Text consolidated by Valsts valodas centrs (State Language Centre) with amending regulations of:

3 March 2020 [shall come into force from 6 March 2020].

If a whole or part of a paragraph has been amended, the date of the amending regulation appears in square brackets at the end of the paragraph. If a whole paragraph or sub-paragraph has been deleted, the date of the deletion appears in square brackets beside the deleted paragraph or sub-paragraph.

Republic of Latvia

Cabinet

Regulation No. 312

Adopted 16 June 2015

**Regulations Regarding Latvian Construction Standard LBN 016-15, Building Acoustics**

*Issued pursuant to*

*Section 5, Paragraph one, Clause 3 of the Construction Law*

1. The Latvian Construction Standard LBN 016-15, Building Acoustics (hereinafter – the Latvian Construction Standard LBN 016-15) is approved by this Regulation.

2. The Ministry of Economics shall, in cooperation with the relevant technical committee for standardisation, recommend the national standardisation authority a list of standards that need to be developed, adapted, and applied in connection with this Regulation.

3. The national standardisation authority shall publish on the website www.lvs.lv a list of Latvian national standards to be applied for the purpose of enforcement of the Latvian Construction Standard LBN 016-15.

4. The building designs which have been developed or submitted for coordination to the building authority in accordance with specific procedures prior to the date of coming into force of this Regulation in accordance with the requirements of the laws and regulations applied in the relevant time period need not be revised in accordance with the Latvian Construction Standard LBN 016-15.

5. The wording of this Regulation that was in force from 16 June 2015 to 5 March 2020 shall be applied to the construction intention documentation which has been coordinated (accepted) or submitted for coordination in accordance with specific procedures in the period from 16 June 2015 to 31 December 2020 to an authority performing the functions of the building authority. The wording of this Regulation that was in force until 5 March 2020 shall be applied to the construction intention documentation which is developed on the basis of the planning and architectural order issued until 30 September 2014 or which has been coordinated (accepted) in accordance with specific procedures from 1 October 2014 to 31 December 2020.

[*3 March 2020*]

6. Starting from 1 January 2021, the acoustic measurements referred to in Paragraph 32 of the Latvian Construction Standard LBN 016-15 shall be carried out by the authorities which have been accredited with the national accreditation authority or with the accreditation bodies of the European Economic Area.

[*3 March 2020*]

Prime Minister Laimdota Straujuma

Acting for the Minister for Economics – Minister for Health Guntis Belēvičs

Approved by

Cabinet Regulation No. 312

16 June 2015

**Latvian Construction Standard LBN 016-15, Building Acoustics**

**1. General Provisions**

1. The main requirements for acoustic parameters of building premises and roofed-in open-air stages shall be prescribed in the Construction Standard.

2. The following terms are used in this Construction Standard:

2.1. weighted apparent airborne sound reduction index of external enclosing structures R'tr,s,w (dB) – value used for evaluation of the sound insulation between the room and the external territory – the sound insulation of the external enclosing structure of the building and its elements;

2.1.1 acoustic comfort – environmental conditions where noise is at such levels that do not threaten the health of people inside the structures or in their vicinity, do not prevent the people from sleeping, resting, or working in satisfactory conditions;

2.2. level of background noise LAeq,T (dBA) – such continuous A-weighted sound pressure level which is useless and obstructive in seats of the listeners;

2.3. C80 (dB) – ratio, which characterises the clarity of the sound in certain points of the room, of the sound energy of the early (up to 80 ms) and late (after 80 ms) time period perceived by a listener;

2.4. C50-3150 (dB) and CI,50-2500 (dB) – spectral correction for the sound insulation calculations by using measurements with expanded frequency range of up to 50 Hz. Correction shall be applied to rooms of Classes A and B;

2.5. Ctr (dB) – specified correction of the traffic noise;

2.6. actual weighted normalized impact sound pressure level L'n,w (dB) – value which is used for the evaluation of propagation of the impact sound pressure in the building and which characterises the insulation of impact sound pressure in real conditions with flanking sound paths. Weighted normalized impact sound pressure level Ln,w – value which characterises the insulation of impact sound pressure of enclosing structures in laboratory settings without flanking sound paths;

2.7. weighted apparent airborne sound reduction index R'w (dB) – value which is used for the evaluation of the sound insulation of internal enclosing structures of the building and which characterises the sound propagation through the relevant enclosing structures, and also through adjacent structures (via flanking sound paths). Weighted airborne sound reduction index Rw – value which is determined by means of laboratory measurements or calculations and which does not include transmission of sound via flanking sound paths;

2.8. peak sound pressure level LCpeak (dBC). C – maximum value of weighted instantaneous sound pressure;

2.9. noise barrier – a continuous barrier (structure, building or an element of terrain) which is placed on the direct sound route from its source to the receiver and causes diffraction of the sound waves;

2.10. reverberation time T (s) – time required for the level of sound pressure to decrease by 60 dB in the receiver after switching off the sound source;

2.11. T30 (s) – reverberation time within the sound decay interval from –5 dB to –35 dB;

2.12. speech transmission index RASTI (%) – indicator of sound comprehensibility using the following evaluation scale:

2.12.1. less than 30 % – bad;

2.12.2. from 30 % to 45 % – poor;

2.12.3. from 45 % to 60 % – fair;

2.12.4. from 60 % to 75 % – good;

2.12.5. from 75 % and more – excellent;

2.13. airborne sound – sound (noise) which is transmitted by air from the sound source to receivers in the adjacent room, traversing structures;

2.14. structural noise – mechanical vibrations that are transmitted in structures of a building and create airborne sound;

2.15. lateral fraction (spaciousness) coefficient LFC – ratio of non-oriented sound energy to direct sound energy that is perceived by a listener within the time period of 80 ms which characterises the spaciousness of the sound;

2.16. impact noise – noise which is transmitted in rooms and which is caused by direct mechanical impacts on the structure (for example, walking on floors and stairs).

[*3 March 2020*]

**1.1. Scope of the Construction Standard**

3. The requirements of the Construction Standard shall apply to public and residential buildings. The requirements of the Construction Standard shall be mandatory to all legal persons and natural persons.

[*3 March 2020*]

4. The Construction Standard shall not apply to industrial, technical, and special-purpose premises, and also to buildings (for example, recording and broadcasting studios and sound editing rooms) to which special acoustic requirements are brought forward and for which the acoustic parameters are determined by the customer.

5. Rooms shall be divided into four classes from the point of view of acoustic comfort:

5.1. Class A – rooms with particularly high requirements of acoustic comfort;

5.2. Class B – rooms with high requirements of acoustic comfort;

5.3. Class C – rooms in which the minimum requirements specified for sound insulation are mandatorily applicable in the designing of new buildings;

5.4. Class D – rooms in buildings which have been put into service.

[*3 March 2020*]

6. In the design of acoustic requirements of buildings and roofed-in open-air stages such standards shall be applied which are published by the national standardisation authority in the list on the website www.lvs.lv.

7. Acoustic calculations and the measurements necessary for calculations shall be carried out in accordance with the requirements of the applicable standards.

[*3 March 2020*]

**1.2. Objectives of Building Acoustics Measures and Implementation Thereof**

8. The main objective of building acoustics measures shall be the creation of human-friendly acoustic (sound) environment in buildings and in built environment at large. Architectonic and construction methods shall be used in the implementation of the abovementioned objective. The parameters of sound sources, noise control elements, and acoustic environment shall be determined by using measurements or calculations.

9. Building acoustics measures shall include noise control measures and measures for increasing the acoustic quality. Noise control measures shall include built environment acoustics, reduction of noises created by technical equipment (engineering equipment), and sound insulation. Their objective is to prevent the exceeding of the limit values of the noise level in rooms and built area. The measures for increasing the acoustic quality shall include the provision of optimum audibility and euphony in rooms and roofed-in open-air stages.

10. When designing rooms with regulated acoustics requirements, and also with Class A and B sound insulation requirements, acoustic calculations and surveys of buildings shall be performed by qualified experts of building acoustics. An expert of building acoustics shall be a certified specialist with higher education degree and at least five-years of work experience in the field of acoustics whose qualification is certified by a certificate issued by such authority which has been accredited in a national accreditation authority or with a certificate issued by an accredited authority of another European Union Member State.

[*3 March 2020*]

10.1 The values of acoustic parameters of the rooms referred to in Annex 1 to this Construction Standard, the sound insulation values of enclosing structures referred to in Annexes 3 and 4 to this Construction Standard, and also noise level projections shall be included in the section on building acoustics of the construction intention documentation of the second and third group multi-apartment residential and public buildings.

[*3 March 2020*]

**2. Room Acoustics**

**2.1. Requirements for Acoustic Parameters**

11. Room acoustic parameters which characterise the acoustic quality of rooms may be determined according to the applicable standards. Acoustic parameters shall be determined and evaluated in octave frequency bands with the centre frequencies 125, 250, 500, 1000, 2000, and 4000 Hz

12. The general requirements for acoustic parameters of listener areas in rooms with different functions are specified in Annex 1 to this Construction Standard. The customer, when planning the purpose of the use of rooms of the building, has the right to indicate values of acoustic parameters which are higher than the values referred to in Annex 1 to this Construction Standard, and also to indicate additional parameters. If values of parameters are not indicated and have not been referred to in Annex 1 to this Construction Standard, upon an agreement with the customer they shall be determined by a qualified expert of building acoustics.

13. Room acoustics shall be designed so that the useful values of the maximum level of the sound signal would not exceed the hearing risk values and would exceed the level of ambient noise LAeq,T in any place of the listener area by not less than 6 dBA. The sound level values admissible in the listener areas shall be LAeq,T < 103 dBA and LCpeak < 125 dBC.

[*3 March 2020*]

14. Room acoustic parameters in existing rooms and in roofed-in open-air stages shall be determined by using acoustic measurements or calculations, but in rooms to be designed or reconstructed by using calculations or acoustic modelling. Sound absorbing and sound scattering properties of surfaces of rooms shall be taken into account when calculating the acoustic parameters of the rooms by using three-dimensional computer modelling.

**2.2. Requirements for the Shape and Size of Rooms**

15. The shape of rooms shall provide the formation of maximally even (diffusive) field of sound preventing the phenomena of sound concentration and standing waves and ensuring optimum values of acoustic parameters. The proportions of audience halls for theatres and concert halls shall be determined in accordance with the area indicated in Figure 1 of Annex 2 to this Construction Standard. The actual sizes of rooms shall be divided by the mean height when using the chart, so the values of the altered width and length should be located within the marked area.

16. Fixed viewer seats in rooms and roofed-in open-air stages without electro-acoustic sound reinforcement equipment shall be permitted not farther than:

16.1. 17 m from the speaker’s place in study-rooms, conference halls, and meeting rooms;

16.2. 23 m from the plane of stage portal in drama theatres;

16.3. 30 m from the performers’ platform in roofed-in open-air stages, except for open-air stages intended for choirs with more than 50 participants;

16.4. 35 m from the plane of stage portal in halls of opera-houses;

16.5. 40 m from the centre of orchestra or choir area in symphonic and choral music halls.

17. In rooms with regulated values of acoustic parameters the ratio of the acoustic volume part (the part of the building volume of room where only direct and reflected sound prevails and which is not separated by using sound insulation elements) to the number of seats (the total number of visitors and performers) shall be designed to be not less than:

17.1. 5 m3 per seat in rooms with electro-acoustic sound reinforcement equipment, study-rooms, conference halls, and drama theatres;

17.2. 6 m3 per seat in multifunctional halls, and also halls of community centres and musical comedy theatres, cult and sacral premises;

17.3. 7 m3 per seat in halls of opera theatres and chamber music;

17.4. 10 m3 per seat in symphonic music halls;

17.5. 12 m3 per seat in halls of choral and organ music and churches;

17.6. [3 March 2020]

[*3 March 2020*]

**2.3. Sound-reflecting and Sound-absorbing Finish of Rooms**

18. From the point of view of building acoustics, the interior elements of a room shall be divided into sound-absorbing (damping) elements and sound-reflecting elements. Sound-reflecting elements shall be divided into guided reflecting elements and diffusers. The application of these elements directly influences the acoustic parameters of a room.

19. Sound-reflecting elements and structures shall conform to the following requirements:

19.1. the average sound absorption coefficient is less than 0.1;

19.2. the surface mass is not less than 10 kg/m2;

19.3. the surface area is more than 3 m2;

19.4. the ratio of the shortest edge and the longest edge is not less than 1:3;

19.5. they are flat or with a curvature radius that exceeds 5 m.

20. Diffuse reflective elements (diffusers) shall have such dimensions which ensure the necessary sound diffusion in accordance with Figure 2 of Annex 2 to this Construction Standard.

21. Diffuse reflective elements (diffusers) shall form at least 25 % of the room surfaces where acoustic parameters are regulated and if rooms are intended for musical performances. Chairs, balconies, columns, and other three-dimensional objects may be included in this amount. The layout of the relevant elements shall be determined on the basis of the results of acoustic measurements or computer modelling of a room.

22. Acoustic absorbers (sound dampers) are finishing materials and special structures with sound absorption coefficient of more than 0.5 in at least one of the frequency bands referred to in Paragraph 11 of this Construction Standard.

23. Acoustic absorbers shall be used in rooms with regulated acoustic parameters only on the basis of the results of acoustic measurements or computer modelling of rooms.

**2.4. Special Requirements for Particular Types of Rooms**

24. The clarity and audibility of the spoken sound shall be ensured in study-rooms, conference halls, halls of drama theatres, and similar rooms. If electro-acoustic sound reinforcement equipment is not used in the abovementioned rooms, their acoustic volume shall not exceed 2000 m3 (in halls of drama theatres – 3000 m3). Electro-acoustic sound reinforcement equipment shall be provided if the maximum distance from the speaker’s position (area) to the farthest seats of listeners exceeds 17 m.

25. Acoustic parameters differing from the acoustic parameters of the listener area shall be allowed in the performers’ areas of concert halls: the reverberation time T30 may be lower by up to 30 %, but the values of C80 and RASTI may be higher than those specified in Annex 1 to this Construction Standard. Concert halls the length of which exceeds 35 m shall be equipped with a stationary system of electro-acoustic sound reinforcement equipment.

[*3 March 2020*]

26. In order to ensure acoustic balance, the admissible depth of the floor of the orchestra pit of opera theatres in relation to the floor of forestage shall be not more than 2.5 m, except for transformable floors. The floor and walls of the orchestra pit shall be shaped so that they would ensure damping of low frequency sounds (the airspace under the floor shall exceed 0.5 m, behind the panelling – 0.1 m). The floor area of the pit for the seat of each musician shall be not less than 1.2 m2. The halls of opera theatres the length of which exceeds 30 m shall be equipped with a stationary system of electro-acoustic sound reinforcement equipment.

27. When determining the acoustic parameters for multifunctional halls (also halls of community centres and large clubs), the mean indicators specified for different types of performances shall be used. Where technologically feasible, transformable rooms shall be designed by adjusting the acoustic parameters to each function or few functions.

28. Multifunctional halls shall be equipped with a stationary system of electro-acoustic sound reinforcement equipment.

29. In cinemas and other rooms to be equipped with electro-acoustic sound reinforcement equipment (for example, discotheques, dance floors) the particular requirements shall depend on the type of room, and the requirements shall be determined by the customer.

**3. Sound Insulation**

**3.1. General Requirements**

30. Building structures shall be designed and built so that noise levels in the interior premises of the buildings and in the territories adjacent to them would be ensured in accordance with the requirements of the laws and regulations regarding admissible limit values of noise. Such building constructions and articles shall be used the sound insulation properties of which ensure the fulfilment of the requirements laid down in laws and regulations.

[*3 March 2020*]

31. Technical specifications of articles, results of laboratory examinations, measurements, and calculations shall be used when evaluating the acoustic properties of building constructions and articles in a completed or unfinished object. The following one-digit parameters shall be used in order to evaluate the insulation properties of a building and its individual elements:

31.1. weighted apparent airborne sound reduction index R'w (dB);

31.2. actual weighted normalized impact sound pressure level L'n,w (dB).

32. Airborne sound and impact sound pressure insulation properties of the structures referred to in Annex 3 to this Construction Standard shall be evaluated by carrying out sound insulation measurements of multi-apartment residential and public buildings to be built prior to the commissioning thereof. Measurements shall be carried out for not less than three structures in accordance with Annex 3.1 to this Construction Standard.

[*3 March 2020*]

**3.2. Sound Insulation Requirements for Internal Enclosing Structures of Buildings**

33. Standardised sound insulation values are the weighted apparent airborne sound reduction index R'w and the actual weighted normalized impact sound pressure level L'n,w as specified in Annex 3 to this Construction Standard. Surfaces of internal enclosing structures of a building shall be made in accordance with the sound insulation requirements laid down in Annex 3 to this Construction Standard: the weighted apparent airborne sound reduction index R'w shall be not less than that specified in Annex 3 to this Construction Standard and the actual weighted normalized impact sound pressure level L'n,w shall be not more than that specified in Annex 3 to this Construction Standard. Values of indices R'w and L'n,w shall be the required level of sound insulation between rooms in vertical and horizontal direction and diagonally for adjacent rooms. Corrections of the limit values of weighted apparent airborne sound reduction index R'w (dB) and weighted normalized impact sound pressure level L'n,w (dB) in accordance with the acoustic comfort class of a room are specified in Annex 7 to this Construction Standard.

[*3 March 2020*]

34. Sound insulation of internal enclosing structures of a building shall be constructed in such a way that will limit indirect noise transmission also with adjacent building constructions. The technical construction of shafts and communications (for example, ventilation shafts, pipelines that are crossing the building constructions) shall ensure the preservation of sound insulation of these structures within the limits set in this Construction Standard. Values of the sound insulation index R'w/L'n,w (dB) option class for internal enclosing structures of residential buildings are specified in Annex 8 to this Construction Standard.

[*3 March 2020*]

**3.3. Sound Insulation Requirements for External Enclosing Structures of Buildings**

35. Sound insulation requirements for external enclosing structures and their elements shall be put forward depending on the level of noise in surrounding territories of the building and rooms. The level of external noise shall be determined by using measurements or calculations. The permissible level of noise in built areas and rooms shall be determined in accordance with the laws and regulations governing the procedures for noise evaluation and management. The sound insulation of external enclosing structures and their elements shall be evaluated by performing acoustic measurements and calculations. The sound insulation of external enclosing structures shall be deemed sufficient if it ensures the protection of internal premises against external noise and the protection of the surrounding territories against the noise originating in internal premises of the building.

36. The necessary sound insulation of external enclosing structures of the buildings near the sources of environmental noise shall be determined in accordance with Annexes 4 and 5 to this Construction Standard depending on the highest value of the environmental noise indicator Lday, Levening, or Lnight.

37. If the external enclosing structures contain various elements that have different sound insulation (for example, a wall with a window or doors), the sound insulation index specified in accordance with Annex 4 to this Construction Standard shall apply to the common insulation of these structures. When evaluating the conformity with the limit values, a correction factor shall be applied to the index R'tr,s,w in accordance with Annex 5 to this Construction Standard according to the ratio of the area of external enclosing structure and the floor area of rooms.

38. Sound insulation indices of external enclosing structures shall be not less than those indicated in Annexes 4 and 5 to this Construction Standard.

39. When calculating the sound insulation of external enclosing structures R'tr,s,w and when choosing individual external enclosing elements, their sound insulation indices R'w and Rw shall be taken into account. It shall be assumed that R'tr,s,w is the common sound insulation of external enclosing structure that is determined in accordance with the sound insulation indices R'w and Rw of individual elements of external enclosing structure.

40. The sound insulation for windows in rooms with floor area of up to 25 m2 shall be determined by using the approximation method: value 10 lg S/S0 where S is the area of external enclosing structure and S0 is the area of the window (doors) of rooms shall be subtracted from the value of index R'tr,s,w that is determined in accordance with Annexes 5 and 6 to this Construction Standard. If a window takes up more than 50 % of the area of external wall, the value of the sound insulation of the window shall be equal to the sound insulation index of external enclosing structure. The approximation method shall be applied to heavy materials of external walls (for example, concrete, brick wall). The approximation method shall not be applied to light, multi-layered materials with mass of enclosing structures less than 100 kg/m2, and also to large rooms where floor area exceeds 25 m2.

[*3 March 2020*]

41. The noise limit values in rooms, when implementing sound insulation measures, depending on the preferable acoustic comfort class of rooms, shall be obtained by adjusting the existing noise limit values that are determined in accordance with the procedures for noise evaluation and management. Numerical values for adjusting the noise limit values are specified in Annex 6 to this Construction Standard.

[*3 March 2020*]

42. When ensuring the necessary sound insulation for external enclosing structures, the elements provided for ventilation (for example, airways in a window structure or wall) shall not reduce the sound insulation of the structure to the level where the level of noise that is penetrating the room exceeds the permissible level. In order to ensure a very low level of noise in rooms that are situated in noisy surroundings, rooms shall be ventilated by using air-conditioning equipment or fresh air inlet via air pipes from ventilation equipment.

43. If noise sources are located in buildings (internal premises) and the surrounding territories are to be protected, the sound insulation necessary for external enclosing structures shall be determined only by using calculations.

**3.4. Insulation of Structural Noise**

44. At first it shall be required to perform additional measures for restricting the propagation of structural noise by taking into account the level of noise created by technical equipment and its layout in relation to rooms in which noise levels are regulated. The necessity for additional measures shall be determined on a case-by-case basis.

45. Technical equipment shall be technical communications of a building (for example, water supply and sewage equipment), installations of the heating system, ventilation and cooling, elevators, and similar installations. The characterisation of the noise created by technical equipment may be specified by corresponding standards, and it shall be indicated in the technical documentation of equipment.

46. It shall not be permitted to install equipment that is generating structural noise in enclosing structures in which it must be ensured that indicator Lnight is less than 30 dB. Flexible covers or supports shall be fitted on the pipes going through an enclosing structure in order to reduce structural noise. Rotational and translational motion units (for example, pumps, compressors, fans) shall be mounted on vibration isolators; stiff anchoring of vibration isolators shall not be permissible. Structural noise shall be evaluated by performing acoustic measurements and calculations. Connections of pumps and ventilation units with the air duct (pipeline) system shall be made flexible.

47. It shall not be permitted to mount units of engineering systems on walls that are bordering with residential premises or with rooms that are comparable thereto in public buildings where the noise limit values specified in laws and regulations must be ensured. If it is necessary to mount water supply systems on walls, the mass of enclosing structures shall be not less than 200 kg/m2. The level of the sound pressure created by water supply systems shall be determined by performing acoustic measurements and calculations. The conformity of a solution for walls of light, multi-layered structures shall be proved by tests. If the pressure of the flow in the system exceeds 0.3 MPa, additional measures shall be taken in order to reduce structural noise.

48. Propagation of the noise created by technical equipment shall be reduced by taking building acoustics and anti-noise measures, by ensuring that such level of sound insulation of enclosing structures which corresponds to the requirements is ensured during the assembly process of equipment and communications, and by using special equipment to restrict the propagation of noise and vibrations:

48.1. installing sound insulation cases or covers on the equipment;

48.2. installing a noise barrier;

48.3. forming parts of connections flexible;

48.4. using noise dampers, vibration isolators, and vibration-isolating suspensions.

49. The acoustic properties required for the special equipment shall be determined by using calculations and taking into account the acoustic parameters of noise sources and the permissible sound levels in rooms and territories.

**4. Acoustics of Built Environment**

**4.1. General Requirements**

50. Local governments which determine acoustic discomfort areas during spatial planning process or which take into account their influence shall apply the requirements for protection of built environment against noise that are laid down in this Construction Standard and other laws and regulations.

**4.2. Forecasting of the Acoustic Discomfort Areas**

51. Acoustic discomfort areas are environmental areas where the regulated noise limit values specified in the laws and regulations for the relevant territory are exceeded.

52. The boundaries of acoustic discomfort areas shall be determined individually for each period of twenty-four hours by using acoustic measurements or calculations in accordance with the relevant laws and regulations. If several noise sources are active or several buildings are affected, the network acoustic measurements or three-dimensional computer modelling of the situation shall be performed. Acoustic measurements may be performed periodically or by using acoustic monitoring.

53. When evaluating the impact of acoustic discomfort areas, the time of operation of the discomfort cause in different periods of twenty-four hours shall be taken into account.

54. Such buildings may be located in acoustic discomfort areas that have external enclosing structures with such sound insulation that ensures appropriate levels of sound in internal premises in accordance with this Construction Standard and other laws and regulations regarding permissible noise level.

55. The boundaries of an acoustic discomfort area may be reduced by designing and implementing anti-noise measures at the noise source, in the noise distribution route or in the object that must be protected against the negative impact of the noise (hereinafter – the object to be protected).

56. Acoustic discomfort areas shall be determined for all external noise sources (for example, streets and roads, airports, airfields, manufacturing units, power plant buildings, sports fields, tracks, and other engineering structures) if their levels of sound intensity exceed 80 dBA, and also for internal noise sources of buildings if any of external (2 m from the façade and 1.5 m above the floor of the relevant storey of the building or ground level) noise indicator levels (Lday, Levening, Lnight) exceeds 45 dBA.

**4.3. Noise Control Measures**

57. The noise control measures shall be performed at first in (at) the source of the noise, and they shall be as follows:

57.1. adjustment of the operation mode of the noise source and ensuring of accurate compliance with norms of operation;

57.2. replacement of the noise source with an acoustically less active analogue;

57.3. insulation of noise source vibrations, thus reducing its acoustic emissions;

57.4. limiting the time of operation of the noise source.

58. Noise control measures on noise transmission route shall be as follows:

58.1. increasing the sound transmission route by moving the object to be protected away from the noise source or the noise source away from the object to be protected;

58.2. sound insulation – complete separation of the noise source from the environment by using, for example, enclosing structures and covers;

58.3. sound shielding – creation or use of obstacles that limit direct sound transmission (for example, barriers, buildings, terrain elements);

58.4. sound absorption and absorption-shielding measures (for example, change of covering of the territory, use of greenery bands and forest tracts).

59. Noise control measures at the object to be protected shall be as follows:

59.1. complete separation of the object or room to be protected from the noisy environment by using enclosing structures;

59.2. orientation of the room or area to be protected towards the quietest directions.

60. Sound shielding measures shall be the use of noise barriers – structures, buildings, and terrain elements (for example, embankments, entrenchments). Acoustic efficiency of the barrier shall be determined by using measurements or calculations. Acoustic efficiency of the barrier depends on its external dimensions, material and layout, and it varies in different places of environment behind the barrier. If the built environment that is located on the opposite side from the noise source also must be protected, the barrier surface that is directed towards the noise source shall be covered with a sound absorbing material. On the basis of results of a noise situation modelling, the use of noise barriers without a covering of sound absorbing material shall be permissible in cases if the increase of the level is not more than 2 dB in the built environment to be protected that is located on the opposite side of the barrier. The total mass of the surface of the noise barrier shall be not less than 20 kg/m2, and the sound insulation value Rw of the noise barrier shall exceed 30 dB. Such sound insulation value Rw which is not less than 25 dB shall be ensured for the doors and gates of the screen.

61. Sound absorption and absorption-shielding measures shall be the creation of such surfaces of the territory which absorb noise (for example, lawns, land to be used in agriculture, shrubbery, continuous greenery belts, and greenery areas). Acoustic efficiency of the abovementioned measures shall be taken into account if their impact on sound absorption is effective throughout the year, not just only during the vegetation season. Acoustic efficiency shall be determined by using measurements or calculations.

Acting for the Minister for Economics – Minister for Health Guntis Belēvičs

**Annex 1**

Latvian Construction Standard LBN 016-15, Building Acoustics

(approved by Cabinet Regulation No. 312

16 June 2015)

**Requirements for Room Acoustic Parameters within the Boundaries of 500-2000 Hz**

[*3 March 2020*]

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Type of room | T (T30)(sec) | C80(dB) | LF(coefficient) | *RASTI*(%) |
| 1. | Halls for organ music and choral music, churches\* | 0.45 lgV + 0.45 | > –4 | > 0.22 | > 40 |
| 2. | Cult premises (except for churches) | < 2.1 | – | – | > 45 |
| 3. | Symphonic music halls\* | 0.4 lgV + 0.4 | –2...+3 | > 0.20 | > 45 |
| 4. | Chamber music halls and opera-houses\* | 0.3 lgV + 0.3 | –1...+4 | > 0.15 | > 50 |
| 5. | Multifunctional halls, halls of musical comedy theatres\* | 0.25 lgV + 0.25 | > 0 | > 0.12 | > 53 |
| 6. | Premises for spoken word performances (drama theatres, study-rooms, conference halls, meeting rooms)\*\* | 0.2 lgV + 0.2 | > 1 | > 0.10 | > 60 |
| 7. | Halls and premises for performances only to be equipped with electro-acoustic sound reinforcement equipment\*\* | 0.2 lgV + 0.15 | > 0 | – | > 60 |
| 8. | Classrooms (except music classrooms) | 0.4...0.6 | > 2 | – | > 60 |
| 9. | Music classrooms and rehearsal premises | 0.3...0.9 | > 0 | > 0.15 | > 50 |
| 10. | Group of sports premises | – | > –3 | – | > 50 |
| 11. | Dance, aerobics, and fitness halls | < 1.3 | > 0 | – | > 50 |
| 12. | Staircases, hallways, waiting rooms, foyers, lobbies in residential and public buildings | – | > –2 | – | > 50 |

Notes.

1. C80, T30, and RASTI values shall be ensured in speech and electro-acoustic sound reinforcement mode of the sound source.

2. Values of lateral fraction (spaciousness) coefficient LFC for a specific condition/position of a sound source in a room.

3. Acceptable deviations from values in the table are +/– 5 %.

4. Values apply to rooms where 70 % of the anticipated visitors are present.

5. \* It is recommended to increase T values by 10–20 % within the boundaries of 125–250 Hz, and to reduce by 5–10 % those values in the 4000 Hz frequency–.

6. \*\* T values within the boundaries of 125–250 Hz shall be assumed for 500–2000 Hz band, and those values in the 4000 Hz frequency may be reduced by 5–10 %.

**Annex 2**

Latvian Construction Standard LBN 016-15, Building Acoustics

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**Geometrical Parameters of Rooms and Internal Surfaces**



Figure 1.

Area of optimum proportions for premises



Figure 2.

Dimensions of sound diffusion elements

Acting for the Minister for Economics – Minister for Health Guntis Belēvičs

**Annex 3**

Latvian Construction Standard LBN 016-15, Building Acoustics

(approved by Cabinet Regulation No. 312

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**Sound Insulation Requirements for Internal Enclosing Structures of Buildings**

[*3 March 2020*]

|  |  |  |  |
| --- | --- | --- | --- |
| No. | Type of buildings and rooms | Class C | Notes |
| **I. Multi-apartment Residential Buildings** |
|  |  | R'w (dB) | L'n,w (dB) |  |
| 1. | Between residential premises of apartments, between residential premises and common use premises | 55 | 52 |  |
| 2. | Between rooms within one apartment | 46 | \* |  |
| 3. | Between residential premises and sanitary and utility rooms of the adjacent apartment | 55 | 52 |  |
| 4. | Enclosing structures of an apartment together with the structures of doors, windows or their sets included in these enclosing structures | 37 | – | Limit value of wall insulation – not less than the one specified in Paragraph 1 of this Annex; entrance from common use premises.A set shall mean, for example, a door or window + wall |
| 5. | Between apartments and rooms where noise sources with the maximum level of 75–100 dBA are located\*\* | R'w\*\*\* = LAeq,T x 0,93 – 70 | 47 | Ventilation chambers, engine rooms, cafés, bars, shops, restaurants, sports halls.If necessary, additional measures shall be taken to reduce the propagation of structural noise |
| **II. Hotels** |
|  |  | R'w (dB) | L'n,w (dB) |  |
| 6. | Between bedrooms of hotel rooms, including with a double door.Between bedrooms of hotel rooms and common use premises of a hotel | 53 | 56 |  |
| 7. | Between hotel rooms and rooms where a noise source with the maximum level of 75–100 dBA is located\*\* | R'w\*\*\* = LAeq,T x 0,93 – 70 | 47 | Kitchens, technical and staff premises, cafés, bars, shops, restaurants, sports halls |
| 8. | Enclosing structures together with the doors or structures thereof included therein that are located between hotel rooms and the staircase or public hallway | 33 | – | Limit value of wall insulation – not less than the one specified in Paragraph 6 of this Annex |
| **III. Office Buildings and Group of Office Premises** |
|  |  | R'w (dB) | L'n,w (dB) |  |
| 9. | Between work premises, work premises and staircases, hallways, halls, lobbies | 51 | 59 | Including also the buildings and groups of premises of civil airports, the buildings and groups of buildings of passenger stations regardless of the mode of transport, the buildings of port terminals, cableway and chairlift station buildings, telephone centres, telecommunication centres, the buildings and groups of premises for air traffic control. Communication buildings, stations, terminals, and related groups of premises. Printer, photocopier, office kitchen, and other premises |
| Between office premises and office service premises | Printer, photocopier, office kitchen, and other premises |
| 10. | Enclosing structures of offices with included structures of doors or structures of their sets | 31 | – | From work premises to hallways, staircases, halls, lobbies.From halls and meeting rooms to hallways, staircases, halls, lobbies |
| 11. | Between work premises and rooms where noise sources with the maximum level of 75–100 dBA are located\*\* | R'w\*\*\* = LAeq,T x 0,93 – 70 | 49 | Cafés, bars, shops, restaurants, sports halls, server room |
| **IV. Medical Treatment or Health Care Institution Buildings** |
|  |  | R'w (dB) | L'n,w (dB) |  |
| 12. | Between wards, between wards and rooms equivalent thereto.Between wards, rooms equivalent thereto and common use premises (staircase, hallway, lobby, recreation premises, dining-room) | 53 | 56 | Rooms equivalent to wards are rooms for examinations and procedures, and also doctor’s office |
| Between operating rooms, special rooms, and common use premises\* |
| 13. | Between intensive care wards, between intensive care wards and hallway | 28 | – | If there are windows in the walls, their sets, sliding structures |
| 14. | Between work premises and operating rooms, and rooms where noise sources with the maximum level of75–100 dBA are located | R'w\*\*\* = LAeq,T x 0,93 – 70 | 49 | If necessary, additional measures for reduction of structural noise shall be taken |
| 15. | Enclosing structures between wards, operating rooms and equivalent rooms together with the structures of doors, windows or their sets included in these enclosing structures | 33 | – | Limit value of wall insulation – not less than the one specified in Paragraph 12 of this Annex |
| **V. Group of Rooms of Educational Institutions (Including Pre-school Education Institutions)** |
|  |  | R'w (dB) | L'n,w (dB) |  |
| 16. | Between teaching rooms and common use premises (staircases, hallways, halls, lobbies).Between classrooms, study premises, study-rooms and kitchen, dining-hall | 54 | 57 | Premises equivalent to teaching rooms: classrooms, study rooms, and similar training rooms |
| Between premises for groups of pre-school establishment, premises for sleeping and the music room or sports hall\* |
| 17. | Enclosing structures between classrooms and equivalent rooms with included structures of doors or their sets | 39 | – | Limit value of wall insulation of hallways, lobbies, halls – not less than the one specified in Paragraph 16 of this Annex. Door structure insulation – not less than R'w ≥ 33 dB |
| 18. | Between teaching rooms\* and rooms where noise sources with the maximum level of 75–100 dBA are located\*\* | R'w\*\*\* = LAeq,T x 0,93 – 70 | 49 |  |
| **VI. Theatres, Cinemas, Concert Halls, Circuses, Music, Dance Halls, and Other Buildings for Mass Entertainment Events** |
|  |  | R'w (dB) | L'n,w (dB) |  |
| 19. | Between various rooms, foyers, halls or hallways, work premises | 58 | 50 | See the sound insulation index between separate work premises in Chapter III of this Annex |
| 20. | Between various halls and rooms where noise sources with the maximum level of 75–100 dBA are located\*\* | R'w\*\*\* = LAeq,T x 0,93 – 70 | 49 |  |
| 21. | Between theatre halls, halls for speech\*, concert halls, cinema halls | 72 | 47 |  |
| 22. | Enclosing structures between theatre halls, concert halls, cinema halls together with the structures of doors, windows or their sets included in these enclosing structures | 52 | – | Door structure insulation – not less than R'w = 44 dB |
| **VII. Sports Buildings and Group of Sports Premises** |
|  |  | R'w (dB) | L'n,w (dB) |  |
| 23. | Between the sports hall, swimming-pool hall and lobby, café.Between sports halls, swimming pool and work\* premises | 50 | 56 | Arenas, sports arenas, sports halls, indoor swimming-pools, covered sports grounds, shooting galleries, bowling premises and groups of rooms, etc. |
| 24. | Enclosing structures between the sports hall, swimming-pool room and lobby, café together with the structures of doors, windows or their sets included in these enclosing structures | 48 | – | Sound insulation index for the door structure – not less than R'w ≥ 33 dB |
| 25. | Between shooting galleries and work premises | 65 | 56 |  |
| 26. | Enclosing structures between shooting galleries and common use premises together with the structures of doors, windows or their sets included in these enclosing structures | 50 | – | Sound insulation index for the door structure – not less than R'w ≥ 38 dB |
| 27. | Between sports halls and rooms where noise sources with the maximum level of 75–100 dBA are located\*\* | R'w\*\*\* = LAeq,T x 0,93 – 70 | 56 |  |

Notes.

1. \* See the values of the sound insulation index option class in Annex 8 to this Construction Standard.

2. \*\* If there is a noise source in the room the maximum level of which exceeds LAeq,T > 100 dBA, the noise control measures shall be taken in order to improve the insulation of enclosed structures.

3. \*\*\* The result shall be added to (summed up with) the determined insulation index.

**Annex 3.1**

Latvian Construction Standard LBN 016-15, Building Acoustics

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**Sound Insulation Measurements to Be Carried Out for Structures of Buildings**

[*3 March 2020*]

|  |  |
| --- | --- |
| Buildings | Structures to be measured |
| Multi-apartment residential buildings | A wall between an apartment and common use premises, a wall between an apartment and an adjacent apartment, inter-storey covering between apartments |
| Hotels | A wall between bedrooms of adjacent hotel rooms, a wall between a hotel room and common use premises, inter-storey covering between hotel rooms |
| Office buildings and group of office premises | A wall between work premises, a wall between work premises and common use premises, inter-storey covering between work premises |
| Medical treatment or health care institution buildings | A wall between adjacent wards, a wall between operating rooms and common use premises, inter-storey covering between the operating room and work premises |
| Educational institutions | A wall between a teaching room and common use premises, a wall between a teaching room and an adjacent teaching room, wall between various halls and common use premises |
| Theatres, cinemas, concert halls, circuses, music, dance halls, and other buildings for mass entertainment events | A wall between various halls and common use premises, a wall between adjacent halls, inter-storey covering between various halls |
| Sports buildings and group of sports premises | A wall between a sports hall and common use premises, a wall between a sports hall and work premises, inter-storey covering between a sports hall and work premises |

**Annex 4**

Latvian Construction Standard LBN 016-15, Building Acoustics

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**Requirements for Insulation of External Enclosing Structures from Environmental Noise**

[*3 March 2020*]



Notes.

1. **×** – if external noise level is too high for these rooms, the additional measures (for example, double-skin façade construction) shall be taken for reduction thereof.

2. Exact values are obtained by rounding the values of the external noise level up to an integer (for example, if Lday=70.4 dBA, then Lday=70 dBA).

3. Classes of the relevant acoustic comfort are obtained by adding 5 dB to R'tr,s,w value determined for Class A, by adding 3 dB to R'tr,s,w value determined for Class B, and by adding 0 dB to R'tr,s,w determined for Class C in the diagram.

Acting for the Minister for Economics – Minister for Health Guntis Belēvičs

**Annex 5**

Latvian Construction Standard LBN 016-15, Building Acoustics

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**Correction Coefficients of the Index R'tr,s,w that Depend on the Ratio S/So of the Area of Enclosing Structure and the Area of the Floor of a Room**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| S/So | 2.5 | 2.0 | 1.6 | 1.3 | 1.0 | 0.8 | 0.6 | 0.5 | 0.4 |
| Correction coefficient | +5 | +4 | +3 | +2 | +1 | 0 | –1 | –2 | –3 |

Notes.

1. S – area of the external enclosing structure of a room (m2).

2. So – area of the floor of a room (m2).

Acting for the Minister for Economics – Minister for Health Guntis Belēvičs

**Annex 6**

Latvian Construction Standard LBN 016-15, Building Acoustics

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**Corrections of the Limit Value of Noise in Accordance with the Class of Premises**

[*3 March 2020*]

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Room | Class A (dB) | Class B (dB) | Class C (dB) | Class D (dB) |
| Correction value | –5 | –3 | 0 | 0 |

**Annex 7**

Latvian Construction Standard LBN 016-15, Building Acoustics

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**Corrections of Limit Values of Weighted Apparent Airborne Sound Reduction Index R'w (dB) and Weighted Normalized Impact Sound Pressure Level L'n,w (dB) in Accordance with the Acoustic Comfort Class of a Room**

[*3 March 2020*]

Table 1

**Corrections of Limit Values of Weighted Apparent Airborne Sound Reduction Index R'w (dB) in Accordance with the Acoustic Comfort Class of a Room**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Acoustic comfort class of a room | Class A (dB) | Class B (dB) | Class C (dB) | Class D (dB) |
| Correction value of the limit value | 6 | 4 | 0 | –1 |

Table 2

**Corrections of Limit Values of Weighted Normalized Impact Sound Pressure Level L'n,w (dB) in Accordance with the Acoustic Comfort Class of a Room**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Acoustic comfort class of a room | Class A (dB) | Class B (dB) | Class C (dB) | Class D (dB) |
| Correction value of the limit value | –6 | –3 | 0 | 1 |

**Annex 8**

Latvian Construction Standard LBN 016-15, Building Acoustics

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**Values of Sound Insulation Index R'w/L'n,w (dB) Option Class for Internal Enclosing Structures of Residential Buildings**

[*3 March 2020*]

|  |  |  |
| --- | --- | --- |
| No. | Acoustic regime in a room where there is noise | Required insulation indices for the internal enclosing structures of a room or a group of rooms to be insulated to ensure Class C acoustic comfort(R'w/L'n,w values) |
| 1. | Quiet (LAeq,T ≤ 50 dBA) | 42/65 |
| 2. | Low noise (LAeq,T ≤ 60 dBA) | 47/60 |
| 3. | Noise (LAeq,T 61 ≤ 70 dBA) | 52/55 |
| 4. | High noise (LAeq,T 71 ≤ 74 dBA) | 57/50 |
| 5. | Particularly high noise (LAeq,T ≥ 75 dBA) | –/–2) |

Notes.

1. Exact values of indices shall be obtained by using approximation by rounding the noise level values up to an integer (for example, LAeq,T = 49,5 dBA, then LAeq,T = 49 dBA).

2. If the value caused by noise sources in the room exceeds 75 dBA, the limit value R'w shall be calculated by using the formula R'w = LAeq,Tx 0.93 – 70.