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**HSH Engineering Design Service
428 Cheetham Hill Road
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**Acoustic Assessment
128450/FO/2020
715A Stockport Road
Manchester
M19 3AR**

**AB Acoustics
4 Cumbrian Close
Shaw
Oldham**

February 2021

Introduction

AB Acoustics were commissioned by HSH Engineering Services with reference to Planning Application Number 128450 / FO / 2020 to undertake an environmental noise assessment of a site for the change of use of the above address from a Church Hall into a Snooker Hall

The following letter has been received from Manchester City Council :

Mr Talat Zeria
HSH Engineering Design Service
428 Cheetham Hill Road Cheetham
Manchester M8 9LE

Date: 2 December 2020

Dear Sir/Madam,

Reminder Letter Application number: 128450/FO/2020

Proposal: Conversion of first floor of premises to snooker club (Class E) Location: Connections Dance Centre ,
751 Stockport Road, Manchester, M19 3AR

We wrote to you previously to inform you that the above application could not be registered and to date we have not received the requested information from you. We could not register your application for the following reason(s):

1) Please confirm that the submitted drawings relate to the use of the first floor as a snooker hall and provide a drawing showing how the first floor would be accessed via separate ground floor access point.

2) Please amend section 1 of the application forms and confirm that the proposal relates to 751A Stockport Road as stated on the application drawings.

3) Please provide an acoustic report to identify noise attenuation measures, including measures to address noise outbreak to adjoining residential uses. Please see guidance at:
http://www.manchester.gov.uk/info/500207/planning_and_regeneration/1962/additional_planning_guidance/3

4) Please provide a complete waste management proforma:
http://www.manchester.gov.uk/info/500207/planning_and_regeneration/1962/additional_planning_guidance/3

If we do not hear from you by 30 December 2020, we will assume you do not wish to proceed and will therefore return the application. However, if you wish to discuss the information required, a member of my staff will be pleased to assist. Please return any required documents and/or information to the Technical Support Team using the details above.

Yours faithfully

As can be seen from the above the LPA require an acoustic study to assess the impact of the proposal on the existing background noise levels and the adjacent residential properties

The following report aims to satisfy this requirement – however due to the current lock down (and the great likelihood that this will continue in some form or other after the current lock down has ended) the following report is based on library figures regarding traffic noise at the proposed site and internal noise from the snooker hall.

This is due to the traffic flows being significantly lower than during 'normal' times which would result in incorrect data.

It is understood that the Snooker Hall will be open between the hours 08.00 to 23.00 - and the maximum number of people in the Hall could be 30

No music will be played and refreshments in the form of tea / coffee and ready made sandwiches will be served.

The entrance / exit to the proposed Snooker Hall will be via the existing door to Stockport Road.

The door onto Mayford Road will only be used as a Fire Exit.

It is understood that there will be no chiller / air conditioning units on the premises.

There is a Discount Shop on the Ground Floor (Levenshulme Discount Shop which is open from 09.00 to 19.00 hrs) under the proposed Snooker Hall – on Mayford Road (which at the present time is closed to traffic turning off Stockport Road) there is a recent residential development that is adjacent to the proposed Snooker Hall.

Technical Background

A major revision of the Building Regulations Approved Document E on Sound Insulation came into force on 1st July 2003. The previous 1992 Regulations have been extended to include rooms for residential purposes, the insulation of internal walls, reverberation in multiple occupancy dwellings and a new section on schools. Levels of sound insulation between domestic dwellings were stated which were deemed to be "reasonable" and methods of achieving these were suggested. Acceptable

Before detailing the work required it is worth repeating the following requirements :

When this kind of work is undertaken, there is a duty on the developer to specify methods and materials of construction to ensure compliance with the Noise Insulation aspects of the current Building Regulations (Approved Document E). The Approved Document E provides guidance on "typical" constructions that should provide the required noise insulation but does not specify exact materials.

I levels were specified for both New Build and for Conversions. Most importantly, a new requirement for Pre-Completion Testing (**PCT**) has been added.

For **Airborne Noise**, the actual performance levels chosen were expressed in terms of a new parameter, **DnTw + Ctr**, the Weighted Standardised Level Difference corrected for low frequency noise. The parameters **DnTw** and **Ctr** are defined in BSEN ISO 717. The basic parameter **DnTw** is the value of the Rating Curve at 500Hz. The Rating Curve is arrived at by taking the difference between the level of a Standard Source noise in one room and the residual level in a corresponding Receiving Room and correcting for Reverberation Time and Background Noise. This is then compared with a Standard Reference curve using the methods of BS EN ISO 717. The **DnTw** value is then corrected for low frequency using a calculation for the **Ctr** term. The previous 1992 regulations used only the **DnTw** parameter.

The minimum airborne insulation level required for floors is:- **45dB DnTw + Ctr** for New Build and **43dB DnTw + Ctr** for Conversions. These values are numerically smaller than the value for **DnTw** in the previous Regulations since the **Ctr** term is a negative value. A higher value suggests better noise insulation.

There can be confusion between the attenuation figures quoted in literature :

DnTw + Ctr : this denotes a FIELD measurement – this figure is ALWAYS lower than the Rw attenuation quoted because it is a field measurement on partitions built on site.

The Ctr term is a correction for low frequency performance of the partition, this has become more important with the advent of high-powered music systems.

It is important to note that the 'Building Regulations' denote this term the *apparent sound insulation* between rooms – this not only takes into account the attenuation (or lack of it) of the party wall but also any acoustic leakage paths (flanking transmission) between the two properties – **this is why it is very important to correctly seal the wall to the floor, ceiling and outer walls.**

Rw – this figure is quoted by manufacturers of building elements (and is the only one they can quote as they are not responsible for the building of the various elements into the final structure) and is obtained by LABORATORY measurements – it will ALWAYS be greater than the DnTw + Ctr figure because in the lab. measurements there is no flanking transmission – and the building elements are always correctly fitted in the aperture.

The proposed plans for the development are enclosed at the end of the report – it is seen from these that the Admin. Office is immediately over the present Take Away and is adjacent to the existing Church building (Inspire) that has no residential use in this area.

However there is residential property adjacent on Mayford Road that is recently built – prior to the building of this residential property the party wall between the two premises is understood to have been an external brick wall.

This development is covered under Planning Applicant Number 099909/FO/2012/N2.

There is also residential property opposite the proposed development on Mayford Road.

As can be seen the proposed development is located in a busy commercial / residential area that consists of a number of take aways that are open for extended periods.

Noise Assessment Criteria

The likelihood of complaints about noise from industrial plant can be assessed where the standard is appropriate using BS 4142 – 2014 – this has replaced the earlier standard BS 4142 : 1997

This standard describes methods for rating and assessing sound of an industrial / commercial nature. The methods described use outdoor sound levels to assess the likely effects of sound on people who might be inside / outside residential premises.

The significance of sound of an industrial / commercial nature depends upon the margin by which the rating level of the source exceeds the background sound level and the context in which the sound occurs.

The Standard is intended to be used for :

Investigating complaints regarding noise.

Assessing sound from proposed / new / modified or additional noise sources of an industrial / commercial nature.

Assessing sound at proposed new dwellings or premises used for residential purposes.

The sound level from a source when determined as a discrete entity distinct and free of other influences contributing to the ambient sound is referred to as the 'specific sound level'.

The specific sound level is evaluated at an identified location over the appropriate reference time interval which are : 1 hours during the daytime – 07.00 to 23.00 hrs and 15 minutes during the night time – 23.00 to 07.00 hrs.

The specific noise may be subject to acoustic feature correction if the noise level at the measurement location is subjectively considered to contain certain acoustic features that may increase the significance of the impact of the noise over the background level.

If these features are present at the measurement location then the character correction is added to the specific sound level to arrive at the rating level.

The Standard requires the assessor to consider the subjective prominence of the character of the specific noise source at the measurement location / noise sensitive receptors and the extent to which the character of the noise will attract attention to it – such features are taken into account by applying the following corrections :

	Tonality	Impulsivity	Other Characteristics
Just Perceptible	+ 2 dB	+ 3dB	-
Clearly Perceptible	+ 4dB	+ 6 dB	-
Highly Perceptible	+ 6dB	+9 dB	-
Readily Distinctive against Residual Environment			+ 3 dB

If both tonal and impulsive characteristics are both present then two corrections can be made – however if only one is dominant then only one correction need be applied.

If no corrections are deemed appropriate then the Rating Level equals the Specific Noise Level.

An initial estimate of the impact of the specific sound is obtained by subtracting the measured background level from the rating level and considering the following :

- A) Typically the greater the difference the greater the impact.
- B) A difference of around + 10 dB or more is likely to be an indication of a significant adverse impact – depending on context.
- C) A difference of around + 5 dB or more is likely to be an indication of a significant adverse impact – depending on context.

- 1.0 The lower the rating level is to the measured background level the less likely it is that the sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the measured background level this is an indication that the sound source will have a low impact depending upon context.

Where the initial estimate of the impact needs to be modified due to the context then all pertinent factors need to be taken into consideration – these include the following :

- The absolute level of the sound.
- The character and level of the residual sound compared to the character and level of the specific sound.
- The sensitivity of the receptor and whether residential dwellings already incorporate design measures that secure good internal and outdoor conditions eg facade insulation – ventilation / cooling that reduces the need to open windows – acoustic screening.

The standard recognises that the response to sound can be subjective as well as to the local attitudes to the source of the sound and the character of the neighbourhood.

As the proposed Snooker Hall is over Commercial premises there is no requirement for acoustic treatment to the floor / ceiling between the two premises.

Discussion

As can be seen from the plan of the site enclosed the Snooker Hall has party walls to neighbouring property.

With regard to the internal noise from the Snooker Hall there is only one area of concern – the party wall to the residential apartments at 1A Mayford Road (Mega Plaza).

As stated above the Ground Floor of the proposed Snooker Hall is commercial premises and the adjacent property on Stockport Road is Inspire (in the Church) which is adjacent to the Admin. Office of the proposed development.

As can be seen from the enclosed plans there are proposed to be 6 tables and if it is assumed that they are all in use at the same time then there could be 24 people playing snooker.

Assuming some people are waiting / watching the number could increase to 30 – this is the number assumed in the following.

If all the tables are occupied and the distance between the talker and listener is 1.0m then for a 'normal' voice the noise level will be 57 dBA – as there is the possibility of 15 conversations (30 people) taking place then the level is increased by $57 + 10 \log 15 = 69$ (68.7) dBA.

If the above conversations are taking place with a 'raised' voice – this would result in a level in the hall of $62 + 10 \log 15 = 74$ (73.7) dBA.

The construction of the party wall to the adjacent residential property is unknown and is not detailed on the planning application for the residential property – however if it is assumed that as a minimum the existing wall was a single masonry wall (as there was an attached property prior to the residential apartments being built) and that the internal face of the residential property is a single layer of masonry which will either have been plastered or treated with plasterboard then the likely attenuation offered by this party wall could be of the order of $DnTw + Ctr = 48 / 50$ dB (from experience).

In addition to the above part of the party wall is separated from the residential property by a stairwell which is separated from the Snooker Hall by an additional partition wall – however in the area adjacent to the access doors to the fire escape and kitchen there is no partition wall as is the case in the actual kitchen.

The doors to the Fire Escape and the kitchen must be at least half hour fire rated (acoustically) and be a 44mm thick timber door -having a mass of at least 27 kg / sq m.

The frame that the doors fit into is also important as gaps around the perimeter of the doors must be kept to a minimum – the frames having a 90mm x 40mm section with a stop of at least 15mm – if these doors are used then the quoted attenuation of them is $Rw = 30$ dB – however as stated above the seal around the doors is important and in general will reduce the attenuation offered to around 20 dB.

Therefore the attenuation offered by the party wall at the head of the stairs and in the kitchen between the two properties needs to be increased – we would recommend the following solution :

The condition of the party wall needs to be visually examined and any defects repaired to at least the standard of the existing wall.

This area (marked on the enclosed plan) therefore needs to be acoustically treated to improve the attenuation of this section of the party wall.

It is recommended that a timber / metal partition is built in this area – the cavity created is filled with mineral fibre sound insulation material having a thickness of at least 50mm and a minimum density of 10 kg / sq m and then the whole is finished with a double layer of 12.5mm Gyproc SoundBloc plasterboard (or similar). – with staggered joints and fully sealed around its perimeter the whole is then skim plastered to 3mm.

No holes must be cut into this wall for electrical sockets / switches etc. as the holes will very effectively reduce the attenuation offered by the independent studded wall.

From previous Pre Completion measurements of this type of construction the attenuation achieved has been in excess of $DnTw + Ctr = 53 / 55$ dB – in excess of the New Build requirement.

If it is assumed that the internal noise level within the Snooker Hall could be of the order of **74 dBA** then the noise level in the adjacent property could be of the order of $74 - 53 / 55 = \mathbf{21 / 19\ dBA}$

This level is within the daytime (and night time) requirements for the internal noise level within residential property detailed in BS 8233 : 2014

Conclusion and Recommendations – Internal Noise Levels

- The present internal construction of the party wall may not be satisfactory with respect to the requirements of BS 8233 : 2014 for the internal noise levels generated in the adjacent property on Mayford Road.
- The construction of an independent studded wall adjacent to the existing party wall in the area of the Kitchen and Fire Escape should be constructed as detailed above and as shown on the attached plan of the proposed Snooker Hall.
- This will result in a calculated noise level in the adjacent residential property of the order of **21 / 19 dBA** which is well within the noise levels detailed in BS 8233 : 2014 of **30 dBA**.

External Noise

It is understood that there is no intention of installing any air conditioning units in the Snooker Hall.

Due to the current lock down restrictions no external noise level measurements were undertaken as it is deemed that these would not be representative of the true situation therefore existing level measurements from a location near by have been used.

Equipment Used and Procedure

The noise levels were measured using a :

The measurements were made with a Bruel & Kjaer Type 2238 Sound Level Meter (Type 1 instrument) – at a height of 1.5m and at least 1.5m away from any reflecting surfaces.

The system was calibrated prior to the series of measurements and checked afterwards using a B & K Type 4231 Calibrator – no deviation was found.

The measurements were undertaken at the times stated in the results.

Results

These were undertaken at the rear of 811 Stockport Road on the date shown in the results and are considered to be representative of the noise levels at the proposed Snooker Hall



Measurement Location

Weather

Date	Wind Speed M/sec	Wind Direction	Temperature C	Rain	Cloud Cover %	Road Conditions
02/12/17	0	-	7	No	100	Damp
03/12/17	0	-	5	No	80	Dry
05/12/17	3	SW	6	No	100	Dry

Saturday 02 December 2017

Measurement Period	LA eq	LA 90	LA 10
A - 20.00 – 21.00	51.1	49.4	52.8
B - 22.00 – 23.00	50.5	46.2	51.8

Octave Band Centre Frequencies Hz

L 90 dBA	62	125	250	500	1000	2000	4000	8000
A – 49.4	54.4	47.5	47.1	45.2	45.5	41.1	35.4	29.9
B – 46.2	49.5	41.3	44.9	44.5	40.3	35.8	32.1	25.9

Sunday 03 December 2017

Measurement Period	LA eq	LA 90	LA 10
22.30 – 23.30	46.7	44	48.5

Octave Band Centre Frequencies Hz

L 90 dBA	62	125	250	500	1000	2000	4000	8000
44	46.2	41.3	38.7	39	38.1	36.7	28.5	21.3

Tuesday 05 December 2017

Measurement Period	LA eq	LA 90	LA 10
22.00 – 23.00	52.1	49.6	54.4

Octave Band Centre Frequencies Hz

L90 dBA	62	125	250	500	1000	2000	4000	8000
49.6	55.3	48.1	47.7	46.4	46.2	43.7	38.2	31.1

Rear of Building

To the rear of Desi Style Take Away and to the side of the Hall there are two existing extract ducts.

The side windows to the proposed Snooker Hall that overlook Inspire have been 'brick up' previously therefore there are no opening on this facade that overlooks Inspire.

On the Stockport Road facade there are three windows and on the Mayford Road facade four – these are visible from No. 2 Mayford Road.

The glazing of these windows is understood to be IGU's of 4mm / 6 to 20mm / 4mm which as can be seen from the data sheet at the end of the report have a quoted attenuation of $R_w = 29$ dB – the size of these windows is approximately $1\text{m} \times 2\text{m} = 2$ sq m therefore the total area on the Mayford Road facade is 8 sq m.

The distance between these windows and the residential property at No. 2 Mayford Road is scaled at 12m therefore the noise level at this residential property from the use of the Hall as a Snooker Hall can be calculated from :

$$L_2 = L_1 - 6 - R + 10 \log S - 11 - 20 \log r + DI$$

Where

L_2 = Calculated level at distance r metres

L_1 = Internal Level within building – this is assumed to be **74 dBA** is used as the overall level this could be regarded as the *worst case situation* as it is unlikely that this level will be the noise level within the whole of the building – See above

R = the sound reduction index of the building element which in this case is **29 dBA** – see enclosed data

S = surface Area of building facing the residential property (windows) = 4 x 2 = **8 sq m**

r = distance to houses = **12m** – this is the scaled distance to the nearest residential properties on Mayford Road

DI = Directivity Index = **3**

$$L_2 = 74 - 6 - 29 + 10 \log 8 - 11 - 20 \log 12 + 3$$

$$L_2 = 18 \text{ (18.4) dBA.}$$

As can be seen from the above measurements the lowest measured background level (LA 90) at a similar location was recorded at **44 dBA**.

The above calculated noise level for the noise breakout from the windows of the Snooker Hall on the residential property at No.2 Mayford Road is **18 dBA** below the recorded background level and as such could be inaudible.

This level will not increase the existing noise level on Mayford Road.

The National Planning Guidance 2014 states that noise exposure defined by the response of people to the noise – briefly it states that :

Perception	Examples of Outcome	Increasing Effect Level	Action
Not Noticeable	No effect	No observed Effect	No Specific Measures required
Noticeable and not Intrusive	Noise can be heard – does not cause any change in behaviour or attitude	No Observed Adverse Impact	No Specific Measures required
Noticeable and Intrusive	Noise can be heard and causes small changes in behaviour and / or attitude – affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Impact	Mitigate and reduce to a minimum.

The Perception at the nearest property is highlighted.

As stated above there are no current plans for externally mounted equipment on either the Mayford Road facade or the facade that overlooks Inspire.

However if this changes then the total noise level of all the equipment fitted must achieve an external noise level that is 5 dBA below the assumed background level of 44 dBA – that is **39 dBA**.

This must be achieved across the whole of the frequency spectrum in order to reduce the effects of tonal noise – therefore the overall noise spectrum of an external plant must be :

Octave Band Centre Frequencies Hz								
dBA	62	125	250	500	1000	2000	4000	8000
44	46.2	41.3	38.7	39	38.1	36.7	28.5	21.3
Required Noise Spectrum 38	41.2	36.3	33.7	34	33.1	31.7	23.5	16.3

Conclusions

- With regard to the external noise from the proposed use of the Snooker Hall the above shows that the noise level generated will be well below the background level and therefore will not have a detrimental effect on the adjacent residential properties.

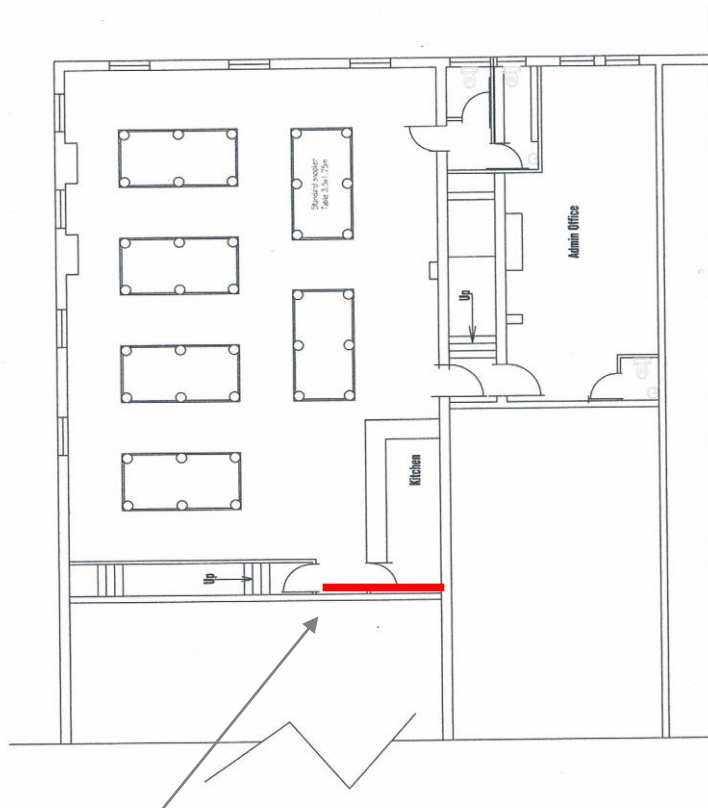
Recommendations

With respect to the noise generated by the change of use of the existing Hall to a Snooker Hall the above shows that there is no detrimental effect on the residential property adjacent to it – therefore planning permission could be granted for the change of use.

Roger Leach AMIOA

Dated : February 2021

THE BUILDER MUST CHECK THE SITE AND THE APPROVED DRAWINGS BEFORE COMMENCING THE WORKS AND MUST TAKE ANY WORKING MEASUREMENTS AS NECESSARY. ANY DISCREPANCY IN THE DRAWING MUST BE REPORTED TO THE CLIENT.



Proposed Layout Plan

H S H
 Residential Design Services
 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

Location of Proposed stud wall



Pilkington Optiphon™

	dB sound reduction index by octave band – Hz						$R_w(C;C_T)$	R_w	R_w+C	R_w+C_T
	125	250	500	1000	2000	4000				

Configuration single glazing

6.8 mm Pilkington Optiphon™	21	26	31	35	37	38	35(-1;-3)	35	34	32
8.8 mm Pilkington Optiphon™	24	28	34	38	37	43	37(-1;-4)	37	36	33
10.8 mm Pilkington Optiphon™	28	31	36	38	39	47	38(-1;-2)	38	37	36
12.8 mm Pilkington Optiphon™	30	32	37	39	41	51	39(-0;-2)	39	39	37
16.8 mm Pilkington Optiphon™	29	34	37	39	46	55	40(-0;-2)	40	40	38

Configuration Insulating Glass Unit (IGU), thickness in mm

6 / 6 to 20 mm / 6.8 Pilkington Optiphon™	23	24	34	42	43	52	38(-2;-5)	38	36	33
6 / 6 to 20 mm / 8.8 Pilkington Optiphon™	24	26	40	48	46	54	41(-3;-7)	41	38	34
6 / 6 to 20 mm / 10.8 Pilkington Optiphon™	23	28	41	47	45	55	42(-3;-7)	42	39	35
6 / 6 to 20 mm / 12.8 Pilkington Optiphon™	20	29	43	47	46	49	42(-3;-8)	42	39	34
8.8 Pilkington Optiphon™ / 6 to 20 mm / 12.8 Pilkington Optiphon™	26	36	46	50	52	63	47(-2;-7)	47	45	40
16.8 Pilkington Optiphon™ / 6 to 20 mm / 16.8 Pilkington Optiphon™	29	40	45	47	54	68	48(-2;-6)	48	46	42

The above IGUs with Pilkington K Glass™ on one pane and a 16 mm 90 % Argon-filled cavity achieve a U value of 1.5 W/m² K.

Further information on solar and thermal performance is available on the Pilkington website using the Spectrum program: www.pilkington.com/spectrum

Impact classification EN12600 Class 1(B)1 for all above Pilkington Optiphon™ products

$R_w(C;C_T)$ are in accordance with EN1717-1

Non Pilkington Optiphon™ glass products. Figures from BS EN 12354

	dB sound reduction index by octave band – Hz						$R_w(C;C_T)$	R_w	R_w+C	R_w+C_T
	125	250	500	1000	2000	4000				

Configuration single glazing

4 mm Float Glass	17	20	26	32	33	26	29(-2;-3)	29	27	26
6 mm Float Glass	18	23	30	35	27	32	31(-2;-3)	31	29	28
8 mm Float Glass	20	24	29	34	29	37	32(-2;-3)	32	30	29
10 mm Float Glass	23	26	32	31	32	39	33(-2;-3)	33	31	30
12 mm Float Glass	27	29	31	32	38	47	34(-0;-2)	34	34	32

Configuration Insulating Glass Unit (IGU), Float glass, thickness in mm

4 / 6 to 20 mm / 4	21	17	25	35	37	31	29(-1;-4)	29	28	25
6 / 6 to 20 mm / 6	20	18	28	38	34	38	31(-1;-4)	31	30	27
6 / 6 to 20 mm / 4	21	20	26	38	37	39	32(-2;-4)	32	30	28
10 / 6 to 20 mm / 4	24	21	32	37	42	43	35(-2;-5)	35	33	30
10 / 6 to 20 mm / 6	24	24	32	37	37	44	35(-1;-3)	35	34	32

Note that these are conservative figures and cover all products by European glass manufacturers.

R_w = Weighted sound reduction. This scale allows for the response of the human ear and could be used for determining a suitable product to reduce noise such as voices.

C = An adjustment to the R_w scale that could be used for selecting a product to reduce noise from music, radio, tv, high speed traffic and other medium to high frequencies.

C_T = An adjustment to the R_w scale that could be used for selecting a product to reduce noise from urban road traffic, disco music and other noises with a large component of low frequencies.

Note that a 3 dB difference is barely discernable, 5 dB is clearly discernable and 10 dB is a doubling or halving of the noise.