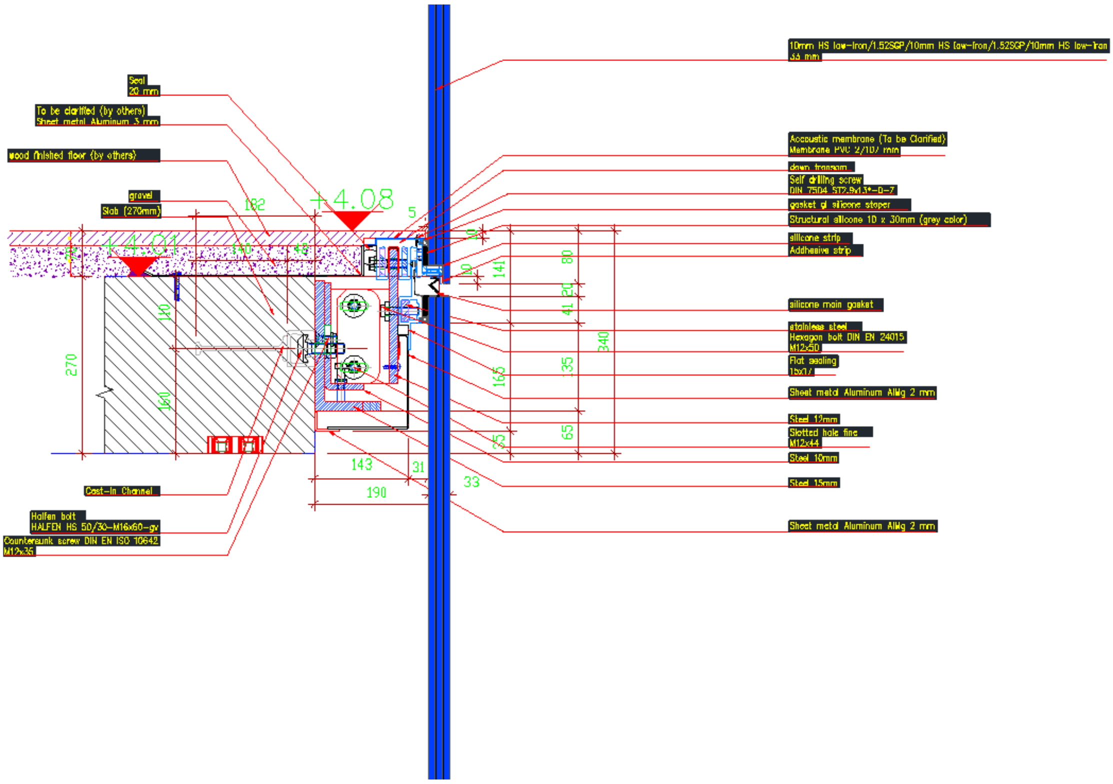


Figure 3:
Detail at floor slab intersection

4.0 CALCULATION OF THE SOUND REDUCTION OF THE FAÇADE ELEMENTS

The sound reduction of the façade elements have been determined in the following manner:

- The sound reduction indices of the glazing for the Type EWS-01 facade has been estimated by using the AGC YourGlass configurator program. The program doesn't allow two separate layers of pvb to be inserted in a single glazing makeup, so the 10/1.52SGP/10/1.52SGP/10 construction proposed was estimated by assuming a 12/1.52SGP/12 construction, which should be a slight underestimate. The program output is reported in Appendix 1. The weighted sound reduction index of the glazing is calculated to be Rw 42 dB.
- The sound reduction indices for the other façade elements were calculated using the

specialist program INSUL 8.0 by Marshall Day Acoustics. The horizontal joints will consist of a 2.5 mm external rubber seal and approx. 0.5 mm thick internal weatherproofing separated by an airgap of approximately 20 mm. This detail is report in the following Figure 4:

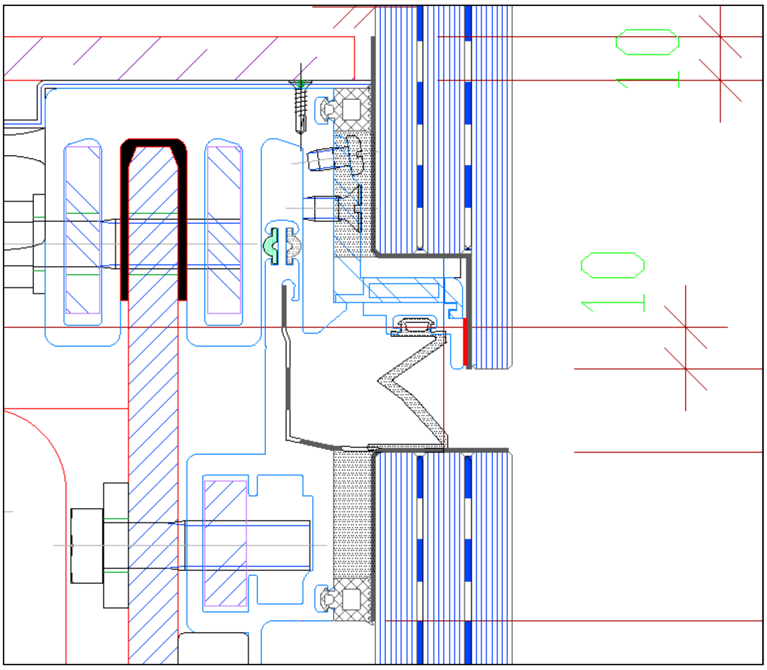


Figure 4:
Horizontal joint detail

This horizontal joint is calculated to have a sound reduction index of Rw 33 dB, as given in the Insul program output reported in Appendix 2.

Reported in the following Figure 5 is the corresponding vertical corner joint detail

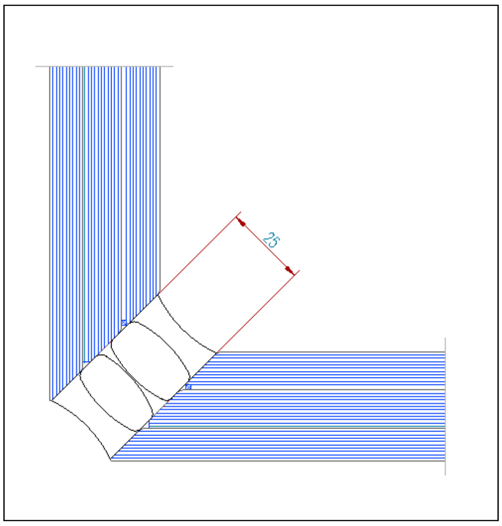


Figure 5:
Vertical corner joint detail – horizontal section

These corner joints are calculated to have an R_W of 34 dB, as reported in Appendix 3.

4.0 CALCULATION OF THE OVERALL FAÇADE SOUND INSULATION

In order to calculate the overall weighted apparent sound reduction index, R'_W obtainable in-situ in a typical room behind the Type EWS-01 façade, the composite apparent sound reduction indices were calculated at each octave band centre frequency, introducing into the calculations the area of each of the elements, their individual sound reduction indices and safety factors. Subsequently, the rating curve given in EN ISO 717-1 *"Rating of sound insulation of buildings and of building elements"* was applied to the average octave-band results to determine the weighted single-number value.

In the calculation, a safety factor of 2 dB has been applied to the sound reductions of the joint elements estimated with the Insul program.

The typical façade / receiving room which has been considered is reported in the following Figure 6:

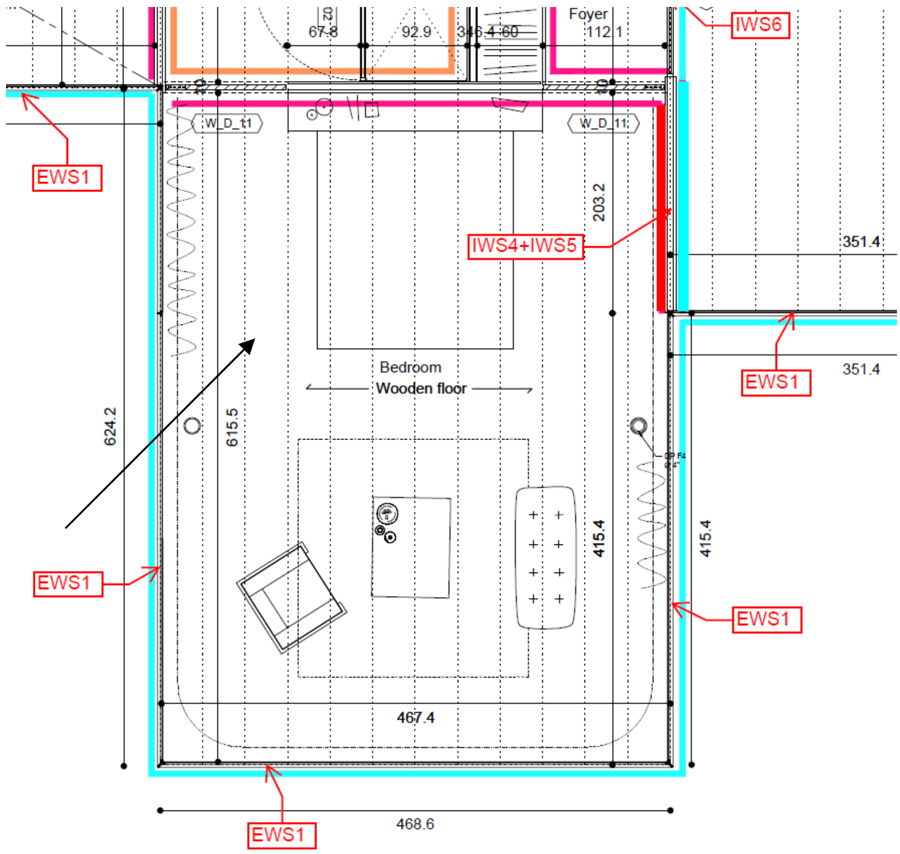


Figure 6:
Façade/Receiving room considered – 29.1 m^2 Bedroom on Floor F2

The façade which has been considered is the largest one of the room, as indicated by the arrow in Figure 6, and has approximate dimensions 6.24 x 3.5 m.

As far as the safety factor to be applied to the glazing performance is concerned, in the laboratory the test sample size of the glass including framing is 1.25 x 1.50, which is 1.88 m^2. For the project being considered, as is evident from the receiver room layout in Figure 6, some of the glass areas will be much larger and therefore a reduction needs to be applied, as given in the following chart,

Dependence of Sound Transmission on the Size of Glazings

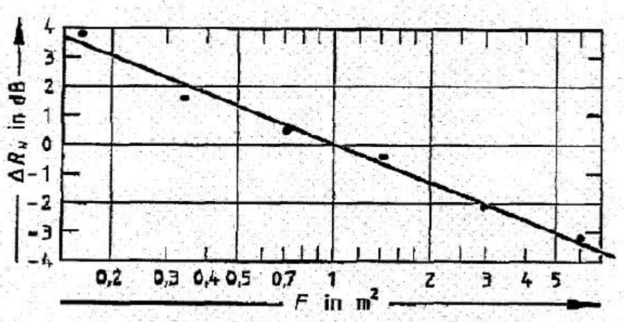


Bild 4. Veränderung des bewerteten Schalldämm-Maßes R_w luftgefüllter Isoliergläser in Abhängigkeit von deren Fläche. Für die Scheiben 4(12)4, 8(12)4, 12(12)4, 12(16)4 und 12(24)4 wurden jeweils die Mittelwerte der Messungen von Scheiben gleicher Fläche bestimmt. An diese Mittelwerte wurde bei Auftragung über dem Logarithmus der Fläche eine Gerade angepaßt und diese dann bei 1 m² auf „0" normiert. Die damit gewonnenen relativen R_w-Werte wurden nun über alle Scheiben gemittelt. Der Zusammenhang zwischen ΔR_w und der Scheibenfläche läßt sich in guter Näherung durch die folgende Gleichung beschreiben:

$$\Delta R_w = -4,3 \text{ dB} \cdot \log F \text{ mit } F \text{ in m}^2.$$

From: "Einfluss der Scheibengrösse auf die Schalldämmung von Isolierglas" (Influence of Size on the Sound Transmission of Insulating Glazing)
P.Derner et al.
Glastechn. Ber. 55 (1982) Nr. 9 pp. 183-186

$$\Delta R_w = -4.3 \cdot Log(S/1.88m^2)$$

Figure 7:
Glazing size correction chart and equation

In this case, the largest pane size will be 6,24 x 3,5m = 21,8 m^2. Applying the above equation, it is calculated that the correction factor equates to 4.5 dB which has been rounded up to a 5 dB reduction factor for the glazing.

5.0 FAÇADE SOUND INSULATION RESULT – CALCULATED WEIGHTED APPARENT SOUND REDUCTION INDEX, R'$_w$

The calculation of the weighted apparent sound reduction index in-situ for the typical Type EWS-01 façade is reported in Appendix 4 and the overall result given in the following Table 1. The calculated value, which is considered to be the worst case, is valid for the typical receiving room indicated in the table:

Façade	Typical receiving room considered	R'w calculated
EWS-01	29.1 m^2 Bedroom on the West façade at F2 level	37

Table 1:
Calculated weighted apparent sound reduction index R'w

The calculated result therefore confirms that the target contract limit of R'w 35 dB can be achieved.

5.0 VERTICAL FLANKING SOUND INSULATION

5.1 ACOUSTIC MITIGATION DETAIL

Reported in Figure 8 below is the detail, in vertical section, of the floor slab and curtain walling junction, complete with the proposed acoustic treatment:

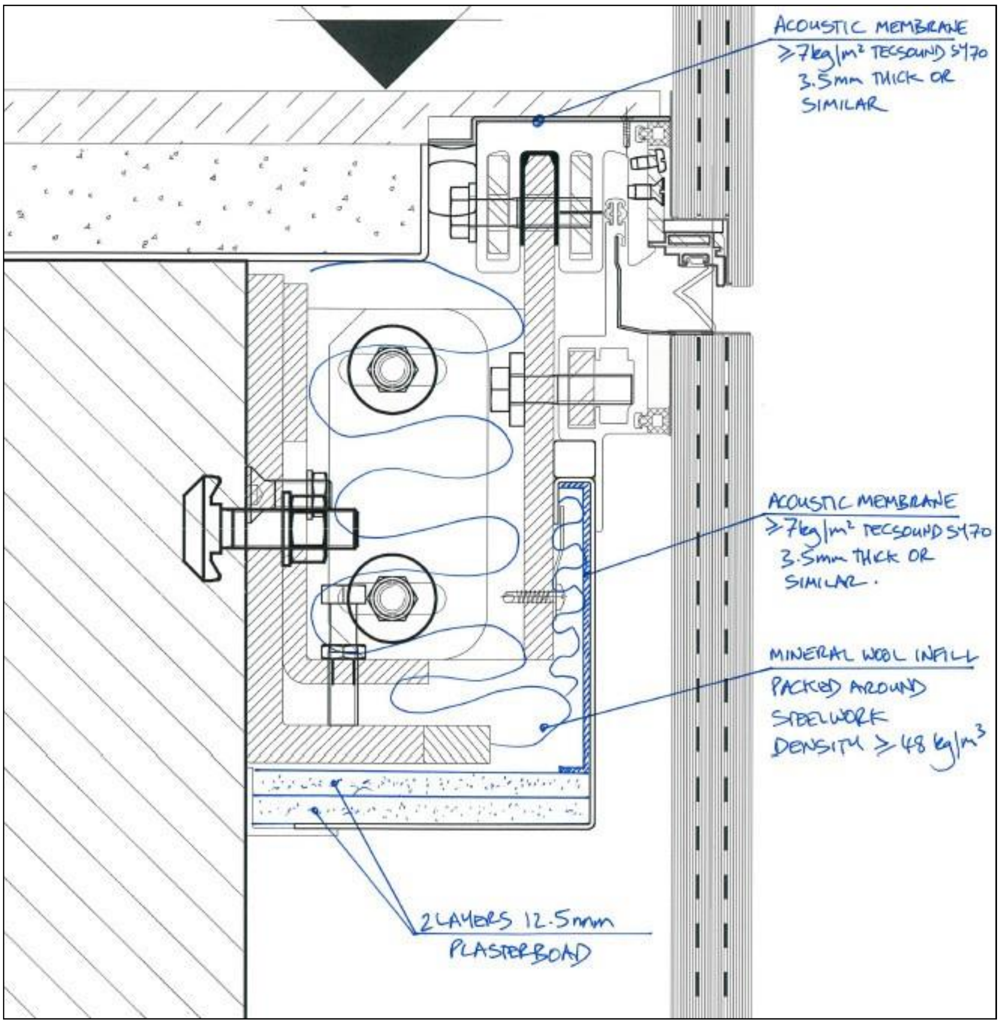


Figure 8:
Typical Type EWS-01 façade /slab intersection with
proposed acoustic treatment

The acoustic detail reported in the above Figure 8 shows that the supporting steelwork fixed to the floor slab edge will be completely boxed in. The horizontal acoustic treatment will consist of two layers of 12.5 mm plasterboard with 2 mm aluminium externally, which will need to be well sealed with a flexible joint at the border of the floor slab edge.

The 2 mm thick aluminium panel box section will continue vertically and will be lined internally with an acoustic membrane of superficial density ≥ 7 kg/m^2, such as TEXSA TECSOUND SY 70 or similar. Mineral wool of ≥ 48 kg/ m^2 will be well packed around the steelwork.

The upper part of the curtain walling floor closure will be acoustically reinforced with the same TECSOUND SY 70 acoustic membrane located underneath the thinner part of the wooden flooring to provide useful damping and increase the sound insulation.

The sound insulation of this element has been modelled with the aid of the INSUL 8.0 program by Marshall Day Acoustics, considering sound transmission through the weakest path. This is considered to be via the thinner portion of the wooden floor and the vertical part of the box section, which will be weaker than the horizontal part reinforced with plasterboard. A weighted sound reduction index of Rw 51 dB is calculated for this element. This calculation is reported in Appendix 5.

5.2 VERTICAL FLANKING SOUND TRANSMISSION– CALCULATED APPARENT WEIGHTED SOUND REDUCTION INDEX, R'w

The calculation of the weighted apparent sound reduction index in-situ between vertically separated rooms for the typical Type EWS-01 façade is reported in Appendix 6. The calculated value takes into account direct transmission through the floor slab and flanking noise transmission through the curtain walling floor slab closure. A weighted apparent sound reduction index of R'w 55 dB is calculated. This partial result doesn’t take into account the vertical flanking sound transmission along the external curtain walling itself.

Reported in Appendix 7 is a laboratory flanking transmission test certificate by Schuco for their Skyline S65 unitised façade. The weighted normalised flanking sound insulation, Dnf,w, of this system is 61 dB. This is considered to be acoustically similar to the façade under consideration, as the glazing will not be continuous between floors. However, a 5 dB safety factor will be applied to this result to take into account some prediction uncertainty.

The following overall result is therefore calculated, taking into account flanking sound transmission along the glass façade itself:

Transmission path	Sound insulation
Floor slab + curtain walling closure	R'_w 55 dB
Flanking along the facade itself	$D_{nf,w}$ 61 – 5 = 56 dB
Total	**$R'_w = 10\log(10^{-55/10}+10^{-56/10}) = 52$ dB**

Table 2:
Calculated weighted apparent sound reduction index R'_w
between floors

It is calculated that the weighted apparent sound reduction index between vertically adjacent rooms is R'_w 52 dB, assuming the curtain walling floor closure detail is well executed on-site.

The calculated result therefore confirms that the target contract limit of R'_w 48 dB can be achieved.

Appendixes:

1. AGC YourGlass glass configurator program output for glazing
2. Insul program output for horizontal joint
3. Insul program output for corner joint
4. In-situ façade sound insulation calculation
5. Insul program output for curtain walling floor closure
6. In-situ vertical flanking sound insulation calculation
7. Flanking sound insulation test certificate for typical unitised facade

Your composition:

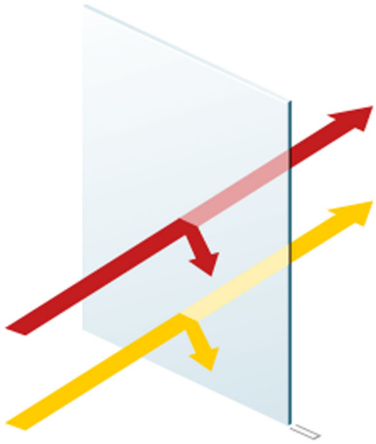
12 12.4 Stratobel 2x Planibel Clear

Personal notes:

Estimate for 10/1.52SGP/10/1.52SGP/10

LIGHT	
Transmission	80
Reflection	7

ENERGY	
Solar factor	63
Reflection	6



THERMAL PROPERTIES (EN 673)	EN 673
Ug-Value - W/(m².K)	5.0

LIGHT PROPERTIES (EN 410)	EN 410
Light Transmission - τv (%)	80
Light Reflection - ρv (%)	7
Internal light reflection - ρvi (%)	7
Colour Rendering - RD65 - Ra (%)	94

ENERGY PROPERTIES	EN 410	ISO 9050
Solar factor - g (%)	63	62
Energy Reflection - ρe (%)	6	6
Direct Energy Transmission - τe (%)	53	51
Total Energy absorption - αe (%)	41	43
Shading coefficient - SC	0.72	0.71
UV Transmission - UV (%)	0	
Selectivity	1.27	1.29

OTHER PROPERTIES	
Resistance to fire - EN 13501-2	NPD
Reaction to fire - EN 13501-1	NPD
Bullet Resistance - EN 1063	NPD
Burglar Resistance - EN 356	P3A - P4A
Pendulum body impact resistance - EN 12600	1B1

ACOUSTIC PROPERTIES	
Direct airborne sound insulation(Rw (C;Ctr) - EN 12758) - dB	42 (0; -3)(1)

THICKNESS AND WEIGHT	
Nominal thickness (mm)	25.52
Weight (kg/m²)	62

The data are calculated using spectral measurements that are conform to standards EN 410, ISO 9050 (1990) and WIS/WINDAT.
The Ug-value (formerly k-value) is calculated according to standard EN 673. The emissivity measurement complies with standards EN 673 (Annex A) and EN 12898.
This document is no evaluation of the risk of glass breakage due to thermal stress. For tempered glass: the risk of spontaneous breakage due to Nickel-Sulfide is not covered by AGC Glass Europe. The Heat Soak Test is available on request.
Specifications, technical and other data are based on information available at the time of preparation of this document and are subject to change without notice. AGC Glass Europe can not be held responsible for any deviation between the data introduced and the conditions on site. This document is only informative, in no way it implies an acceptance of the order by AGC Glass Europe.
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The user of the AGC GlassConfigurator undertakes to indemnify and hold harmless AGC from and against any and all claims, costs and damages arising out of, or relating to improper / misleading use of the AGC GlassConfigurator.
See also conditions of use.

(1)These sound reduction indexes correspond to glazings which are 1,23 by 1,48m according to EN ISO 10140-3 and are tested in laboratory conditions. In-situ performances may vary according to the effective glazing dimensions, frame system, noise sources etc. The accuracy of the given indexes is not better than +/- 1dB.

(2)These sound reduction indexes are estimated (no test).They correspond to glazings which are 1,23m. by 1,48 m. In-situ performances may vary according to the effective glazing dimensions, frame system, noise sources etc.
The accuracy of the given indexes is +/- 2dB.

Sound Insulation Prediction (v8.0.12)

- Key No. 0437

Margin of error is generally within Rw +/- 3 dB

Job Name:Rothschild 48

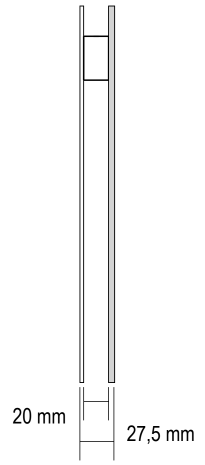
Job No.:170040   Page No.:

Date: 4 lug 17   Initials:DB

File Name: EWS-1 Horizontal joint.ixl

Notes:

EWS-1 Horizontal joint



Rw 33 dB
C -1 dB
C_{tr} -4 dB
D_{nTw} 35 dB [V:50m3] [A:11m2]

System description

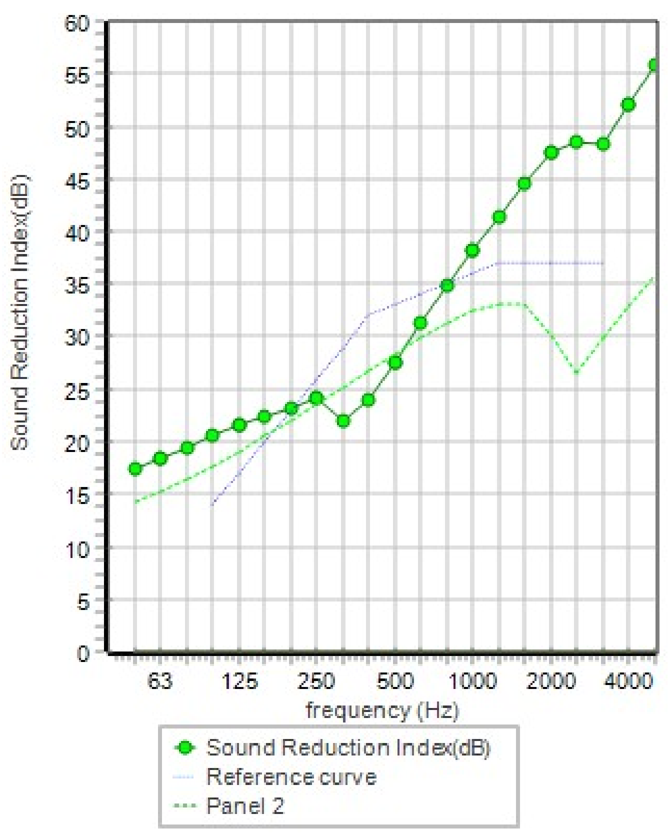
Panel 1 : 1 x 2,5 mm Rubber (ρ:920 kg/m3,E:0,03GPa,η:0,20, ρs:2,3 kg/m², fc:1,437E5 Hz)

Cavity: Steel stud (0.55mm): Stud spacing 600 mm
Panel 2 + 1 x 5,0 mm Aluminium (ρ:2900 kg/m3,E:85GPa,η:0,01, ρs:14,5 kg/m², fc:2393 Hz)

Mass-air-mass resonant frequency =297 Hz

frequency (Hz)	R(dB)	R(dB)
50	17	
63	18	18
80	19	
100	21	
125	22	21
160	22	
200	23	
250	24	23
315	22	
400	24	
500	28	27
630	31	
800	35	
1000	38	37
1250	41	
1600	44	
2000	47	46
2500	48	
3150	48	
4000	52	51
5000	56	

Panel Size 2,7x4 m; Mass 16,8 kg/m²



Sound Insulation Prediction (v8.0.12)

- Key No. 0437

Margin of error is generally within Rw +/- 3 dB

Job Name:Rothschild 48

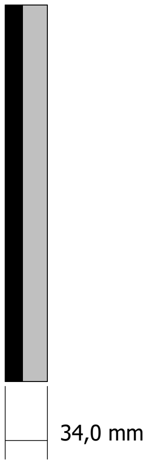
Job No.:170040 Page No.:

Date: 4 lug 17 Initials:DB

File Name: Vertical corner joint.ixl

Notes:

Vertical corner joint



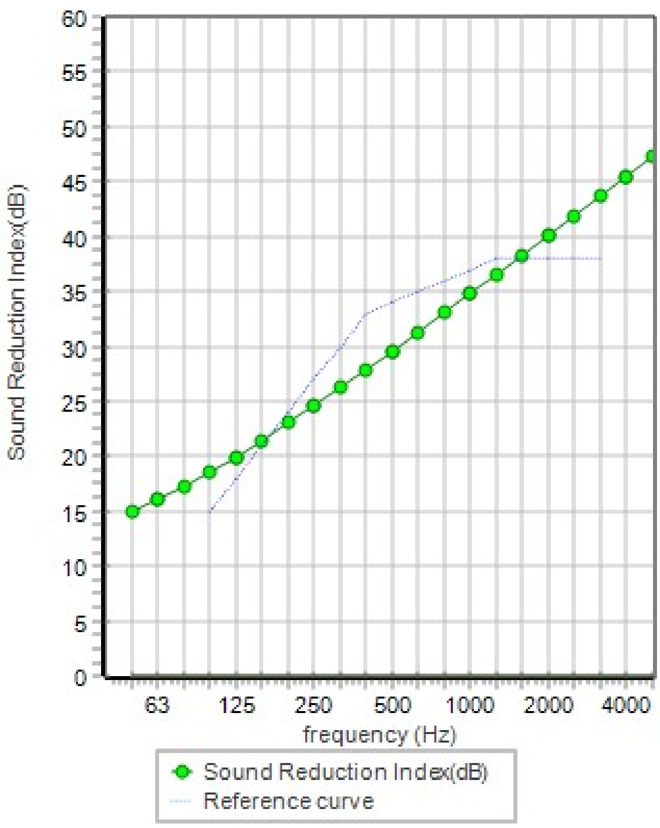
Rw	34 dB
C	-1 dB
C_{tr}	-4 dB
D_{nTw}	36 dB [V:50m3] [A:11m2]

System description

Panel 1 : 1 x 14,0 mm Silicone seal + 1 x 20,0 mm Poliethylene foam seal

frequency (Hz)	R(dB)	R(dB)
50	15	
63	16	16
80	17	
100	19	
125	20	20
160	21	
200	23	
250	25	24
315	26	
400	28	
500	30	29
630	31	
800	33	
1000	35	35
1250	37	
1600	38	
2000	40	40
2500	42	
3150	44	
4000	45	45
5000	47	

Panel Size 2,7x4 m; Mass 16,1 kg/m²



HOTEL ROTHSCHILD 48, TEL AVIV

CALCULATION OF THE SOUND INSULATION OF TYPICAL FACADE TYPE EWS-01

29.2 sq m BEDROOM ON FLOOR F2

Element 1: Single laminated glazing (10/1.52SGP/10/1.52SGP/10: Rw 42 dB)

Octave band centre frequency (Hz)		63	125	250	500	1000	2000	4000	dBA
Lp external, SPL assumed at 2 m from the facade (dB)		80	75	72	68	64	61	57	70
C, Correction for on-site glazing size (dB)		5	5	5	5	5	5	5	
SRI, Sound reduction Index (dB)		24	31	34	39	43	43	48	
S, Element area (sq. m)	21,7								
Lw, Sound Power Level (dB)		68	57	50	41	33	30	21	47
(Lw = Lp-SRI+C+10logS-6)									
V, Room volume (cubic metres)	96,0								
Reference Reverberation Time (seconds)	0,50								
Internal Sound Pressure Level = Lp1		**60**	**48**	**41**	**32**	**24**	**21**	**13**	**38**
(Lp1 = Lw + 10logRT-10logV+14)									

Element 2: Horizontal joint - Rw 33 dB

Octave band centre frequency (Hz)		63	125	250	500	1000	2000	4000	dBA
Lp external, SPL assumed at 2 m from the facade (dB)		80	75	72	68	64	61	57	70
C, Safety factor (dB)		2	2	2	2	2	2	2	
SRI, Sound reduction Index (dB)		18	21	23	27	37	46	51	
S, Element area (sq. m)	0,12								
Lw, Sound Power Level (dB)		49	41	36	28	14	2	-7	31
(Lw = Lp-SRI+C+10logS-6)									
V, Room volume (cubic metres)	96,0								
Reference Reverberation Time (seconds)	0,50								
Internal Sound Pressure Level = Lp2		**40**	**32**	**27**	**19**	**5**	**-7**	**-16**	**22**
(Lp2 = Lw + 10logRT-10logV+14)									

Element 3: Corner vertical joint - Rw 34 dB

Octave band centre frequency (Hz)		63	125	250	500	1000	2000	4000	dBA
Lp external, SPL assumed at 2 m from the facade (dB)		80	75	72	68	64	61	57	70
C, Safety factor (dB)		2	2	2	2	2	2	2	
SRI, Sound reduction Index (dB)		16	20	24	29	35	40	45	
S, Element area (sq. m)	0,08								
Lw, Sound Power Level (dB)		49	40	33	24	14	6	-3	29
(Lw = Lp-SRI+C+10logS-6)									
V, Room volume (cubic metres)	96,0								
Reference Reverberation Time (seconds)	0,50								
Internal Sound Pressure Level = Lp3		**40**	**31**	**24**	**15**	**5**	**-3**	**-12**	**21**
(Lp3 = Lw + 10logRT-10logV+14)									

Calculation of global sound insulation

Octave band centre frequency (Hz)		63	125	250	500	1000	2000	4000	dBA
Total SPL = Lp1 + Lp2 + Lp3		**60**	**48**	**41**	**32**	**25**	**21**	**13**	**38**
DnT, Standardised level difference (dB)		**20**	**27**	**31**	**36**	**39**	**40**	**44**	
R' = DnT-10logV+10logS+5		**19**	**25**	**29**	**34**	**38**	**38**	**43**	
R'w 37 ISO 717-1 curve			21	30	37	40	41		
Positive differences (<= 10)			-4,4	0,8	2,8	2,0	2,6		
R'w dB	37								

Sound Insulation Prediction (v8.0.12)

- Key No. 0437

Margin of error is generally within Rw +/- 3 dB

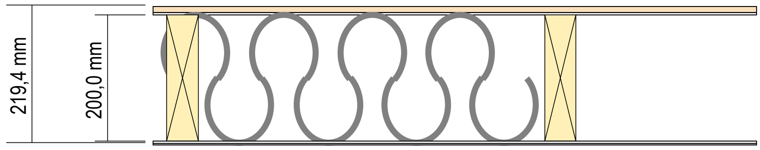
Job Name:

Notes:

Job No.: Page No.:

Date: 4 lug 17 Initials:utente05

File Name: Floor closure calc.ixl



Rw 51 dB

C -1 dB

C_{tr} -6 dB

D_{nTw} 53 dB [V:50m3] [A:11m2]

System description

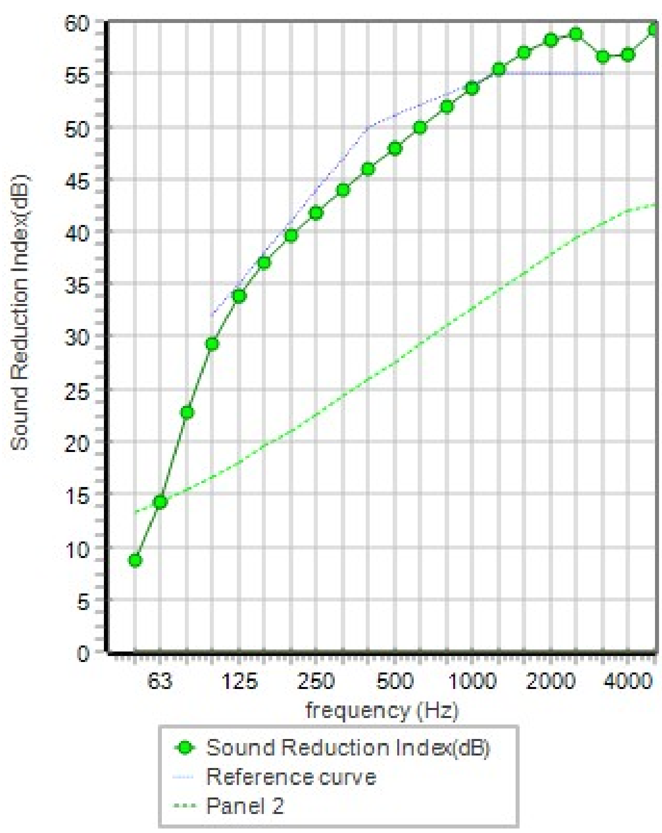
Panel 1 : 1 x 10,0 mm Pine (ρ:490 kg/m3,E:5GPa,η:0,04, ρs:4,9 kg/m², fc:2041 Hz) + 1 x 3,7 mm Tecsound 70

Cavity: Solid joist(timber or Twinaplate): Stud spacing 600 mm , Infill Rockwool (48kg/m3) Thickness 200 mm (ρ:48 kg/m3, Rf:19400 Pa.s/m2)
Panel 2 + 1 x 3,7 mm Tecsound 70 + 1 x 2,0 mm Aluminium (ρ:2900 kg/m3,E:85GPa,η:0,01, ρs:5,8 kg/m², fc:5983 Hz)

Mass-air-mass resonant frequency =46 Hz

frequency (Hz)	R(dB)	R(dB)
50	9	
63	14	12
80	23	
100	29	
125	34	32
160	37	
200	40	
250	42	41
315	44	
400	46	
500	48	48
630	50	
800	52	
1000	54	53
1250	55	
1600	57	
2000	58	58
2500	59	
3150	57	
4000	57	57
5000	59	

Panel Size 2,7x4 m; Mass 34,4 kg/m²



HOTEL ROTHSCHILD 48, TEL AVIV

ESTIMATION OF VERTICAL FLANKING NOISE TRANSMISSION BETWEEN FLOORS

FACADE TYPE EWS-01

Element 1: Floor slab (400 mm concrete) Rw 69 dB

Octave band centre frequency (Hz)		63	125	250	500	1000	2000	4000
Lprev, Sound pressure livello in the source room (dB)		90	90	90	90	90	90	90
C, Safety factor		5	5	5	5	5	5	5
SRI Floor (dB)		50	51	58	66	70	75	80
A, Element area (mq)	26,3							
Lw, Sound power level of the element (dB)		53	52	45	37	33	28	23
(Lw = Lprev + C - SRI + 10logA - 6)								
Volume of the receiving room (cu. metres)	96,0							
Reference RT of the receiving room (seconds)	0,5							
Sound pressure level in the receiving room = Lp1		**44**	**43**	**36**	**28**	**24**	**19**	**14**
Lp1 = Lw + 10logRT-10logV+14								

Element 2: Curtain walling slab closure: Rw 51 dB

Octave band centre frequency (Hz)		63	125	250	500	1000	2000	4000
Lprev, Sound pressure livello in the source room (dB)		90	90	90	90	90	90	90
C, Safety factor		5	5	5	5	5	5	5
SRI Closure (dB)		12	32	41	48	53	58	57
A, Element area (mq)	2,79							
Lw, Sound power level of the element (dB)		81	61	52	45	40	35	36
(Lw = Lprev + C - SRI + 10logA - 6)								
Volume of the receiving room (cu. metres)	96,0							
Reference RT of the receiving room (seconds)	0,5							
Sound pressure level in the receiving room = Lp2		**73**	**53**	**44**	**37**	**32**	**27**	**28**
Lp2 = Lw + 10logRT-10logV+14								

Octave band centre frequency (Hz)		63	125	250	500	1000	2000	4000
Total sound pressure level = Lp1 + Lp2		**73**	**53**	**44**	**37**	**32**	**27**	**28**
DnT standardised level difference (dB)		**17**	**37**	**46**	**53**	**58**	**63**	**62**
R' = DnT-10logV+10logS+5 (dB)		**17**	**37**	**45**	**53**	**57**	**62**	**62**
ISO 717/1 curve for R'w 55			39	48	55	58	59	
Postive differences (≤ 10)			2,3	2,6	2,4	0,6	-3,4	
R'w (dB)	55							

Normalized flanking level difference acc. to DIN 52210-7

Measurement of the normalized flanking level difference in laboratories

Customer: SCHÜCO International KG, 33609 Bielefeld

Designation Schüco SkyLine S 65F

ift ROSENHEIM

Construction of the test specimen

Curtain walling, unitised construction

Material Aluminium

Size 1340 mm × 2797 mm per element

Filling Insulating glazing unit, Panel

Construction Glazing upper 6/16/6, inside 6
lower 6/12/9 VSG SF, inside 9
panel 8 Float/40 air/120 mineral wool/2 steel

Gas filling in pane space air

Transmission path Vertical

Common border length 2,67 m

Special items Profile junction in vertical element junction insulated with mineral wool

Date of test 4. August 2004

Test opening 5,39 m x 5,63 m

Reference absorption area A_0 = 10 m²

Separation element Double concrete ceiling

Test noise bandwidth noise

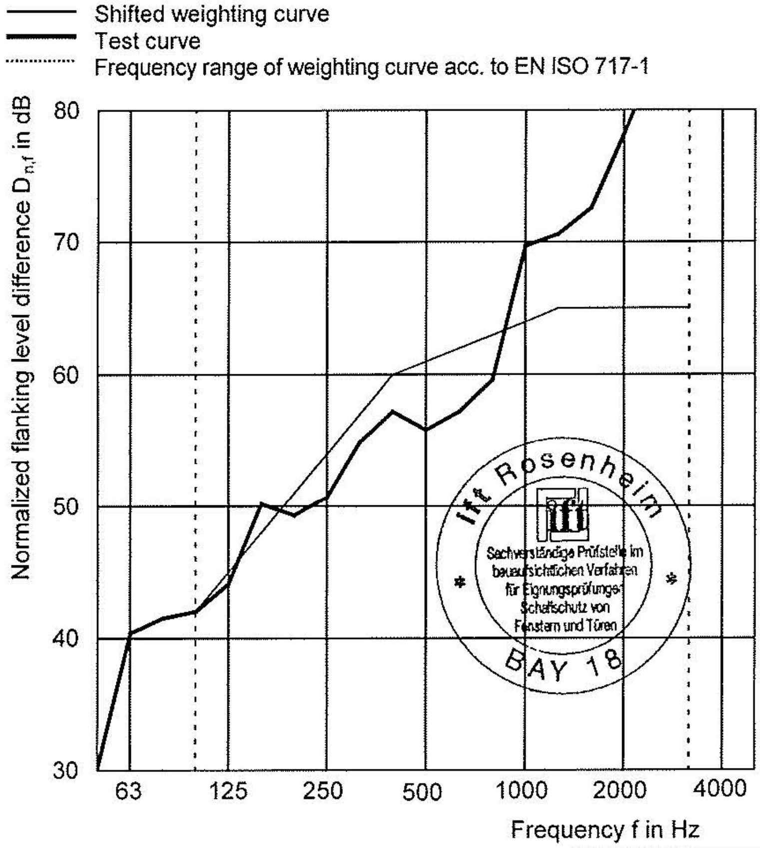
Volumes of the test rooms V_S = 148 m³
V_E = 133 m³

Maximum sound insulation
$D_{n,f,w,max}$ = 72 dB (ref. to 10 m²)

Mounting conditions
Element mounted in the flanking test opening and sealed. Ceiling junction with multiplex and chipboard sandwich element.

Climate 25 °C / 50 % RH

f in Hz	$D_{n,f}$ in dB
50	30,1*
63	40,4
80	41,5
100	42,0
125	44,1
160	50,2
200	49,3
250	50,7
315	54,9
400	57,2
500	55,8
630	57,2
800	59,6
1000	69,7*
1250	70,6
1600	72,6
2000	78,2*
2500	84,2*
3150	84,9*
4000	86,8*
5000	85,6*
6300	81,9*
8000	73,4*
10000	68,8*



Rating according to EN ISO 717-1 (in 1/3rd octave bands):

$D_{n,f,w}$ (C;C_{tr}) = 61 (-1;-5) dB $C_{50-3150}$ = -1 dB; $C_{100-5000}$ = 0 dB; $C_{50-5000}$ = 0 dB
$C_{tr,50-3150}$ = -9 dB; $C_{tr,100-5000}$ = -5 dB; $C_{tr,50-5000}$ = -9 dB

Test report No.: **169 28386/3e**

Data sheet 7

ift Rosenheim

25. August 2004

i. A. Bernd Saß

Head of building acoustics