



Let's be Objective...

...only superior mass can offer genuine acoustic protection!

Acoustic Requirements

Depending on the country, there might be minimum requirements for the protection against noise from neighbouring apartments. Often there will also be guidelines for higher requirements e.g. depending on the use of the rooms or the general quality level of the building.

As an example you will find here the German minimum requirements and guidelines for elevated sound protection levels regarding noise generated by technical installations in dB(A):

| Type | Minimum requirements | | Suggestions for elevated sound protection | | | | | | |
|------------------------|---------------------------|---------------------|---|-----------------------------------|----|--------------------|-----------------------------------|---------|---------------|
| Standard | DIN 4109-1 | | VDI 4100 | | | | | | |
| Noise protection level | - | - | SSt 1 | SSt 2 | | SSt 3 | | SSt EB1 | SSt EB2 |
| Maximum dB(A) | 30 | 35 | 30 | 27 | 25 | 24 | 22 | 35 | 30 |
| Noise source | neighbouring living space | | | | | | own living space | | |
| Type of room | living room and bedroom | work and class room | all rooms with min. 8 m ² floor space, including bathrooms | | | | | | |
| Type of building | all buildings | | apartment building | semi-detached house and row house | | apartment building | semi-detached house and row house | | all buildings |

DIN 4109-1 2016-06 table 6, VDI 4100 2012-10 tables 2, 3 and 4

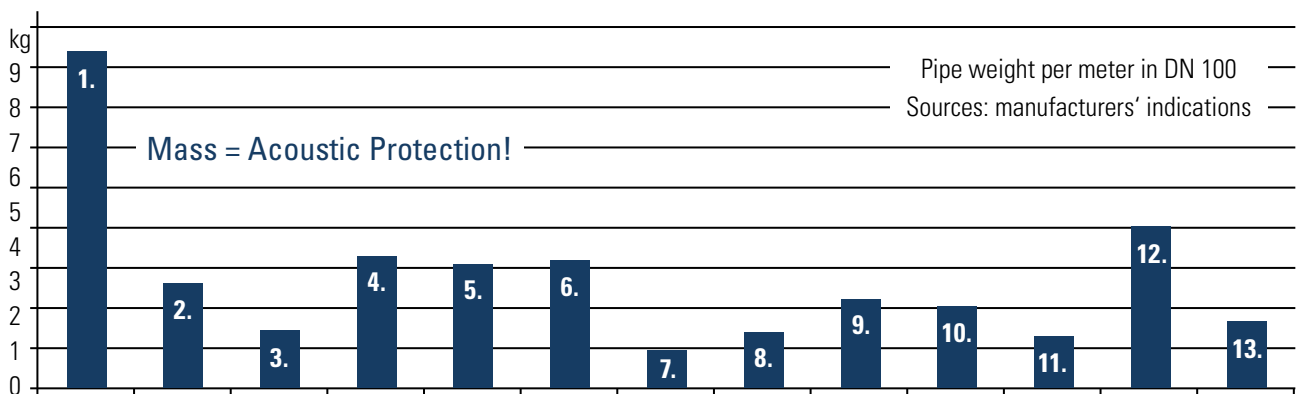
In Germany, the minimum requirements of DIN 4109-1 may never be surpassed. The elevated sound protection levels of the VDI 4100 are valid whenever they are laid down in the contract; however even without contractual definition, in case of a law suit, it often happens that one of the elevated sound protection

levels of VDI 4100 is considered a „generally accepted code of practice“, and non-observance can lead to liability problems!

Comparison of Pipe Materials

Independent acoustics experts say: rigidity, gross density and thickness of the pipe have an important influence on the acoustic behaviour of a drainage pipe system.

In a simple sentence: the heavier the pipe, the better its acoustic behaviour!



1. Düker cast iron pipe 2. Friatec Friaphon 3. Geberit Silent-PP 4. Geberit Silent-dB20 5. Georg Fischer Silenta 6. Ostendorf Skolan dB 7. Ostendorf HT System PP 8. Poloplast Polo-Kal NG 9. Poloplast Polo-Kal 3S 10. Rehau Raupiano Plus 11. Rehau Raupiano light 12. Wavin AS 13. Wavin SiTech+

Read Test Reports Correctly: Airborne Sound and Structure-Born Sound

Germany's most renowned institute for acoustic tests, the Fraunhofer-Institut für Bauphysik IBP Stuttgart, issued a document dated 01 June 2016, containing notes on tests of the acoustic behaviour of drainage systems in the laboratory as per EN 14366. Here an excerpt (translated from German): „The measured values given in test reports are always valid only for a combination of waste water pipe and pipe clamp. The structure-born sound level in the room behind the installation wall where the waste water pipe is fixed (...) is influenced substantially by the type and mounting conditions of the pipe clamp. Whereas the airborne sound level in the installation room where the waste water pipe is mounted (...) mirrors mainly the acoustic characteristics of the pipe material.“

The airborne sound level is what counts in order to judge the acoustic behaviour of a pipe system or material in comparison with others.

The structure-born sound level is considerably influenced by the pipe clamps and fixing in the laboratory, which may be more or less practice-oriented.

Independent acoustics experts say: As a direct function of the clamping and fixing of the pipes, the differences of the values measured in the laboratory can

Excerpt from the test report P-BA 214/2010:

| Düker SML | with standard fixing | with special fixing |
|--|--|---|
| | steel pipe clamps with elastomer inlay | steel pipe clamps without elastomer inlay and with acoustic decoupler |
| flow rate | | 2,0 l/s* |
| Airborne sound pressure level $L_{a,A}$ | | 45 dB(A) |
| Structure-Born sound characteristic level $L_{SC,A}$ | 19 dB(A) | <10 dB(A) |

* corresponds approximately to a toilet flush

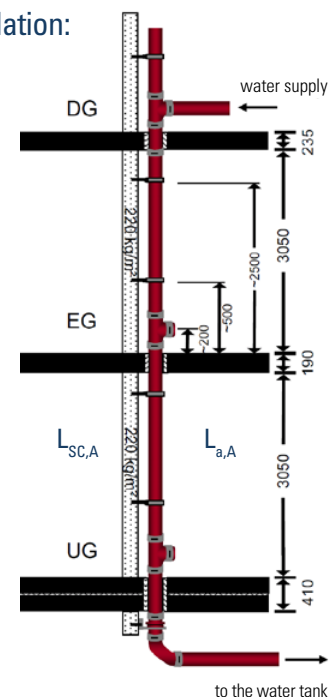
Test installation, measurement and evaluation according to EN 14366.

Even with standard clamps and fixing, all requirements even for elevated acoustic protection are observed without problem!

amount to up to 20 dB. Note: an increase of 3 to 5 dB will be perceived as double volume! In the past, the pipe clamps in the test installations were often mounted in a way that ensured excellent values, but were in no way applicable in reality! A comparison of the sound measurement on drainage pipes is only possible if the type and installation of the pipe clamps is exactly the same. As it was possible for manufacturers to carry out the installation themselves until the end of 2013, a comparison is not possible on the base of some of those older test reports.

Even if the test on the Düker SML system was carried out in October 2010, the Fraunhofer-IPB expressly confirms the comparability with more recent tests! The mounting of the clamps was checked by IBP staff before the measurement.

Test installation:



 DRAINAGE TECHNOLOGY

 GLASS LINING TECHNOLOGIES

 JOBBING FOUNDRY

 FITTINGS AND VALVES

Düker GmbH

Würzburger Straße 10 – 16
D-97753 Karlstadt /Main

Telefon +49 9353 791 - 565
Telefax +49 9353 791 - 198

Internet: www.dueker.de

E-Mail: sales.drainage-tech@dueker.de