



SOC1.3

Acoustic comfort



Objective


The objective is to achieve room acoustic conditions that correspond to the intended use and to ensure appropriate user comfort.

Benefits

Good acoustic conditions are an important requirement for ensuring productivity and comfort of users.

Contribution to overriding sustainability goals



	CONTRIBUTION TO SUSTAINABLE DEVELOPMENT GOALS (SDGS) OF UNITED NATIONS (UN)	CONTRIBUTION TO GERMAN SUSTAINABILITY STRATEGY
 Moderate	3.4 Reduce mortality from non-communicable diseases and promote mental health	3.1.a/b Health and food



Outlook

There are currently no plans to make any of the requirements stricter.

Share of total score

	SHARE	WEIGHTING FACTOR
Office	2.0%	2
Education	2.7%	3
Hotel	2.9%	3
Residential	0.0%	0
Consumer market		
Shopping centre		
Department stores		
Logistics		
Production		
Assembly buildings	3.1%	3



EVALUATION

Room acoustics comfort is evaluated in accordance with the use of the rooms over the reverberation time, in order to achieve appropriate user comfort. In addition, an "Agenda 2030 Bonus" is awarded if all measures listed under indicators 1–5 have been implemented and verified via measurements. In this criterion, a total of 130 points can be achieved, but only a total of 100 points can be actually be awarded, or a maximum of 110 points including bonus.

Assembly buildings are divided into the different building types with regard to the assessment. These are under the chapter "IV. Usage-specific description" described.

Evaluation variants:

Two different variants are permitted for evaluation of this criterion. In both cases, at least 95% of the representative rooms must correspond to the evaluated quality level. For the scheme **Assembly buildings** is only variant 1 applicable.

Variant 1: Weighted evaluation on the basis of the actual ratios of usable area (NUF) (R) in accordance with DIN 277-1 (detailed Area descriptions under the document: "Evaluation and structure of the DGNB System", chapter – Terms and Definitions, [T&D_04]); each of the indicators is weighted by percentage according to the area ratio for the associated use; the maximum possible number of evaluation points is based on the rooms that are actually available and under evaluation.

Variant 2: Simplified method without assignment of area ratios, in accordance with the points assigned for the indicators.

NO.	INDICATOR	POINTS
1	Acoustic concept formulated during the planning process	
1.1	Room acoustics concepts	
	Creation of a room acoustics concept plan which is updated during the planning process	
	Office Education Hotel Assembly buildings - Types I and III	20
	Assembly buildings – Type IV	30
	Assembly buildings – Type II	40
2	Individual offices and multi-person offices up to 40 m²	
2.1	Compliance with the requirements for reverberation times	
	Office	Max. 20
	ARITHMETIC MEAN OF THE REVERBERATION TIME \bar{T} IN S IN EMPTY, UNFURNISHED STATE (OCTAVE BANDS 125 HZ TO 4000 HZ)	
	■ $1.0 < \bar{T} \leq 1.5$	10
	■ $0.8 < \bar{T} \leq 1.0$	15
	■ $\bar{T} \leq 0.8$	20
	Education Hotel Assembly buildings - Types I, III and IV	Max. 10
	ARITHMETIC MEAN OF THE REVERBERATION TIME \bar{T} IN S IN AN EMPTY, UNFURNISHED STATE (MEAN VALUE OF REVERBERATION TIMES IN OCTAVE BANDS 125 TO 4000 HZ)	
	■ $1.0 < \bar{T} \leq 1.5$	5
	■ $0.8 < \bar{T} \leq 1.0$	7.5
	■ $\bar{T} \leq 0.8$	10



3 Multi-person offices larger than 40 m²

3.1 Compliance with the requirements for reverberation times

Office

Max. 30

MEAN VALUE OF THE A/V-RATIO $\overline{A/V}$ IN M ⁻¹	ARITHMETICAL MEAN OF THE REVERBERATION TIME \overline{T} IN S	
IN EMPTY, UNFURNISHED STATE (OCTAVE BANDS 125 HZ TO 4000 HZ)	IN EMPTY, UNFURNISHED STATE (OCTAVE BANDS 125 TO 4000 HZ)	
$0.16 < \overline{A/V} \leq 0.2$	$0.8 < \overline{T} \leq 1.0$	15
≥ 0.2	≤ 0.8	30

Education

Hotel

Assembly buildings - Types I, III and IV

Max. 10

MEAN VALUE OF THE A/V-RATIO $\overline{A/V}$ IN M ⁻¹	ARITHMETICAL MEAN OF THE REVERBERATION TIME \overline{T} IN S	
IN EMPTY, UNFURNISHED STATE (OCTAVE BANDS 125 HZ TO 4000 HZ)	IN EMPTY, UNFURNISHED STATE (OCTAVE BANDS 125 HZ TO 4000 HZ)	
$0.16 < \overline{A/V} \leq 0.2$	$0.8 < \overline{T} \leq 1.0$	5
≥ 0.2	≤ 0.8	10

Re 3 Possible additional points

+ Max. 10

Taking into account sound absorption areas on the ceiling in open office structures or on the ceiling and the room dividers, in the case of floor-to-ceiling room dividers:

- 30% of the average equivalent sound absorption area on the ceiling and/or the floor-to-ceiling room dividers, as applicable 5
- 70% of the average equivalent sound absorption area on the ceiling and/or the floor-to-ceiling room dividers, as applicable 10

4 Rooms in accordance with DIN 18041:2016-03 (room group A1–A5) with special requirements in terms of speech intelligibility (such as meeting rooms, seminar rooms or classrooms)

Office

Hotel

Assembly buildings - Types III and IV

Max. 20

4.1 Compliance with the requirements for reverberation time T_{target}

- Compliance of all rooms with requirements in accordance with DIN 18041:2016-03 has been documented. See Appendix 1 +10

Compliance with the requirements for inclusion

- Taking into account inclusive use in accordance with DIN 18041:2016-03 (teaching/communication inclusive, speech/lecture inclusive). See Appendix 1 +10

Education

Assembly buildings - Type I

Max. 30

Compliance with the requirements for reverberation time T_{target}

- Compliance of all rooms with requirements in accordance with DIN +15



18041:2016-03 has been documented. See Appendix 1

Compliance with the requirements for inclusion

- Taking into account inclusive use in accordance with DIN 18041:2016-03 +15
(teaching/communication inclusive, speech/lecture inclusive). See Appendix 1

Assembly buildings – Type II

Max. 50

- Carrying out detailed acoustic simulations to evaluate room acoustic parameters 30
for theatres and concert halls. For each room, clearly justified requirements for the mean reverberation time T, reverberation time and sound pressure level distribution, strength G, degree of clarity D and clarity C for typical occupancy conditions are to be worked out and assessed in each case.
- Classification of the acoustician - Good acoustic conditions are to be expected. +10
- Classification of the acoustician – Very good acoustic conditions are to be expected. +20

Office Education Hotel Assembly buildings – Types I, III and IV

Re 3, 4, 5 **Possible additional points** +10

Implementation of a detailed acoustic simulation of an open-plan office or for evaluation of other room acoustics parameters for open-plan offices and rooms in room group A $\geq 500 \text{ m}^3$

5 Rooms with recommendations in accordance with DIN 18041:2016-03 (building use B3–B5) with special requirements for noise reduction and/or room acoustics comfort (such as cafeterias, libraries or break rooms)

Note: **Assembly buildings:**

In the case of **Assembly buildings**, with type B2 rooms (such as exhibition rooms, traffic areas with high quality of occupancy, etc.) must be included into the consideration.

5.1 Compliance with the recommendations for the A/V ratio in the frequency range 250–2000 Hz

Office 10

Education Assembly buildings – Types I, II and IV 30

Hotel Assembly buildings – Type III 40

See Appendix 1

6 AGENDA 2030 BONUS – STRESS REDUCTION, HEALTH AND WELL-BEING



+10

6.1 The objective of the AGENDA 2030 BONUS is to reduce premature death and promote good health and well-being.

Noise reduction: Indicators 2–5 achieve at least the reference value, have been implemented and have been confirmed via measurements. On this basis, it is possible to achieve a high level of acoustic quality in the building and a high level of acoustic comfort for building users. This minimises noise as a harmful factor and supports sustained, long-term user performance.



SUSTAINABILITY REPORTING AND SYNERGIES

Sustainability reporting

Information regarding reverberation times and the sound absorption area can be used as key performance indicators (KPI) for the communication.

NO.	KEY PERFORMANCE INDICATORS (KPIS)	UNIT
KPI 1	Evaluation in accordance with room acoustics classes	[s]
KPI 2	Average value of the reverberation times (differentiated for different rooms)	[s]
KPI 3	Average equivalent sound absorption area	[%]

Synergies with DGNB system applications

- **DGNB OPERATION:** Achieving high levels of quality in this criterion provides great potential for achieving high satisfaction rates during ongoing operation for criterion 9.1 of the Buildings in use (BIU) scheme (user satisfaction).
- **DGNB RENOVATED BUILDINGS:** Large similarities with criterion SOC1.3 in the REN scheme.
- **DGNB INTERIORS:** Large similarities with criterion SOC1.3 in the NIR scheme.



APPENDIX A – DETAILED DESCRIPTION

I. Relevance

Depending on the size and usage of a room, different measures may be necessary to achieve good acoustic conditions. In rooms designed for spoken communication, the focus is on a good level of speech intelligibility between the positions of the speakers and the positions of the listeners. In call centres and in dining rooms, achieving a low background noise level and good speech intelligibility over short distances is prioritised. In music rooms, promoting the music experience throughout the room takes priority. Compliance with the different requirements described in the DGNB criterion is required in order to achieve good room acoustic conditions in accordance with the use of the rooms.

II. Additional explanation

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III. Method

Acoustic comfort is evaluated via several individual indicators on the basis of the different room types. The basis of the evaluation is the specifications of DIN 18041:2016-03 "Acoustic quality in rooms", alternatively the local standard may be used.

If a detailed acoustic simulation is carried out, additional points can be achieved in the criterion.

When evaluating the acoustic comfort, the rooms specified in the indicators are relevant for the analysis (DIN 18041:2016-03: Rooms in group A and B, Individual offices and multi-person offices in accordance with room acoustics classes A, B and C. Any other permitted alternative verification options are listed in the relevant indicators.

Indicator 1: Acoustic concept formulated during the planning process

Indicator 1.1: Creation of a room acoustics concept that is updated during the planning process

Rooms have different acoustics requirements depending on their use. Careful planning is required to ensure good yet cost-effective, use-specific room acoustics. The objective is therefore to create an acoustic concept as early as possible during the planning process (room acoustics concept in accordance with German Fee Structure for Architects and Engineers (HOAI)). The concept takes into account both architectural planning and interaction with other construction tasks. The concept contains room groups A and B in accordance with DIN 18041:2016-03. This prevents the need to make subsequent, and generally cost-intensive, improvements to the room acoustics.

Indicator 2: Individual offices and multi-person offices up to an area of 40 m²

In particular, this indicator takes office rooms and multi-person offices up to an area of 40 m² into account. The recommendations for sound protection and acoustical design in offices must be complied with and documented for room acoustics classes A, B or C. Noise damping measures in individual offices can be assessed on the basis of the reverberation time. The reverberation time in furnished rooms when in use is extremely dependent on the distribution of sound-absorbing surfaces within the room, the furnishings and the number and type of objects used. This indicator therefore evaluates whether basic noise damping of the room has been ensured via the sound absorption of the room division surfaces installed on site.

The classification refers to offices that have been constructed and are ready for occupancy but are not occupied. Alternatively, verification for completed projects can be carried out via measurements in accordance with the standard method of DIN EN ISO 3382-2 in an unoccupied empty or furnished state.



Indicator 3: Multi-person offices with an area of more than 40 m²

In particular, this indicator takes multi-person offices with an area of more than 40 m² into account.

The recommendations for sound protection and acoustical design in offices must be complied with and documented for room acoustics classes A, B and C with regard to the reverberation time. The additional parameters used in these guidelines refer exclusively to the acoustic conditions of the room in conjunction with the furniture. If no information regarding the tenant fit out is available, the tenant fit out can only be treated as without absorbing furnishings.

Multi-person offices must be assessed over the reverberation time. Simply assessing the room acoustics conditions on the basis of the room damping is not considered to be meaningful. In the case of large multi-person offices, the A-weighted sound pressure level of speech at a distance of 4 m $L_{p,A,S,4m}$ in dB and the decay rate of speech in the room $D_{2,S}$ in dB must be used for the classification process; these can only be documented via room acoustics simulations.

In large multi-person offices, highly comfortable room acoustics conditions can only be achieved in open office structures with a sound-absorbing ceiling and measures for shielding between workstation groups. As sound-absorbing areas on the ceiling have a significantly higher impact in terms of sound propagation damping than those on the floor, additional points can be awarded for these. Comfortable room acoustics conditions can also be achieved with floor-to-ceiling room dividers which absorb sound on both sides, and in this case the additional points for sound absorption areas on the ceiling and the room dividers can be awarded.

Alternatively, verification for completed projects can be carried out via measurements in accordance with the standard method of DIN EN ISO 3382-2 in an unoccupied empty or furnished state.

Indicator 4: Rooms in accordance with DIN 18041:2016-03 (room group A1–A5) with special requirements in terms of speech intelligibility (such as meeting rooms, seminar rooms or classrooms)

For meeting or seminar rooms, the room acoustics recommendations for the building uses of room groups A1–A5 in accordance with DIN 18041:2016-03 "Acoustic quality in rooms – Specifications and instructions for the room acoustic design" must be calculated and their compliance with the requirements must be documented. The room groups that are to be documented are described in Table 1 of DIN 18041:2016-03.

Noise damping measures in rooms for "speech/lecture" or "teaching/communication" can be assessed on the basis of the reverberation time in furnished rooms with 80% occupancy.

Verification is carried out via calculation of the reverberation time of the room under consideration while furnished and with 80% occupancy in accordance with the calculation specifications of DIN 18041:2016-03. The values used for sound absorption of persons and furnishings must be documented.

If all requirements for **inclusive** use in accordance with DIN 18041:2016-03 are additionally complied with, this will be evaluated positively.

Alternatively, verification can be carried out via measurements in accordance with the standard method of DIN EN ISO 3382-2 in an unoccupied furnished state. An occupancy level of 80% must be taken into account in the calculations.

Indicator 5: Rooms with recommendations in accordance with DIN 18041:2016-03 (building use B3–B5) with special requirements for noise reduction and/or room acoustics comfort (such as cafeterias, libraries or break rooms)

The room damping in rooms of building usage types B3–B5 with special requirements for noise reduction and/or the room acoustics comfort is implemented via the reverberation time while furnished and with 50% occupancy level, in accordance with DIN 18041. Compliance with the recommendations for the A/V ratio in the frequency range 250–2000 Hz is required to achieve good room acoustics conditions. The room groups are described in Table 2 of the DIN



standard.

The values used for sound absorption of persons and furnishings must be documented.

Alternatively, verification can be carried out via measurements in accordance with the standard method of DIN EN ISO 3382-2 in an unoccupied furnished state. An occupancy level of 50% must be taken into account in the calculations.

As an alternative to indicators 1–5: Completion of a detailed acoustic simulation

Conventional statistical calculation methods can be used to determine average reverberation time values that are sufficient for assessing rooms with typical uses and geometries. For rooms with special geometries and requirements in terms of room acoustics quality, detailed calculation methods with location-specific parameters are required to develop optimal room acoustics conditions. Room acoustics simulation calculations can be used to determine the effectiveness of room acoustics measures in detail and check and evaluate even the more complex room acoustics conditions.

Indicator 6: AGENDA 2030 BONUS – Stress reduction, health and well-being

Long-term exposure to noise can have a huge impact on our cardiovascular system and sleeping patterns, and can lead to diseases such as high blood pressure, heart attacks and strokes. The objective is therefore to achieve a high level of acoustic quality and comfort for building users in order to minimise noise levels as a harmful factor. The minimum requirement for awarding points is that the quality listed below has been achieved and confirmed via measurements in indicators 2–5.

2.1 "Individual offices and multi-person offices up to 40 m²/compliance with the requirements for reverberation times"

- At least: compliance with the basic requirements of indicator 2

3.1 "Multi-person offices larger than 40 m²/compliance with the requirements for reverberation times"

- At least: compliance with the basic requirements of indicator 3

4.1 "Rooms in accordance with DIN 18041:2016-03 (room group A1–A5) with special requirements in terms of speech intelligibility (such as meeting rooms, seminar rooms or classrooms)/compliance with the requirements for the reverberation time T target"

- Compliance with the requirements for inclusion

5.1 "Rooms with recommendations in accordance with DIN 18041:2016-03 (building uses B3–B5) with special requirements for noise reduction and/or room acoustics comfort (such as cafeterias, libraries or break rooms)"

- Compliance with the recommendations for the A/V ratio in the frequency range 250–2000 Hz as a minimum



IV. Usage-specific description

Assembly buildings

For the assessment in this criterion, assembly buildings are divided into the following building types:

- Type I: Congress buildings;
- Type II: Theatres and concert halls;
- Type III: Museums, cultural- and civic centres, libraries;
- Type IV: Trade fair and city halls,

Note: "Assembly buildings" that are not listed above as a building type can be assigned to one of the building types. If an assignment is not possible, we ask for direct communication with the DGNB office.

A distinction is made between the application and evaluation of the individual indicators on the basis of building or land use. A DGNB tool supports the assignment of the indicators and the evaluation of the criterion.

In principle, at least 95% of the representative rooms must correspond to the assessed quality level.

According to variant 1, the evaluation is to be carried out area-weighted on the basis of the actual area ratios NUF (R) according to DIN 277-1; each of the indicators is weighted as a percentage with the area share of the associated use; the maximum possible number of points is related to the rooms actually available and to be considered. Variant 2 cannot be used for the usage profile for **Assembly buildings**.

Rooms with special uses that cannot be assigned in accordance with DIN 18041 must be treated separately.

Indicator 4: Rooms according to DIN 18041: 2016-03 (room group A1 - A5) with special requirements for speech intelligibility (e.g. meeting rooms, seminar rooms, classrooms)

For **type II** (theatres and concert halls), good room acoustics are crucial for the success of the house. Since the requirements are very different depending on the project, detailed acoustic simulations and the acoustician's classification of the acoustic conditions to be expected on the basis of key figures are used for the evaluation.

Indicator 5: Rooms with recommendations according to DIN 18041: 2016-03 (type of use B3 - B5) with special requirements for noise reduction and / or room acoustic comfort (e.g. canteens, libraries, break rooms)

In the case of **Assembly buildings**, in addition to the type B3 - B5 rooms, the type B2 rooms must be also considered. Within the indicator there is the possibility of evaluating the relevant rooms (corresponding to the B2, B3, B4, B5 types) weighted by area.



APPENDIX B – DOCUMENTATION

I. Required documentation

Examples of possible documentation include the following items. The documentation submitted for the evaluation of individual indicators should comprehensively and clearly demonstrate compliance with the relevant requirements. In the case of **Assembly buildings**, assignment of the building to the certain type must be argued and documented.

Indicator 1: Acoustic concept formulated during the planning process

- Room acoustics concept with detailed description of the measures implemented in the rooms in accordance with room groups A and B as per DIN 18041:2016-03, transparent representation of the updates during the planning process as well as transparent consideration of the interaction between room acoustics and architectural planning as well as the interaction with other construction tasks.

Indicator 2: Individual offices and multi-person offices up to an area of 40 m²

- The basis and result of the calculation as well as measurement of the reverberation time. Documentation of the values used for sound absorption of persons and furnishings.
- As an alternative to compliance with room acoustics class B in accordance with VDI 2569: 2016-02 (draft), documentation can be performed using the requirements for room group B in accordance with DIN 18041:2016-03: Cf. indicator 5.

Indicator 3: Multi-person offices with an area of more than 40 m²

- The basis and result of the calculation as well as measurement of the reverberation time.
- Documentation of the values used for sound absorption of persons and furnishings.
- As an alternative documentation can be performed using the requirements for room group B in accordance with DIN 18041:2016-03: Cf. indicator 5.
- Documentation of the sound absorption measures implemented on the ceiling or in the form of room dividers, e.g. by means of an order confirmation and photo documentation.



Indicator 4: Rooms in accordance with DIN 18041:2016-03 (room group A1–A5) with special requirements regarding speech intelligibility

- The basis and result of the calculation as well as measurement of the reverberation time of the sound-absorbing areas.
- Documentation of the values used for sound absorption of persons and furnishings.
- **Assembly buildings – Type II:** Documentation of the detailed acoustic simulations as well as the acoustician's classification of the expected acoustic conditions.

Indicator 5: Rooms with recommendations in accordance with DIN 18041:2016-03 (building uses B3–B5) with special requirements regarding noise reduction

- The basis and result of the calculation as well as measurement of the reverberation time.
- Documentation of the values used for sound absorption of persons and furnishings.

In addition to indicators 1–5: Completion of a detailed acoustic simulation

- Basis and results of the completed detailed acoustic simulation.

Indicator 6: AGENDA 2030 BONUS – Stress reduction, health and well-being

- Description of the results of the calculation as well as the measurements carried out.



I. Version

Change log based on version 2017

PAGE	EXPLANATION	DATE
all	General, Evaluation and Usage-specific description: scheme "Assembly buildings" has been added.	16.09.2021

II. Literature

- DIN 18041:2016-03. Acoustic quality in small to medium-sized rooms. Berlin: Beuth Verlag.
- DIN EN ISO 3382-2. Acoustics – Measurement of room acoustic parameters – Part 2: Reverberation time in ordinary rooms. Berlin: Beuth Verlag. September 2008
- DIN EN ISO 3382-2 Corrigendum 1:2009-09. Acoustics – Measurement of room acoustic parameters – Part 2: Reverberation time in ordinary rooms
- DIN EN ISO 354. Acoustics – Measurement of sound absorption in a reverberation room. Berlin: Beuth Verlag. December 2003
- VDI 2569: 2016-02 (draft) "Sound protection and acoustical design in offices". Düsseldorf: Verein Deutscher Ingenieure e.V.



APPENDIX 1

Requirements in accordance to DIN 18041

Indicator 4. Rooms in accordance with DIN 18041:2016-03 (room group A1–A5) with special requirements in terms of speech intelligibility

A1 “Music”: Predominantly musical performances.

$$T_{\text{Soll,A1}} = (0.45 \lg \frac{V}{\text{m}^3} + 0.07) \text{ s} \quad 30 \text{ m}^3 \leq V < 1\,000 \text{ m}^3$$

A2 “Language/Lecture”: Linguistic performances are in the foreground, usually from a (frontal) position. Simultaneous communication between several people at different points in the room is rarely carried out.

$$T_{\text{Soll,A2}} = (0.37 \lg \frac{V}{\text{m}^3} - 0.14) \text{ s} \quad 50 \text{ m}^3 \leq V < 5\,000 \text{ m}^3$$

A3 “Teaching/Communication” (to 1000 m³): Communication-intensive uses with several simultaneous speakers distributed in the room.

and

“Language/Lecture inclusive” (to 5000 m³): Rooms of type **A2** for people who are particularly dependent on good language comprehension. Required for inclusive use.

$$T_{\text{Soll,A3}} = (0.32 \lg \frac{V}{\text{m}^3} - 0.17) \text{ s} \quad 30 \text{ m}^3 \leq V < 5\,000 \text{ m}^3$$

A4 “Teaching/communication inclusive”: Communication-intensive uses with several simultaneous speakers distributed in the room according to type A3, but for people who are particularly dependent on good language comprehension. This type of use is not suitable for rooms larger than 500 m³ and for musical uses. Required for inclusive use.

$$T_{\text{Soll,A4}} = (0.26 \lg \frac{V}{\text{m}^3} - 0.14) \text{ s} \quad 30 \text{ m}^3 \leq V < 500 \text{ m}^3$$

A5 “Sport”: In sports halls and swimming pools Multiple groups communicate (even at the same time) with different content.

$$T_{\text{Soll,A5}} = (0.75 \lg \frac{V}{\text{m}^3} - 1.00) \text{ s} \quad 200 \text{ m}^3 \leq V < 10\,000 \text{ m}^3$$

$$T_{\text{Soll,A5}} = 2.0 \text{ s} \quad V \geq 10\,000 \text{ m}^3$$



Indicator 5. Rooms with recommendations in accordance with DIN 18041:2016-03 (building use B3–B5) with special requirements for noise reduction and/or room acoustics comfort (such as cafeterias, libraries or break rooms)

Type of use	Description	by Room heights $h \leq 2.5$ m m^2/m^3	by Room heights $h > 2.5$ m m^2/m^3
B3	Rooms for longer-term lingering	$A/V \geq 0.20$	$A/V \geq [3.13 + 4.69 \ln (h/1 \text{ m})]^{-1}$
B4	Rooms with need for noise reduction and room comfort	$A/V \geq 0.25$	$A/V \geq [2.13 + 4.69 \ln (h/1 \text{ m})]^{-1}$
B5	Rooms with special need for noise reduction and room comfort	$A/V \geq 0.30$	$A/V \geq [1.47 + 4.69 \ln (h/1 \text{ m})]^{-1}$
<p>A the equivalent sound absorption surface of a room in square metres V the volume of a room in cubic metres h the light room height in metres</p>			