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SAINT-GOBAIN

GLASS

SGG **STADIP SILENCE[®]**

*Beautifully Transparent
Noise Control Glazing*



SAINT-GOBAIN GLASS COMFORT

THE STRESS OF NOISE

70% of people admit to feeling harassed by noise

According to representative surveys, over two thirds of the UK population feel stressed by loud noises and fear they may be harming their health. However, noise pollution in modern society continues to grow inexorably. Road traffic is noticeably intensifying, as is train and air traffic noise. Added to this is the noise from urban expansion. Noise from lawnmowers, stereo systems and loud conversations are all commonplace in our lives, with quiet spaces fast becoming a rarity.

Is an escape to the countryside our only remaining option? Not at all, even those of us living in conurbations can lead a quiet life. Modern noise control glazing using *SGG STADIP SILENCE* will reliably keep intrusive noise out, providing the tranquillity essential for working, living and enabling relaxing sleep.



Insist on Silence in a busy world

Why make so much noise about noise?

Noise really can be deafening: cars and heavy goods traffic, airplane take offs, screeching buses, all contribute to the growing burden of modern day noise pollution. Even if people become accustomed to the permanent exposure to noise and stop perceiving it, it still affects the brain. The affects on health can include difficulties concentrating and sleeping, raised blood pressure, cardiovascular complaints, nervous disorders and even depression.

A recent study carried out by the European Heart Journal (published February 2008) investigated the effect of environmental noise on both blood pressure and heart rate during night time sleep of people living in the vicinity of four major European airports. The study found that both blood pressure and heart rate increased in the preceeding minutes, following exposure to higher noise levels. These effects were comparable for both aircraft and traffic noise. The study therefore concluded that consciousness is not required for sound to produce its cardiovascular effects.

Desire for health and a better quality of life.

Noise protection is rapidly becoming a top priority. A study carried out by Ducker Research asking window buyers what their requirements were showed that protection from noise is right at the top of their wish list, together with thermal insulation and also burglary and solar protection. This is where glazing can play an important role. Noise protection is also a legal requirement in the workplace, in an effort to reduce the incidences of stress and noise related disorders.



"Sound" describes mechanical vibrations travelling in waves at various speeds through air, water and just about any other material or medium. The number of vibrations per second decides the pitch (frequency) of the sound. In simple terms the higher the number of vibrations, the higher the pitch of the sound.

What is noise?

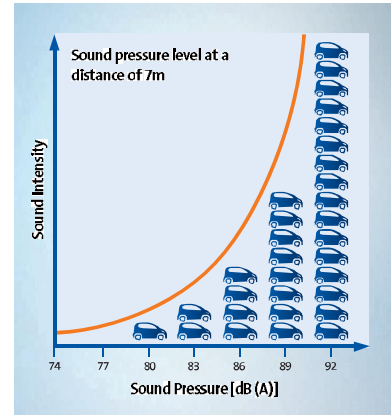
The term noise is derived from latin, meaning nausea and is used to describe sounds which are perceived as disturbing or harmful. Noise is subjective, what one person finds invasive may go unnoticed by the next. In addition sounds can be perceived in very differing ways - even if they are at the same noise level. A splashing mountain stream can easily reach the noise level of a busy road, but we perceive the sound of water as natural and calming and road traffic noises as massively intrusive.

Noise is composed of many sounds at various frequencies. The human ear can perceive sounds ranging from 16-20,000Hz - or at least the ears of younger people can. An adult's hearing range shrinks with advancing age. In particular higher pitched sounds are more penetrating than lower frequency sounds. A high pitched noise with an acoustic pressure of 80dB is hence perceived to be louder than a lower pitched sound that is also 80dB. The so called effective noise level A, specified in dB (A), takes this phenomenon into account. It evaluates the noise level in relation to its perceived quality.

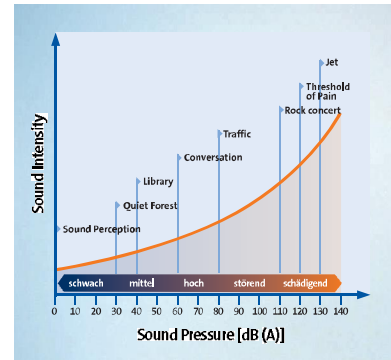
The effects of noise

The perceived loudness of sound is measured in decibels, often abbreviated to dB. The dB scale starts at the threshold of audibility with 0 dB (A) and even with a value as low as 75 dB (A) there is a risk of noise deafness. Depending upon the duration of the exposure, the auditory pain threshold is reached from approximately 120 dB (A).

The sound pressure level, measured in dB (A) doesn't proceed in a linear fashion, but on a logarithmic scale instead, see example.



If two cars each produce 80dB, their joint noise level is not 160 dB, rather it is 83dB.



Sound pressure levels above 90dB and upwards can be classed as irritating to the person experiencing them.



Insulation

Effective sound insulation provides lower decibel ratings, resulting in reduced noise levels.

When a sound wave hits a building component, part of the wave is reflected, another part is absorbed, and the rest travels right through the component to the other side. Sound is therefore dampened by sound waves being met with resistance. The sound proofing provided by a building component is defined as its sound insulation factor R in decibel. This value represents the reduction in noise level provided.

Sound insulation of windows

Non transparent external wall elements such as masonry, usually provide a good level of noise protection. However with windows, its a different story; effective noise protection becomes the result of an optional combination of frame profile, glass and installation type. This calls for special sound absorbing glass panes that will effectively keep out undesirable noises. If the glazing is to provide a high level of noise control, a detailed knowledge of the respective sound source is also critical. Noise control glazing such as SGG STADIP SILENCE therefore takes into account individual requirements with respect to the: type of sound, the level of sound insulation required, installation location and installation thickness.

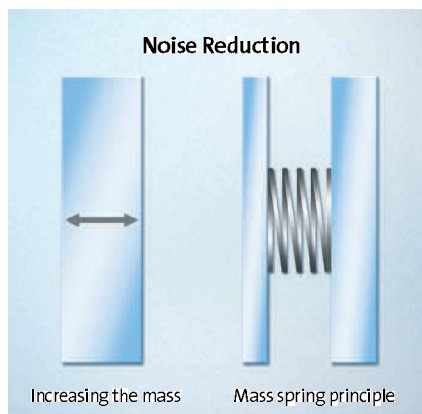
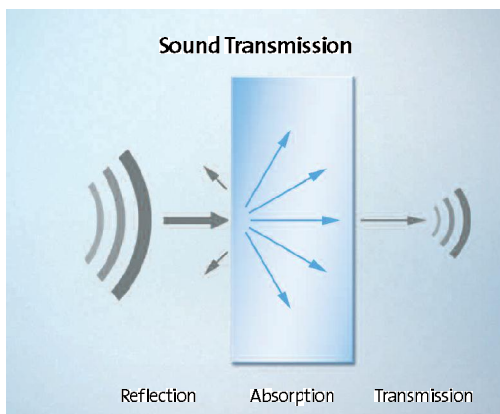
What turns standard glass into sound insulating glass?

The greater the weight, the better the sound insulation provided. In simple terms the thicker the glass the better the acoustic insulation. In the case of a double glazed unit the two panes of glass are separated by a cavity, the gas in this cavity dampens the vibrations of the the first pane before they can reach the second one. This helps to reduce both the level of vibration and the amount of sound transmitted. Higher sound insulation factors can be achieved by increasing the thickness of the glazing and ensuring it is asymmetrical. The frequency response curves of two panes combined to form a mass-spring system in insulating glass add up to better sound insulation. An acoustic laminated glass such as SGG STADIP SILENCE contains a film interlayer that has a special dampening viscoplastic core helping to further reduce the transmission of sound.



R_w - the measuring unit for sound insulation

The measuring unit for the sound insulation behaviour of a building component is R_w . This value is merely an average simplifying mutual comparison of various building components. The ears sensitivity to sound volumes in relation to their frequency pitch can only be taken into account with the airborne sound insulation index R_w . Here the spectrum adjustment factors C and Ctr adjust the average. For sound waves featuring high frequencies, the factor C needs to be added to the R_w value. For lower frequencies, factor Ctr needs to be added. The acoustic behaviour of a building component is hence defined in R_w (C, Ctr). A building component with the values R_w (C, Ctr) = 40 (+2, -8) provides an average insulation performance of 40dB. For higher pitched sounds the sound insulation is lessened by 2dB and for lower pitched sound sources it is lessened by 8dB.



"Higher sound insulation factors can be achieved by increasing the thickness of the glazing and ensuring it is asymmetrical. The frequency response curves of two panes combined to form a mass-spring system in insulating glass add up to better sound insulation."

SILENCE IS SIMPLE

Less is more....

Optimised sound insulation can be achieved by combining two panes of glass with a soft material (PVB). SGG STADIP SILENCE contains a 3 ply interlayer with a special noise dampening core, providing excellent acoustic attenuation.

The Advantage?

The patented acoustic film used in SGG STADIP SILENCE acts as a dampener preventing the glass panes from resonating with each other and ensuring an even sound insulation across the entire frequency range. In addition to its excellent acoustic properties, SGG STADIP SILENCE also provides protection against injury and the highest safety levels required for safety critical areas, over head glazing being one such example.

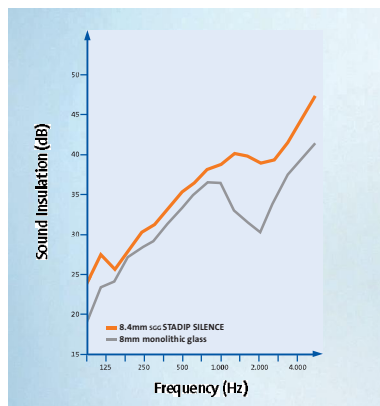
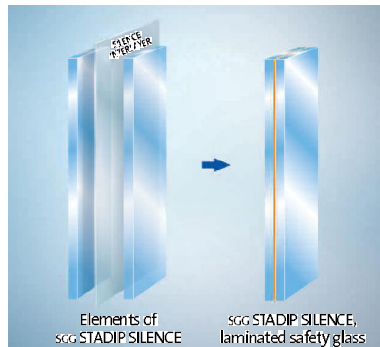


Elements of SGG STADIP SILENCE

The silence effect

SGG STADIP SILENCE levels out intrusive frequencies

Each building component has its own critical sound frequency (resonant frequency) that will cause it to vibrate spontaneously. Any component consequently provides inadequate insulation against noises at this specific frequency. With two panes of glass in a double glazed unit this vibration is heightened. Although this effect can be reduced by using panes of different thicknesses, it cannot be prevented entirely. SGG STADIP SILENCE suppresses the intrusion of sound waves around the critical frequency of the glass, be it a single pane or a double glazed unit. In a double glazed unit, SGG STADIP SILENCE achieves an airborne sound insulation index value of up to 54dB and hence absolutely keeps the promise implied by its name.



Performance of SGG STADIP SILENCE in a double glazed unit

The advantages of SGG STADIP SILENCE at a glance:

- Excellent levels of sound insulation without the need for thick, heavy glass
- Even sound insulation across the entire frequency range.
- Distortion free transparency
- All the safety and security properties associated with standard laminated glass
- Available in sizes up to 6000mm x 3210mm for the production of large panes of insulating glass

and external use.

Glass façades and windows

SGG STADIP SILENCE significantly reduces the effect of exterior noise in buildings situated near noisy locations such as busy streets or airports.



Internal Partitions

In the case of internal partitions, SGG STADIP SILENCE impresses with its high security attributes. Depending on its thickness, a single pane of SGG STADIP SILENCE can dampen the sound to 47 dB. In a double layer construction, sound insulation values far exceeding 50dB are possible. In addition, SGG STADIP SILENCE also provides numerous opportunities for creative designs and personalisation.

Overhead glazing

Overhead glazing is an architecturally attractive design element in atria and passages but also in more private areas such as conservatories. Overhead glazing can be an intrusive source of noise itself through rain or hail landing on the glazing. SGG STADIP SILENCE raises the sound insulation factor by up to 13dB! In addition, SGG STADIP SILENCE also provides splinter adhesion in case of breakage and, with a film thickness of >0.76mm, meets the necessary requirements for overhead glazing.

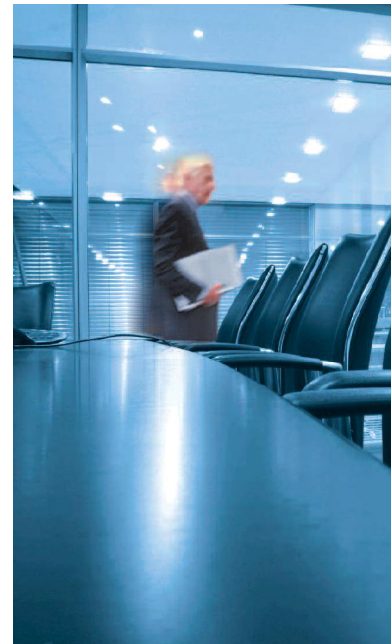
Safety functions of SGG STADIP SILENCE

Function	Standard	Part
Impact Safety	BS EN 12600	
Overhead Glazing	BS 5516	
Safety Glazing	BS 6262, BS 6180	4
Anti bandit	BS EN 356	

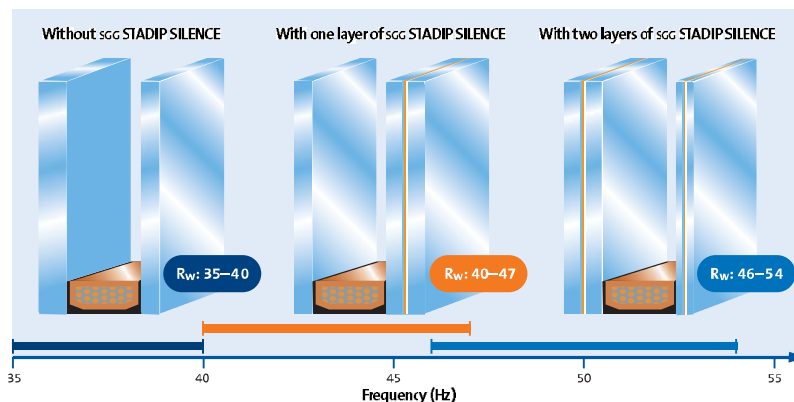
Technical Information

Sound Insulation Values (single glazed)

R _w in dB	C	C _{tr}	Type	Thickness
36	-1	-4	SGG STADIP SILENCE 6.4	6 mm
38	-1	-3	SGG STADIP SILENCE 8.4	8 mm
39	-1	-4	SGG STADIP SILENCE 10.4	10 mm
40	-1	-3	SGG STADIP SILENCE 12.8	13 mm
41	-1	-4	SGG STADIP SILENCE 14.4	14 mm
42	-1	-3	SGG STADIP SILENCE 16.4	16 mm
44	-1	-3	SGG STADIP SILENCE 20.4	20 mm
45	-1	-3	SGG STADIP SILENCE 24.8	25 mm



Effectiveness of SGG STADIP SILENCE in a double glazed unit



Combining sound insulation with other functions

Thermal Insulation

By incorporating sGG PLANITHERM, heat loss can be reduced by up to 70% in comparison with standard float glass. The warmth is distributed evenly, eliminating cold spots. The result is greater comfort combined with a noticeable reduction in heating costs.

Safety

sGG STADIP SILENCE provides all the safety features traditionally associated with laminated glass. Even more stringent safety requirements can also be achieved for those who require an extra level of protection. For these cases, special anti-bandit and anti-theft glass configurations are available from Saint-Gobain.

Solar Protection

sGG COOL-LITE glazing filters the sunlight and helps to prevent excessive heat build up, ensuring a balanced, comfortable room temperature. Solar control glazing can also significantly reduce energy bills by reducing the need for costly air conditioning.

Self-cleaning

Ideal for roofs or any difficult or dangerous to reach areas. sGG BIOCLEAN harnesses nature's elements to keep windows cleaner for longer! A special coating ensures that organic dirt will simply break down and be washed away by the rain helping glass stay cleaner for longer.

Fire protection

Saint-Gobain manufactures special fire protection safety glazing that inhibits heat development and the spread of smoke or flames. This glazing can be used both internally and externally.



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