GUIDE to understand
SOUND

SOUND PROOF WINDOWS

Q-Windows
designs, manufactures and installs
GERMAN
Window and Door Systems.

Only the highest quality materials are considered for our products.
Latest technologies are incorporate to ensure maintenance free, highly durable and long lasting solutions.

Get in touch with us!

For you the best is only good enough!

Noise stress can be a major cause of illness. It not only damages one's hearing, it also leaves persistent marks on the human psyche.

For many years, effective protection against undesired noise has not merely been a matter of comfort, but a decisive issue in health protection.

Since windows are – literally the thinnest parts of a building's shell, they play a decisive role in the acoustic absorption values of your house.

With the right combination of window type, glazing and installation you will reach a perfect noise reduction !

GLAZING
+ PROFILE
+ HARDWARE

= SOUND PROOF

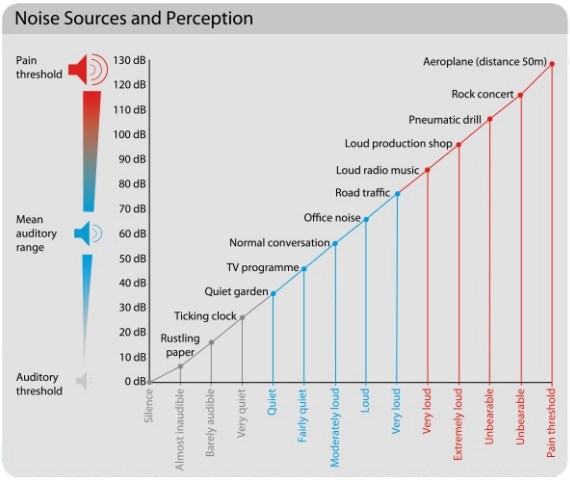
This guide will help you to understand sound and sound proving. If you are considering any sound insulation, it is recommended that you verify the sound insulation specifications with our specialists to ensure the proposed changes provide significant noise reduction.

Where there is a noise problem, you have to evaluate two facts

I. determine or measure the external noise level

II. decide the desired noise inside the room

The table beside provides a guide to examples of noise measured in decibels against the recommended noise levels for a room.



Recommended noise levels

Bedroom	30 - 35 dB
Study room	35 - 40 dB
Living room	40 - 45 dB
Home office	45 - 50 dB

By subtracting the recommended indoor noise level from the typical outdoor noise level, you can estimate the appropriate acoustic performance you need for your windows.

For example:

External noise source		71 dB
Requested Room noise level	./.	35 dB
Difference	=	**36 dB**

In our sample a **36 dB** rating is required for the window system.

I. Window Glazing

Glazing Type	Thickness (mm)	Glazing Structure (mm?)	Sound Reduction Rw (dB)	Weight (kg/m2)
 Single	3 6 10		32 35 39	7.46 14.94 24.9
 Laminated	6.38 10.76 21.52	3- 0.38 PVD-3 5- 0.76 PVD(A)- 5 10- 1.52 PVD(A)-10	33 40 43	15.24 25.1 50.4
	22	8- 6 Air -8	35	26.4
 Insulated (IGU)	21.76	4- 0.38 PVB- 4- 6 Air - 4- 0.38PVD - 3	37	29.25

By chosen the glazing type inside the table above you set the major category to define your sound proof window.

For example:

If you are looking for **36 dB** sound reduction, select either **10.76 mm** laminated glass or **21.76 mm** IGU.

Unexpected Facts

For every 10 dB increase / decrease in intensity we perceive the sound as being a doubling / halving of the noise level.

Insulation value	Sound reduction
10 dB	50 %
20 dB	75 %
30 dB	87 %
40 dB	94 %

What is sound or noise?

SOUND is everything that we can hear, it doesn't have to be noise.
NOISE is often referred to as "unwanted sound".

Noise is difficult to define and is down to personal interpretation and is subjective according to:

- The person receiving the sound
- The circumstances they are in
- The type of sound
- The duration the listener is exposed to the sound

For example:

- A siren going off for a few seconds may be mildly irritating whereas a siren that goes on for a prolonged period can be become both disturbing and painful.
- We notice the noise of a loud motorbike in the middle of the night where as this noise is lost during the day in the middle of rush hour.

How does sound travel?

Sound travels through the air like the ripple you see on the surface of water when a stone is dropped into it. The soundwaves radiate out in all directions from the source, steadily reducing in intensity or until an object stops their progress.

Describing a sound

Sound can be characterised in different ways but primarily in terms of intensity and frequency. The sound intensity describes how soft or loud the sound is. The sound value is measured in dB (decibel). A low dB value indicates a soft sound, a high dB value a loud sound.

How do we hear sound?

These sound waves travelling through the air cause our ear drums to vibrate which we perceive as sound.

SOURCE OF NOICE

Noise is any sound that is unwanted, usually because it distracts or disturbs us. Noise can come from a variety of different sources but there are only reallytwo forms:

Airborne

These are sounds which travel in waves through the air and enter our ears. Airborne noise can travel from outside a building to the inside.

Typical examples are:

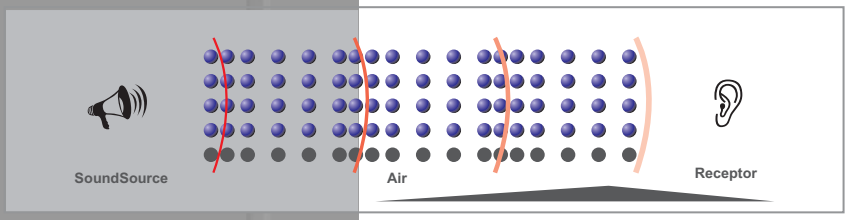
- **Music**
- **Children playing**
- **Traffic noise**

Impact

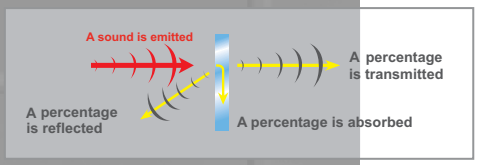
These are sounds that are transmitted via vibration through a physical structure such as a roof.

Typical examples are:

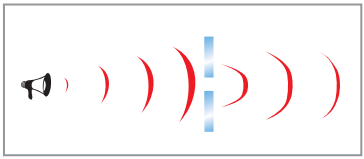
- **Rain**
- **Hail**
- **Wind**



Sound waves steadily reduce in intensity as they travel away from the source.



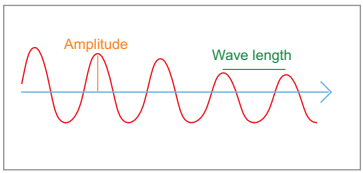
Sound meets an obstacle



One small gap in the obstacle is already enough to allow sound to travel through

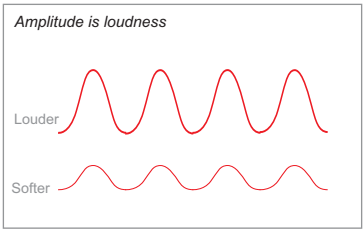
What is amplitude?

Amplitude is directly related to the acoustic energy of a sound, measuring the height or intensity of a soundwave, rather than its length. Both amplitude and intensity are related to sound's power.



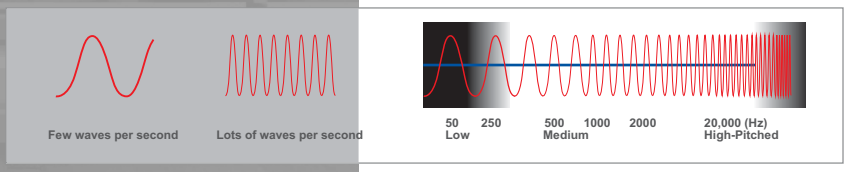
What is loudness?

Loudness is the way in which we perceive amplitude. A particular change in amplitude is not necessarily perceived as being a proportionate change in loudness.
That is because our perception of loudness is influenced by both the frequency and quality of sound, measured as Sound Pressure Level (SPL).



What are low and high frequency sounds?

Frequency is defined as the number of vibrations per second. The higher the number of vibrations per second, the higher the pitch. Pitch is the way we perceive the frequency of sound. Frequency is expressed in Hertz (Hz).
Tones that are high in pitch are high frequency (many vibrations per second) and tones that are low in pitch are classed as low frequency.



Effect of Glazing Area: The larger the glazing area, the greater the amount of noise energy able to pass through it.

Effect of Distance: The more distant the noise source, the lower the noise level.
If you situate your bedrooms away from a noise source, you can expect lower levels of noise.

Street noise will be reduced approximately 3 dB every 10 metre distance from the source.

For example:

Noise level (NL) beside the source 80 dB:

10 m	(NL-3 dB)	77 dB
20 m	(NL-6 dB)	74 dB
80 m	(NL-12 dB)	68 dB
160 m	(NL-15 dB)	65 dB

Effect of Height: On higher floors in a building, the street noise level is expected to decrease.

Effect of Glazing: Sound reduction will improve with increased glass thickness due to the greater mass involved.

Sound reduction will improve with the use of laminated glass due to the vibration dampening effect of the PVB- inner layer.

Sound reduction will slightly improve with the use of glass / airspace combinations.

MAKE YOUR WORLD A QUIETER PLACE…

Q- Windows (Malaysia) Sdn Bhd (965167-T)

Block E, Unit E3A.05, NEO DAMANSARA
Jln PJU8/1, Damansara Perdana
Petaling Jaya, 47820
Selangor
Malaysia

Tel.: (60) 3 7495 0339
Fax.: (60) 3 7596 6399

enquiry@q-windows.com.my

www.q-windows.com.my
www.facebook.com/q.windows

GERMAN Technology

Q WINDOWS™