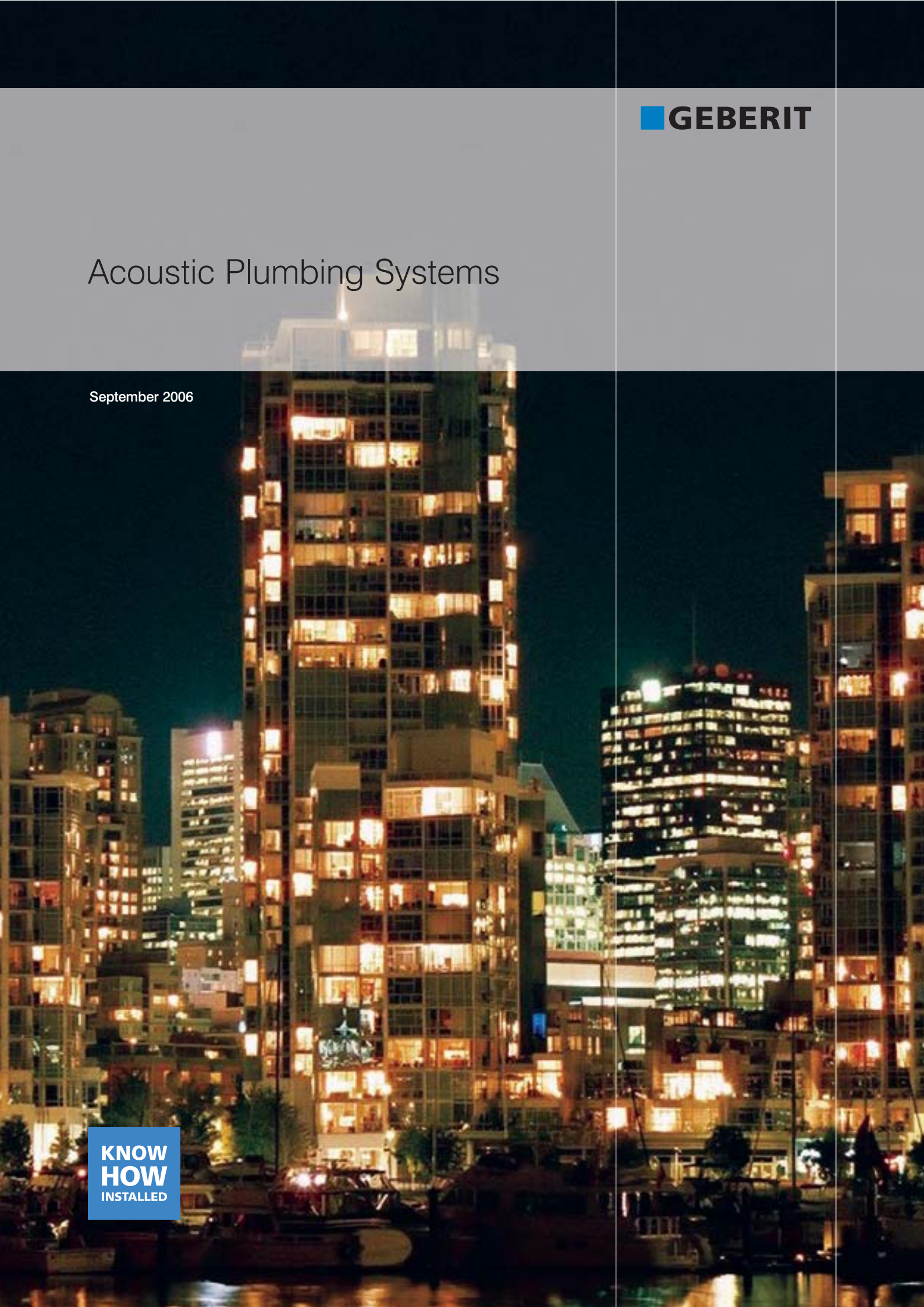


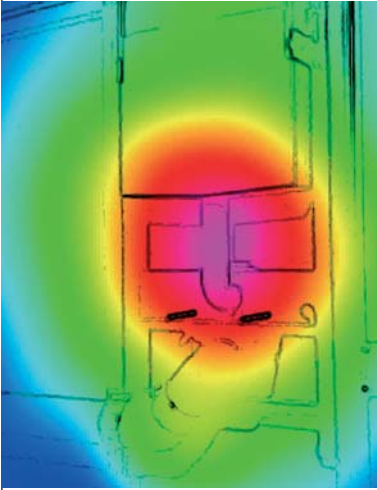
 **GEBERIT**

# Acoustic Plumbing Systems

September 2006

**KNOW  
HOW**  
INSTALLED





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## Meeting Part E with ease

Since the introduction of Part E of the Building Regulations, sanitary noise levels in new and refurbished buildings in the UK have been required to remain below 45dB(A) as a daytime average. This is tested and 46dB(A) is a failure.

As buildings themselves become better insulated acoustically, the drainage and sanitary systems will come under ever greater scrutiny. After all, nobody wants to pay today's prices for a property, only to have to listen to the neighbours.

Fortunately, the building industry in Germany, Austria and Switzerland has had even stricter acoustic standards for many years. Swiss limits are 30dB(A) for apartments, offices, schools and hospitals. Where specialist rooms are required the limits are reduced to 25dB(A). Geberit's involvement in the field of Swiss sanitary and drainage acoustics since 1969, means that Geberit systems and equipment easily meet and exceed the requirements of Part E.

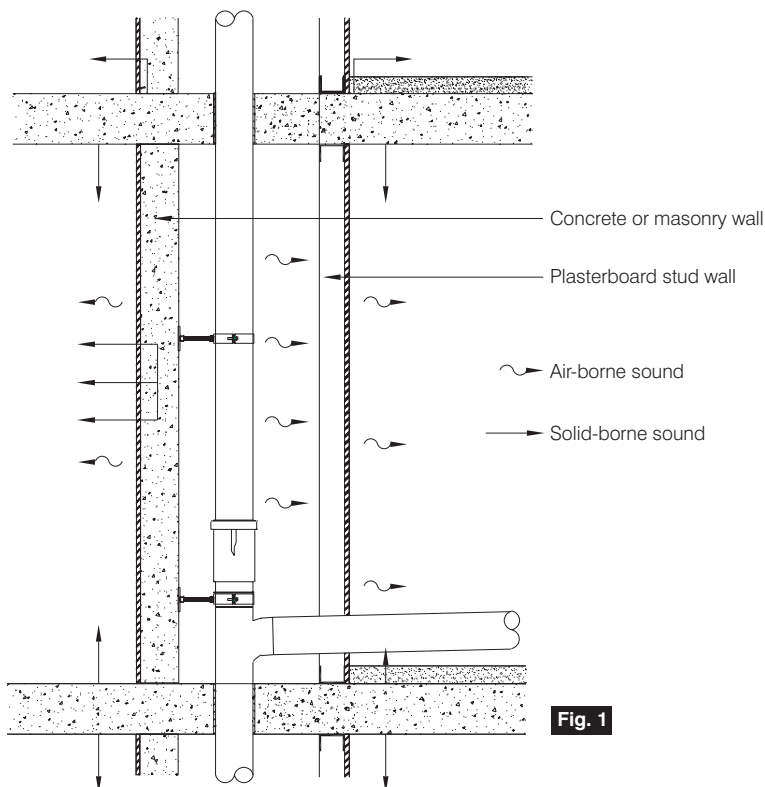
# What is noise?

Noise is generally defined as unwanted sound. In housing, as well as in office buildings, schools, hotels and hospitals, noise reduction has an important role to play in the preservation of what we know as quality of life.

Noise control in drainage stacks and sanitary systems in general therefore, presents a particular challenge and calls for specific solutions.

## Air-borne and solid-borne sound

Air-borne sound, as the name suggests, is sound that is transmitted through the air, while solid-borne sound requires solid material to propagate. The stiffer and more dense the material, the greater the speed of sound transfer. As can be seen from the diagram (Fig.1.), if strong enough, solid-borne sound can become air-borne sound and vice-versa, as it passes from one medium to the next.

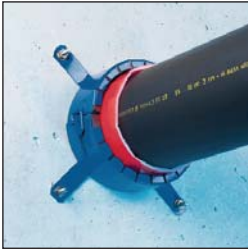


**Fig. 1**

## The everyday noise around us

Below are examples of typical situations and the sound levels (expressed in decibels) that they might typically generate. 0dB(A) is absolute silence to the human ear.

Ambient sound of leaves rustling	17dB(A)
Bedroom	22dB(A)
Library	38dB(A)
Living room	40dB(A)
Discussion	58dB(A)
Typical office noise	67dB(A)
Busy traffic	87dB(A)
Noisy workplace, such as a factory	88dB(A)
Rock band	111dB(A)
Firework display	125dB(A)
Passenger jet taking off	140dB(A)



### Fire Sleeves

Geberit fire sleeves have an acoustic isolating component included to prevent solid-borne noise being transmitted, whilst maintaining the integrity of the fire protection.

Article No. for 110mm 367.815.00.1



### Cutting Patterns

These are supplied with ISOL mat to ensure the most efficient isolation of fittings.

## The Geberit approach to noise control and how to contain it



### Impuls380 Cistern Filling Valve

This unique design works over a range of pressures from 0.1 to 10 bar, allowing the cistern to refill silently and eliminating the noise generating effects of surges and fluctuating mains pressure.

Article No. 240.700.00.1



### Push Rods

Even the flush mechanism of a Geberit cistern has acoustic features, such as these rubber-tipped push rods, which reduce noise by deadening the impact sound generated when the flush plate hits the rods.



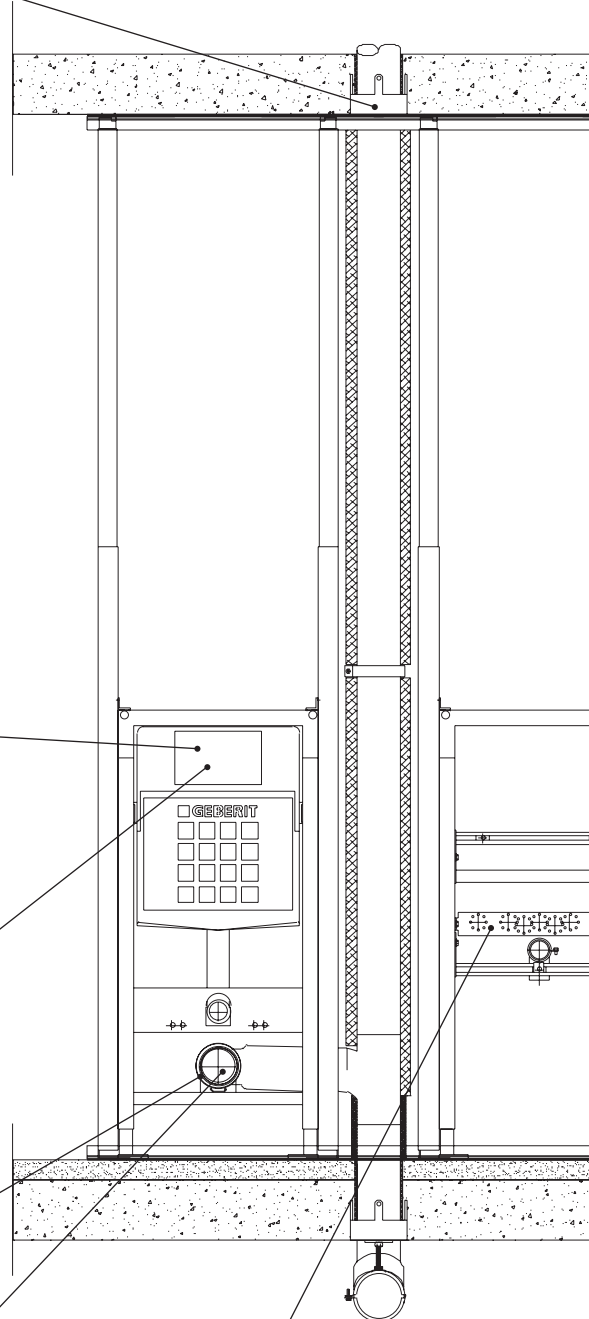
### Outlet Pipe Clip

The clip which holds the WC outlet pipe on the frame has acoustic insulation around its internal diameter, reducing solid-borne noise transfer.



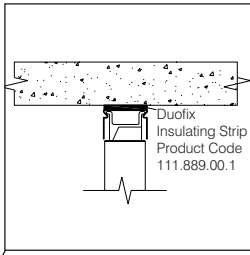
### Pan Isolator

This isolates the WC pan from the wall thus preventing solid borne noise being transmitted to the building structure. For the same reason, the pan washers isolate the pan from the fixing bolts. Article No. 156.050.00.1, or available for hand wash basin Article No. 156.051.00.1



### Back Plate Elbow

The rubber insulating cover reduces solid-borne noise, transferring from the water flow to the Duofix frame.



### Duofix Insulating Strip

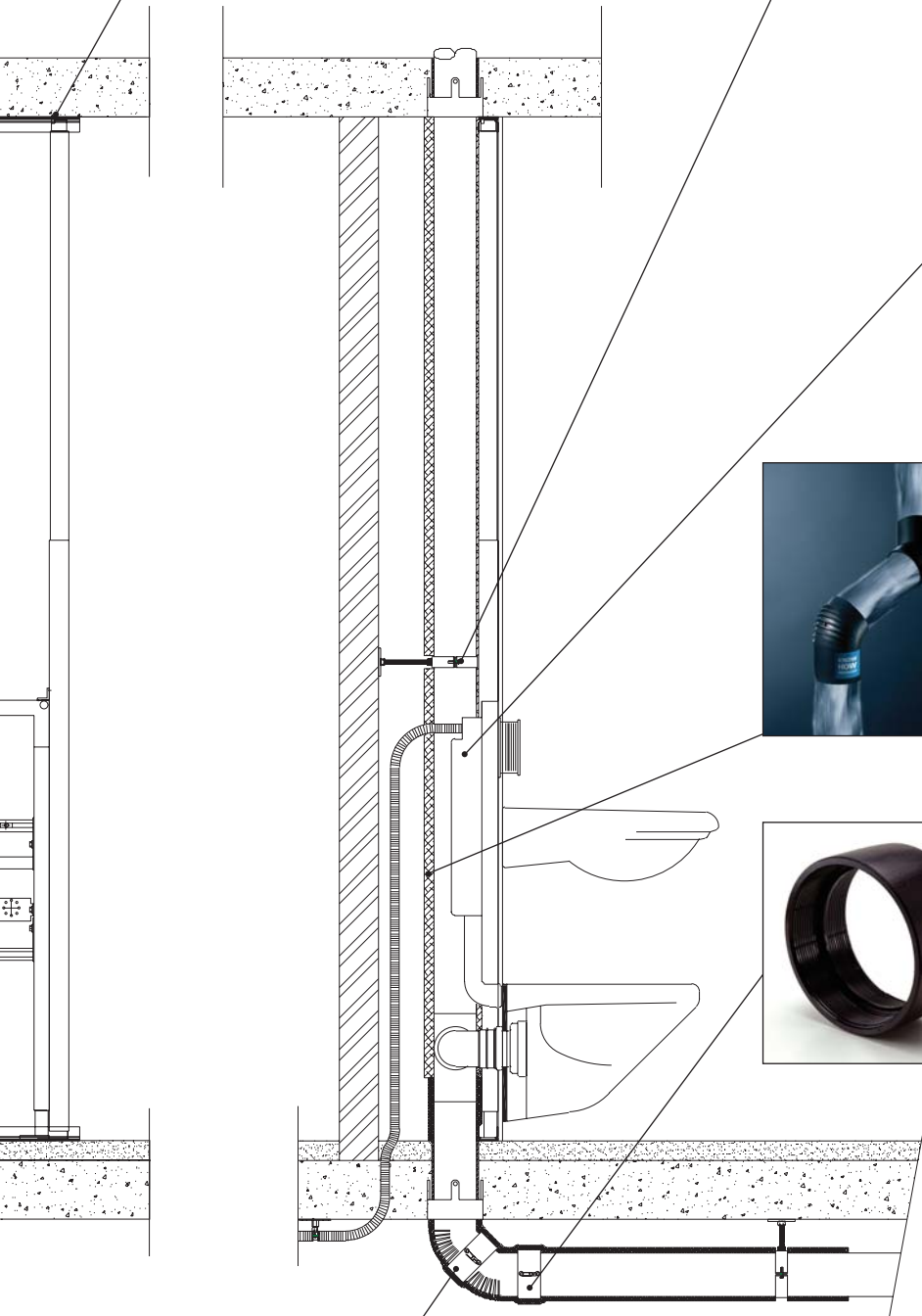
Used to prevent solid borne noise transfer from Duofix units to structure.



### Acoustic Bracket

Rubber lined to prevent solid borne noise travelling to the building structure, the bracket cannot be overtightened to the point where it loses its effectiveness. For use with Silent-db20 drainage system.

Article No. for 110mm 310.812.26.1



### Cistern in duct

This has the effect of cutting down noise significantly.



### Silent-db20 Drainage System

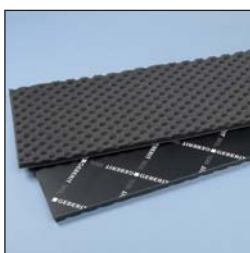
Silent-db20 achieves its outstanding levels of acoustic insulation by patented high density material (PE-S2), ribbed fittings which improve sound dampening near impact zones, and acoustic brackets to reduce solid-borne sound.



### Electroweld Sleeve Coupling

Although the butt-weld is an excellent jointing method for normal PE applications, the Electroweld Sleeve Coupling is recommended for acoustically sensitive installations as it keeps the internal bore of the pipe smooth, thus reducing the possibility of air-borne noise from turbulent flow.

Article No. for 110mm 367.771.16.1



### ISOL Insulation Mat

This is used to wrap both HDPE and Silent-db20 pipe and fittings to reduce unwanted air-borne sound being propagated. Used with the cutting patterns supplied, it can efficiently wrap every fitting. The mat has a foam inner core attached to a plastic coated lead lining. Article No. 356.001.00.1 (without self adhesive backing), 356.002.00.1 (with self adhesive backing)

# Noise in drainage and plumbing

With a drainage stack serving multiple floors, there are generally four types of sound source that we can identify.

## 1 Flushing

Noise from flushing toilets.

## 2 Noise in the stack

Caused by the discharging of waste/soil water.

## 3 Noise caused by impact

For example, impact in the transition area between the vertical stack and the horizontal section of pipe.

## 4 Water supply

Noise generated in water supply systems, particularly in appliances such as cisterns that are fitted with traditional filling valves and where pipework has not been insulated from its bracketing.

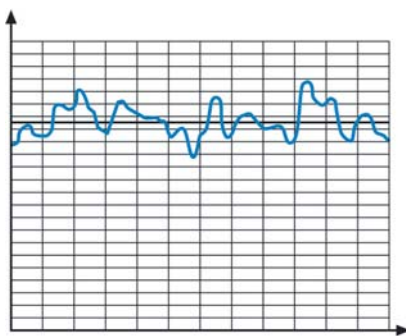
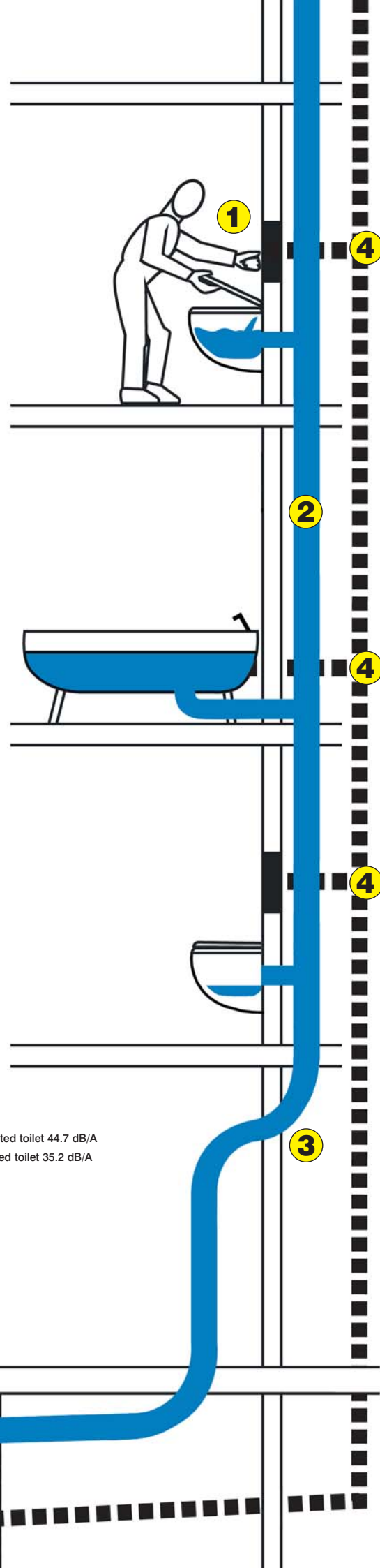
## High Rise Buildings

It is worth noting that any increase in noise due to high rise construction is negligible since the extra potential energy is absorbed by increased frictional losses, keeping the overall noise level more or less constant.

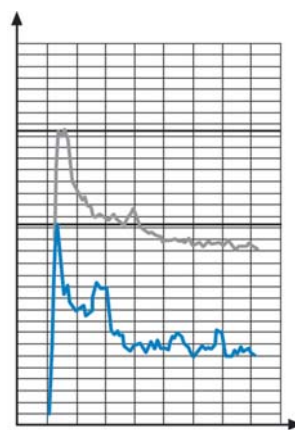
## Noise duration

The period of time for which a noise persists has an effect on how that sound is perceived and, for this reason, noises of long duration are measured by taking the average sound level, while with short duration noises, the maximum sound level is recorded.

Fig.2. and Fig.3. show examples of the difference between WC and bath noise generation periods.



**Fig. 2** Draining of bath (noise of prolonged duration). dB(A)



**Fig. 3** Flushing of toilet (noise of short duration). dB(A)

— Floor mounted toilet 44.7 dB/A  
— Wall mounted toilet 35.2 dB/A



Recording and monitoring equipment set up in acoustically isolated room at Geberit's test facility.

## Prestigious projects



### The Cube Hotel Austria, 2004

900m Silent-db20  
475 Duofix WCs/Urinal frames  
10,000m Mepla for heating



### Stadthalle Graz Town Hall/Conference Centre Austria, 2002

300m Silent-db20  
75 electronic flushing mechanisms for urinal and 140 WC frames



### Kunsthaus Graz Entertainment Complex Austria, 2003

300m Silent-db20  
Architects: Peter Cook & Paul Fournier, London



### Sheraton Arabella Hotel South Africa

Silent-db20  
20 pneumatic flush buttons

## Technical data

### Comparable test results of solid-borne noise for Silent-db20 and HDPE

Test conditions based on measurements taken through an 80mm thick concrete wall using standard system components.

#### Solid Borne Noise

Silent-db20	18dB(A)
HDPE	27dB(A)

Further tests are underway using the EN standard method of comparison testing.



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