




SAINT-GOBAIN
GLASS

SGG STADIP SILENCE®
SGG CLIMALIT® SILENCE
SGG CLIMAPLUS® SILENCE

*Enhanced
acoustic insulation*



SAINT-GOBAIN GLASS COMFORT



SAINT-GOBAIN GLASS COMFORT *Acoustic insulation*

SGG STADIP SILENCE®

SGG STADIP SILENCE®, *SGG CLIMALIT® SILENCE*,
*SGG CLIMAPLUS® SILENCE... Weighty
arguments for restoring silence !*



SGG STADIP SILENCE®, *acoustic laminated glass*

This is the ideal solution for enhanced insulation against both airborne and impact noise. It provides exceptional levels of sound insulation whilst maintaining the safety and security properties of laminated glass.



SGG CLIMALIT® SILENCE and *SGG CLIMAPLUS® SILENCE*

are double glazing products designed to effectively improve interior comfort, by providing a high level of performance in acoustic insulation, thermal insulation and security. SGG CLIMAPLUS SILENCE provides enhanced thermal insulation through the combination of the Silence interlayer with a low-emissivity glass such as SGG PLANITHERM FUTUR N. The low-e coating has the effect of reflecting radiated heat back into the room and saves on energy wastage. By replacing the air in the unit's cavity with an inert gas such as argon, this heat insulating effect can be further improved.



The facts

Noise is bad for your health

A real danger to health

In today's world, more and more people are suffering from noise overload. Solving this problem is one of the biggest challenges for those responsible for our living and working environments.

- Noise generates stress: «From a noise level of 60 dB(A) and above, symptoms of stress can begin to appear: sleep loss, decline in psychomotor and intellectual performance.» (Prof. Lehman, Max Planck Institute).
- ... and cardiac problems. The Berlin Institute for Water, Soil and Air Hygiene reveals that individuals exposed to average noise levels above 65 dB(A) during the day - one-sixth of the German population - have a 20% higher risk of heart attack.
- Sustained exposure to noise and disturbing sounds also means that the body produces a steady stream of adrenaline, a state that can lead to hypertension, psychological problems and sexual dysfunction (Time, July 98).

Noise and children

A study conducted in Munich shows that children attending a school near the airport had a reduced cognitive ability in the area of memory and language comprehension (Psychological Science 1995, 1998).

A problem of pollution

Paradoxically, although there is a world-wide battle to combat certain specific forms of pollution, the deterioration in the quality of life due to noise pollution is steadily increasing.

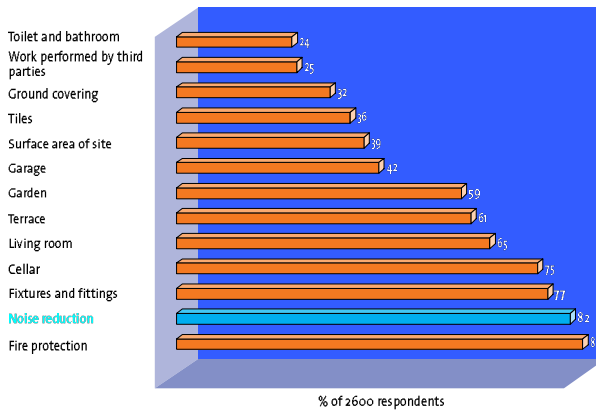
- 65% of the European population is regularly exposed to noise intensities above 55 dB(A) and 16% to more than 65 dB (European Environment Agency).
- Noise abatement measures for cars are offset by the growth in traffic and the development of leisure activities (European Commission: Future noise policy, 4/11/1996).

We can act!

It is difficult to act solely against the sources of noise, but it is possible to strongly reduce the penetration of noise within our homes. Studies conducted in various countries prove that Europeans are ready to invest to protect themselves against noise.



The population is not willing to economise on:



(German National Association of the Concrete Industry, 1994)

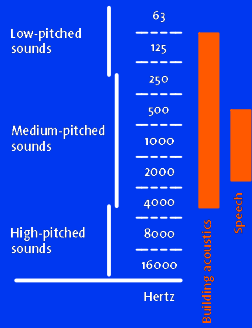
4 out of 10 French people are willing to invest in insulation for their home:

- 13% from 152 to 762 €
- 11% from 762 to 1,524 €
- 10% from 1,524 to 7,622 € (L'Entrepreneur no. 159, April 2000)



The problem

The acoustic weakness of glass around the critical frequency is particularly troublesome because it is situated in the frequency band encountered most often



Windows are the weak link in acoustic insulation

The critical frequency causes an unwanted acoustic peak

The law of mass states that the thicker the glass, the weaker the noise transmitted. A second law states that transmitted noise decreases as we pass from low to higher frequencies.

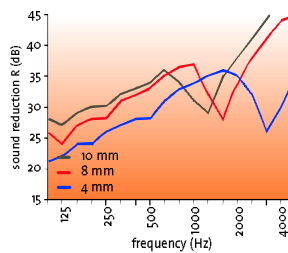
This is true up to a certain level, called the critical frequency. At this point everything is reversed. It is as if the glass suddenly develops a hole through which noise can pass freely.

Conventional products are no solution

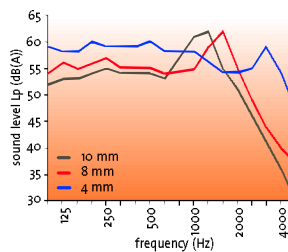
With single glazing, increasing the glass thickness doesn't help. The acoustic peak just moves to lower frequencies. Laminated glazing with an ordinary PVB interlayer is also unable to significantly reduce this peak effect.

With symmetric double glazing the effect is even worse! With two panes of the same thickness the acoustic peaks are superimposed and serve to strengthen each other. In addition a mass-spring-mass resonance point appears at low frequencies.

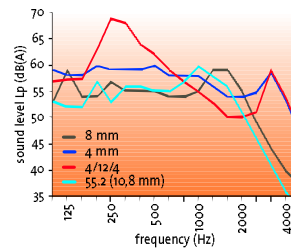
1 The critical frequency: a hole in the insulation



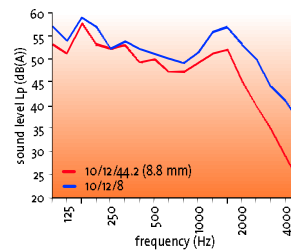
2 This hole is represented by an acoustic peak



3 Behaviour of the acoustic peak



4 ... according to the type of glazing



With asymmetric double glazing the strong peak is replaced by two weaker points. The resonance point decreases and moves toward the lower frequencies. Nevertheless, the problem remains.

Legend details

8mm, 10mm etc. Thickness in mm of the monolithic glass.
 4/12/4: Double glazing comprising: one pane of 4mm glass, a 12mm air cavity and one pane 4mm glass.
 10.8: A laminated glass made up of two sheets of 5mm glass bonded together with two 0.38mm PVB interlayers.

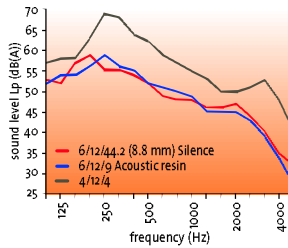


The solution

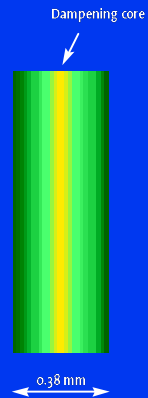
SGG STADIP SILENCE®: THE solution to the problem of critical frequency

The best acoustic performance

SGG STADIP SILENCE is a laminated glass developed by SAINT-GOBAIN GLASS with a special acoustic PVB interlayer, PVB Silence®. PVB Silence acts like a dampening core between the two panes of glass. It prevents vibration, eliminating the problem of the critical frequency and thus the acoustic peaks at high frequencies. SGG STADIP SILENCE is a patented and unique product that offers exceptional levels of acoustic comfort.



PVB Silence: a unique, patented concept!



SGG STADIP SILENCE®: THE perfect solution to airborne noise



Stop the noise!

All the advantages of SGG STADIP®, standard PVB laminated glass

- The industrial production of SGG STADIP SILENCE ensures reliable, consistent and controlled quality.
- SGG STADIP SILENCE has passed all durability tests.
- SGG STADIP SILENCE can be combined easily in double glazing with all types of glass, including coated glass (solar control, thermal insulation etc).
- SGG STADIP SILENCE provides optimum optical quality.
- SGG STADIP SILENCE is easy to use: available in large sizes (max. 3.21m by 6 m), it can be handled, cut, shaped

and assembled like SGG STADIP.

- SGG STADIP SILENCE filters more than 99% of UV between 320 and 380 nanometres and thus reduces the fading of colours in textiles and other items.

And an extra benefit!

SGG STADIP SILENCE is a laminated glass. Like SGG STADIP it therefore helps to enhance security in the event of breakage, attempted break-ins or vandalism, in return for a very modest additional cost. This 'extra' means that traditional acoustic products simply cannot compete.

Tests carried out according to European Norm EN 356* at official test laboratories in Ulm (Germany).

	Class	Ball drops of 4.1 kg	
		Number of drops	Height (m)
SGG STADIP SILENCE 44.2 (8.8)	P2A	3	3
SGG STADIP SILENCE 44.4 (9.5)	P4A	3	9
SGG STADIP SILENCE SP 510	P5A	9	9

* Glass in building - security glazing - testing and classification of resistance to manual attack.





Impact noise

SGG STADIP SILENCE®: THE solution for impact noise on roofs

Moderate the noise from rain with the help of SGG STADIP SILENCE®

The use of glass in overhead applications is becoming more and more common. This creates, however, spaces which are sensitive to impact noise from rain and hail. Trials carried out by a university laboratory^(*) in which different types of glazing were submitted to artificial rain have produced very positive results for SGG STADIP SILENCE, both in single and in double glazed form.

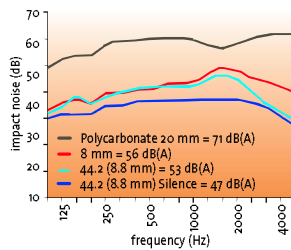
Double glazing containing a pane of SGG STADIP SILENCE performs better by 6 dB than one with an ordinary PVB interlayer. For optimum effectiveness two panes of SGG STADIP SILENCE should be used with 0.76 mm interlayers to provide an additional gain of 7 dB!

It is worth noting that acoustic resin laminated glasses are not suitable for overhead applications due to safety requirements.

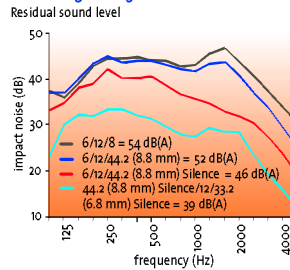
^(*) Study by Prof. Vermeir, Louvain University, Belgium

SGG STADIP SILENCE® makes it easy to combine the essential functions of sound insulation and protection

Single glazing



Double glazing



Bar Rouge - Birmingham - Architect: CZWG Architects





I n t e r i o r s

SGG STADIP SILENCE®: THE clear acoustic solution for interiors

The use of glass in partitions is becoming significantly more apparent. This is due to both the extensive decorative possibilities that glass brings to interior design as well as flexibility and ease of use.

Here too SGG STADIP SILENCE proves to be the optimum glazing solution, combining all the benefits of glass with safety and superior acoustic performance.



SVA Zurich - Courtesy of SVA Zurich - Architect: Isa Sturm & Urs Wolf / Architect: ETH SIA BSA, Zurich - Photographer: Margherita Spiluttini



DW - Brussels - Architect: Groupe Planning, Brussels



European Parliament - Brussels
Architect: Murphy Jahn

SAINT-GOBAIN GLASS COMFORT



The compositions

SGG CLIMALIT® SILENCE and SGG CLIMAPLUS® SILENCE: acoustic and thermal insulation combined

A fully flexible solution

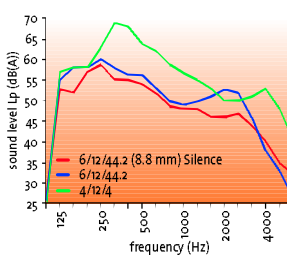
Double-glazing is now standard in most sectors of the construction market. With its SGG CLIMALIT and SGG CLIMAPLUS ranges, SAINT-GOBAIN GLASS offers a group of products that can be tailored to combine both acoustic and thermal insulation. Other functions such as enhanced security and solar control can also be added, enabling you to meet the most demanding of performance specifications.

The ideal composition for noise prevention

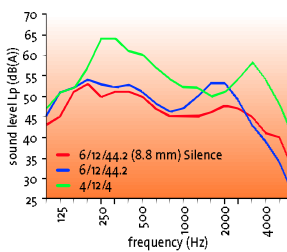
The best acoustic performance is achieved with asymmetric double glazing, incorporating at least one leaf of SGG STADIP SILENCE. The choice of composition will depend on the source of noise confronting you. The diagram below shows the sources of noise which we find most annoying, in descending order. The two graphs opposite show how effective SGG STADIP SILENCE is in comparison to standard PVB for each of the two main noise sources - road traffic and air traffic.

SGG STADIP SILENCE brings a minimum improvement of 6 dB for frequencies between 1000 and 2000 Hz, i.e. the frequencies encountered most often in our surrounding environment.

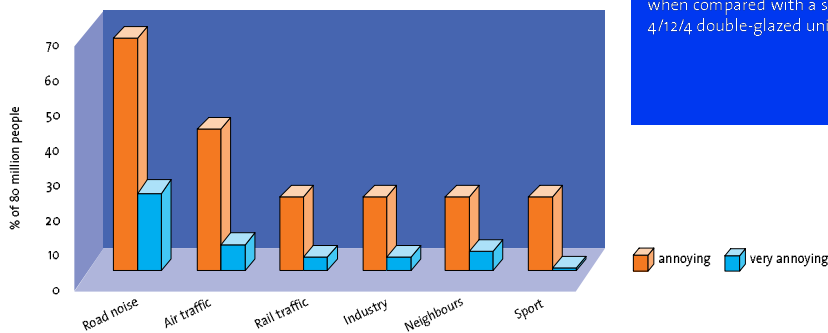
Road noise



Air traffic noise



Complaints from the German population (1994) concerning noise



(The German Federal Agency for the Environment, Annual report 1994, Berlin 1995)

SGG CLIMAPLUS SILENCE 6 mm/16 argon/44.1 or 44.2 (8.4 or 8.8 mm) (R_w 42 dB (-2; -6)) reduces the level of road noise compared with a 4 mm/12 argon/4 mm double glazed unit by:

- 12 dB in R_w
- 10 dB in R_w + C
- (fast traffic, speech, children)
- 9 dB in R_w + C_{tr}
- (street traffic, night clubs, distant aircraft, many low-pitch sounds)
- 14 dB in the area of the critical frequency

If higher levels of acoustic insulation against airborne noise are required we would recommend using either a 55.2 (10.8 mm)/16 argon/44.2 (8.8 mm)

SGG CLIMAPLUS SILENCE (R_w 46 dB (-2; -6)) or a 55.2 (10.8 mm)/20 argon/44.2 (8.8 mm) SGG CLIMALIT SILENCE (R_w 47 dB (-2; -7)):

- 16 to 17 dB better in R_w
- 14 to 15 dB better in R_w + C
- 13 dB better in R_w + C_{tr}
- More than 30 dB better in the area of the critical frequency, when compared with a standard 4/12/4 double-glazed unit!

Performances / Installation

Recommendations for optimum acoustic insulation

In order to achieve exceptionally high levels of acoustic insulation, without significantly increasing the weight and thickness of the unit, SAINT-GOBAIN GLASS has developed and tested different compositions of SGG CLIMAPLUS SILENCE.

Performance details for SGG CLIMALIT SILENCE and SGG CLIMAPLUS SILENCE double-glazing					
Composition (mm)	Total thickness (mm)	Weight (kg/m ²)	R _w dB	R _A dB	R _{A,tr} dB
64.2(10.8) SGG STADIP SILENCE/20 air/44.2(8.8) SGG STADIP SILENCE	40	47	47	45	40
10/12 air/44.2(8.8) SGG STADIP SILENCE	31	46	42	40	37
44.1(8.4) SGG STADIP SILENCE/16 argon/6*	30	35	42	40	36
33.1(6.4) SGG STADIP SILENCE/16 argon/6	28	30	40	38	34
33.1(6.4) SGG STADIP SILENCE/16 argon/4	26	25	37	36	33

* from the SWA Laboratory, Germany.
The values of the sound reduction indices have been measured in acoustic laboratories, in conditions according to EN ISO 140. These values may vary from one laboratory to another.

These configurations of unit are particularly well suited to use in urban areas where sound intensity levels can be superior to 70dBA. SGG CLIMALIT SILENCE and SGG CLIMAPLUS SILENCE sealed units when glazed into performant framing systems, allow the installer to meet the most demanding acoustic insulation levels for the façade.

INSTALLATION

SGG STADIP SILENCE must be installed in accordance with current national regulations and our special guidelines in particular concerning the following areas:

- Overhead applications
- Air and water tightness
- Thermal stress

For details see section 3 in the Glass Guide 2000.

Placing a direct heat source in close proximity of the glass should be avoided (spotlight, radiator etc) as they may create localised overheating. Similarly, avoid covering the inside face of external glazing with excessive notices/labelling, lettering, etc.

Please ensure that SGG STADIP SILENCE is not exposed to temperatures exceeding 60°C, for prolonged periods.



Immeuble de l'Etoile - La Part-Dieu - Lyon
Architect: Heskia - Photographer: Michaël Vertat

Halle de Sport Omnisport - La Part-Dieu - Lyon
Architect: Chabanne - Photographer: Michaël Vertat




SAINT-GOBAIN
GLASS

Saint-Gobain Glass UK
Marketing Department
Herald Way, Binley, Coventry,
CV3 2 ND
Tel: 024 7654 7400, Fax: 024 7663 6473
www.saint-gobain-glass.com

Distributor

see CLIMAUT, see CLIMAUT SILENCE, see CLIMAPLUS, see CLIMAPLUS SILENCE, see PLANITHERM,
see PLANITHERM FUTUR N, see STADIP, see STADIP SILENCE and all devices, brand names and logos
are registered trademarks of the Saint-Gobain Group. © Saint-Gobain Glass March 2002.

Creation/Realisation: AID&Co - Saint-Gobain Glass France - RCS Nanterre 8998 269 211 - D7704 - 11/01 - 10.000 - Subject to modifications