



## TEST REPORT

No. : GZIN2001000014SC

Date : Jan 20, 2020

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### IV. Test Results

<b>Specifications</b>	PVC SOUND BARRIER, with an area of 6.2m <sup>2</sup> , is installed in the opening of sound insulation laboratory and is sealed with 500mm thick composite sound insulation wall around it. (Composite wall sound insulation $R_w = 65\text{dB}$ ).	
Test project	Airborne Sound Insulation	
<b>Test results</b>		
f (Hz)	R (dB)	<p style="text-align: center;">Frequency Characteristic Curve of Air Acoustic Insulation</p>
100	17.8	
<b>125</b>	<b>20</b>	
160	16.4	
200	14.7	
<b>250</b>	<b>19.5</b>	
315	22	
400	22.6	
<b>500</b>	<b>24.4</b>	
630	25.6	
800	26.4	
<b>1000</b>	<b>26.5</b>	
1250	28.5	
1600	30.3	
<b>2000</b>	<b>32.7</b>	
2500	33.6	
3150	35.2	
<b>4000</b>	<b>37.1</b>	
5000	38.2	
<b>Rw(C;Ctr)</b>	<b>28 (-1;-4)</b>	

Now we are ready to use the numbers for comparison purposes. Here are some points of reference from the website, <https://noiseawarness.org>:

**0 dBA – The softest sound a person can hear with normal hearing**

**10 dBA – normal breathing**

**20 dBA – whispering at 5 feet**

**30 dBA – soft whisper**

**40 dBA – quiet residential area on a calm day**

**50 dBA – steady rainfall**

**60 dBA – normal conversation**

**70 dBA – freeway traffic**

**85 dBA – noisy restaurant**

**90 dBA – shouted conversation**

**100 dBA – nearby snowmobile**

**110 dBA – shouting into an ear**

**120 dBA – nearby thunder**

As you know, at some level our hearing can be damaged. It is recommended that we avoid extended periods of exposure to levels above 80 dBA. Above 90 dBA is considered dangerous according to the Occupational Safety and Health Association (OSHA) standards. Loud music fans beware!

Frequent pickleball sounds are typically about 70 dBA at about 100 feet away from the strike of the ball. Residents in homes located in a quiet residential area, that are within 100 feet from pickleball courts are used to noise levels of 40 dBA, therefore the level of pickleball noise is 30 decibels louder. And, remember, each time you increase a sound level by 10 decibels, it will sound twice as loud. So, an increase of 30

decibels is (10dB+10dB+10dB) or 2x as loud x 2x as loud x 2x as loud, or 8 times as loud. That's a significant increase in loudness. Would that be annoying? Probably.

Making sound level measurements requires calibrated accurate equipment. Do not rely upon sound level apps downloaded to your phone, except for simple relative readings. A good sound level meter, like the Sper840015, costs about \$500 with calibration and it needs to have its calibration checked yearly or so.

## **So, what can you do?**

What can be done to reduce complaints? First of all, courts that are expected to get lots of use should not be located close to homes! When we increase the distance to homes, things get better. Doubling the distance drops sound levels by 6 decibels in open areas and even more when there are obstructions to sound propagation, like hills and shrubs. Barriers can help as well. A 10 ft high wall can provide about 10 decibels of reduction, cutting the perceived sound level in half. Higher barriers help even more.

Using the quietest balls and paddles available can cut the sound as much as 10 more decibels or in half again, but many players will resist using other gear. Restricting play hours can also help reduce complaints.

Barriers can be absorbing or reflecting. Sound reflecting barriers, like that known as Acoustifence, are less expensive, but they will send pickleball sound back towards the courts or perhaps towards other homes. Absorbing barriers, like the sound blankets made by eNoise Control, are thicker, heavier and more expensive but they may be the best choice in some cases.

The reality is that most residential neighborhoods have background sound levels, known as ambient noise, close to 50 dBa. If all homes are 200 or more feet away from courts, the expected sound level will be about 64 dBa. If a sound barrier and quieter balls and paddles are used, we soon approach the typical sound level of average neighborhoods, under 50 dBa. To do more is difficult since sound will travel over a sound barrier. The solution to that problem might be a roof, basically making the courts an indoor facility and adding greatly to the cost, and an unrealistic option.

Determining what sound level is acceptable is not simple. Local ordinances can be consulted and sometimes this will set the specific sound level limits that apply, but other times an ordinance will simply state that any repetitive sound must not be “annoying”, and becomes a difficult goal to achieve. Sound level predictions and neighbor tolerance predictions must be part of designing a pickleball facility.

## Summary:

Pickleball sound levels within 100 feet of courts will usually be around 70 dBa with no sound reduction efforts applied. This is as loud as freeway traffic sound.

At 200 feet, (using the 6 dB drop for doubling the distance) the level will be about 64 dBa. That’s louder than normal conversation.

At 400 feet it will be about 58 dBa. That’s quieter than normal conversation levels. By limiting use of paddles and ball brands based on sound testing, you can achieve below 50 dBa, and usually below local background level at that distance.

Adding a 10 ft. high barrier can drop that to below 40 dBa, a level below normal library sound levels.

Even at 100 feet, with consideration for equipment and sound barriers, the level could be about 52 dBa, and may be an acceptable sound level in many neighborhoods. This means that barriers and distance are the most effective tools. It also means that sound levels can be predicted in advance of having complaints, so consider your location and work with your pickleball community to make the sport a welcome addition to your neighborhood.

I hope the above will be helpful to those of you with current or potential sound problems. I am available to help with making sound levels estimates so send me an email if you have questions and I invite you to join the Facebook group Pickleball Noise (Mitigation) for much more pickleball sound information.