

DEGA Sound insulation certificate - a concept for more transparency

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Introduction

The German society for acoustics has published the DEGA recommendation 103 "sound insulation in the housebuilding - sound insulation identity card". The two main targets of the DEGA recommendation 103 are:

- (1) creating a multi-level system for the differentiated designing and marking of the structural sound insulation between room-situations regardless of the kind of the building,
- (2) developing a classification system on this basis for the simple marking of the sound insulation performance of whole housing units or buildings.

The recommendation was compiled by the working-group "building and room acoustics", in which most German experts of the structural noise control and architectural sound insulation are organized. The DEGA has developed a new, multistage, also for the layman clear concept.

Concept

The introduction of a multi-level requirement- and assessment-system is meaningful and necessary for a clear differentiation and evaluation of the sound-related quality of buildings. The system is co-ordinated with the today usual building methods and with the today's build-up-obviously introduced minimum requirements according to DIN 4109. A differentiated and practical classification is made possible by the organization into altogether 7 levels both for new buildings and for the old building existence.

increased sound insulation:

The architectural sound insulation has a long tradition in Germany. The first standard, in which the height of the sound insulation was laid down is the standard sheet DIN 4110, appeared in the year 1938. A first version of DIN 4109 was published 1944. These basic works are till this day a base of the architectural sound insulation in Germany and was also model for comparable standards and sets of rules of the neighbouring foreign countries.

The sound insulation classes of the DEGA recommendation 103 are meaningfully and practically graded. With the help of the contained verbal descriptions the increased sound insulation can be estimated and agreed also by laymen.

Sound insulation certificate:

Unfortunately, the identity values of the sound insulation are very badly clear for planners and users and badly to understand. A way must be found, how complicated technical circumstances can be shown and marked simply for the user and the consumer.

In the area of the energy conservation an easy way was found for the consumer to create more transparency. Electrical appliances are marked with her energy consumption and for building an energy identity card was created. The consumer can carry out high-class comparisons without deeper professional knowledge and make purchase decisions.

The assessment system of the DEGA recommendation 103 contains the evaluation of location and outside noise as well as the architectural sound insulation between neighbouring residential unities and also the architectural sound insulation in the own living area. In Germany were built free standing single family houses, apartment houses and terraced houses or semidetached houses.

Walls between terraced houses and semidetached houses are mostly double walls, therefore, the sound insulation is clearly higher than in apartment houses.

Whereas legal requirements usually depend on the type of the building (e.g. apartment house), the multi-level system provides a universal tool focusing on the need to protect inhabitants, regardless of their building's type.

A labelling system similar to the energy certificates in buildings could illustrate the acoustic properties of different accommodation. Requirements and classes of the sound insulation (F-A) are determined according to the perception degree of different levels and types of noise and speech, with the help of psychoacoustic aspects. Based on this classification, two values will be provided for a specific accommodation unit or building: one for the location and exposure of the building to external noise and one for its structural sound protection. The certificates are designed in such a way as to be easily understood by every dweller and to inform them on the sound insulation quality of a building in the most transparent manner.

Already for many years it is not differentiated any more between dwellings and semidetached houses in many European countries.

The structure of the DEGA-recommendation 103 "sound insulation in the housebuilding - sound insulation identity card" is given in this order:

- usual noises from neighbour accommodation units /dwellings (loud speech, normal music, walking noise etc.) (Table 9)
- verbal description of the perception of noise and speech (audible, intelligible) (Table 10)
- assignment to the classes F ... A of the sound insulation
- definition of requirements in the classes F ... A with help of psychacoustic aspects (→ perceptible differences between classes) (Table 1...7)

Type of noise emission	Description
loud speech	party, disputation etc., only seldom appearing
raised speech	excited conversation between several people, usually only occasionally arising
normal speech	quiet conversation between several people
very loud music	making music with loud acoustic instruments or with amplifying systems very loud audio- or video equipment
loud music	making music with acoustic instruments without amplifying systems loud audio- or video equipment
normal music	making music with acoustic instruments without amplifying systems normal audio- or video equipment

water installations and building service installation	usual, gentle activity of water-armatures heating, climate and ventilation systems
brief loud activity noise	brief noise at opening, closing and switching of armatures (usual, gentle activity)
user noise	place a cup on the lavatory , manually used roller shutters, use of mail boxes, opening and closing the toilet lid etc. (usual, gentle activity)
walking noise	normal walking (not walking on the heel)
children playing	on the floor
household appliances	vacuum cleaner, kitchen mixer, washing machine

Table 7: usual noises from neighbour accommodation units /dwellings

	F	E	D	C	B	A	A*
loud speech	very intelligible Very clearly audible		very intelligible clearly audible	partly intelligible in general audible	in general not intelligible partly audible	not intelligible still audible	not intelligible not audible
raised speech	very intelligible very clearly audible	very intelligible clearly audible	partly intelligible in general audible	in general not intelligible partly audible	not intelligible still audible	not intelligible not audible	
normal speech	very intelligible clearly audible	partly intelligible in general audible	in general not intelligible partly audible	not intelligible still audible	not intelligible, not audible		
very loud music	very clearly audible					clearly audible	audible
loud music	very clearly audible				clearly audible	audible	Still audible
normal music	very clearly audible			clearly audible	audible	Still audible	in general not audible

Table 10: verbal description of the perception of noise and speech from neighbouring accommodation units (part 1)

References

- [1] DEGA recommendation 103, DOWNLOAD:
<http://www.dega-akustik.de/publikationen/online-publikationen>

	F	E	D	C	B	A	A*
walls/ ceilings [R' _w]	< 50 dB	≥ 50 dB	≥53/54 dB	≥ 57 dB	≥ 62 dB	≥ 67 dB	≥ 72 dB
entrance doors in corridors [R _w]	< 22 dB	≥ 22 dB	≥ 27 dB	≥ 32 dB	≥ 37 dB	≥ 40 dB	
entrance doors in living rooms [R _w]	<32 dB	≥ 32 dB	≥ 37 dB	≥ 42 dB	≥ 45 dB	≥ 48 dB	

Table 1 requirements for airborne sound insulation

	F	E	D	C	B	A	A*
ceilings, stairs, balcony [L' _{n,w}]	> 60 dB ^{a)}	≤ 60 dB ^{a)}	≤ 53 dB	≤ 46 dB	≤ 40 dB	≤ 34 dB	≤ 28 dB

Table 2 requirements for impact sound insulation

	F	E	D	C	B	A	A*
noise from water installations and other building service installations [L _{AF,max,n}]	>35 dB(A)	≤ 35 dB(A)	≤ 30 dB(A)	≤ 25 dB(A)	≤ 20 dB(A)		

Table 3: requirements for noise caused by water installations and other building service installations

	F	E	D	C	B	A	A*
operation noise, use occurrences and user noise (L _{AF,max,n})	> 45 dB(A)	≤ 45 dB(A)	≤ 40 dB(A)	≤ 35 dB(A)	≤ 30 dB(A)	≤ 25 dB(A)	≤ 20 dB(A)

Table 4: orientation values for user noise and vibration insulation



Schallschutzausweis

Antragsteller: Max Mustermann Musterbau GmbH Musterstraße 1 11111 Musterstadt	Gebäude: Musterbau Muster A Musterstraße 24 70000 Musterhausen	Wohnungsbezeichnung: H1EG2
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Standort und Außenlärmsituation

Punktzahl		Klasse
47 von mind. 45 in Stufe A	<p>A scale from F (0) to A* (65) with intermediate markers at E (10), D (20), C (25), B (30), and A (35). A black arrow points down to the 'A' section.</p>	A

Baulicher Schallschutz

Punktzahl	Ausführungsqualität teilweise durch Messungen überprüft (siehe detaillierter SSAw,	ja	nein	Klasse
	Gesamtklasse von allen Kriterien eingehalten	ja	nein	
197 (incl. 17 Bonuspunkte) von mind. 150 in Stufe C			X	C
		X		

	<p>A scale from F (0) to A* (60) with intermediate markers at E (30), D (30), and C (45). A black arrow points down to the 'C' section.</p>	C

Wohnheit mit gegenüber der Klasse D wahrnehmbar besserem Schallschutz, in der die Bewohner bei üblichem rücksichtsvollen Verhalten im allgemeinen Ruhe finden und die Vertraulichkeit gewahrt bleibt.

Gebäudetyp	Mehrfamilienhaus
Baujahr des Gebäudes	2000
Anzahl der Wohneinheiten	8
Wohnungsbezeichnung	H1EG2
Geschoß	2
Anzahl der Räume	4
Wohnfläche [m²]	80

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(DAGA)



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- Acoustical Society of the Netherlands (NAG)



- German Acoustical Society (DEGA)



In co-operation with

- Belgian Acoustical Society (ABAV)



- European Acoustics Association (EAA)



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