Assises Nationales de la Qualité de l'Environnement Sonore

9e ÉDITION

INVESTISSONS [DANS] L'ENVIRONNEMENT SONORE !

CidB Centre d'information sur le Bruit

MINISTÈRE DE LA TRANSITION ÉCOLOGIQUE ET SOLIDAIRE

Liberté Égalité Fraternité

ISOVER SAINT-GOBAIN

Placo SAINT-GOBAIN

NORME ISO/TS 19488:2021 CLASSIFICATION ACOUSTIQUE DES LOGEMENTS

Pascal OZOUF

ISO/TS 19488:2021
Classification acoustiques des logements

- Quelques rappels :
  - Objectif : décrire les critères de classe et les procédures de classification acoustique des logements
  - Permettre aux prescripteurs de pouvoir spécifier un niveau de qualité acoustique « standardisé » autre que la qualité définie par les réglementations nationales,
  - Permettre aux utilisateurs d'exiger ou d'être informés de la qualité acoustique de leur logement

→ « TS » (Technical Specification) donc pas d'obligation d'être appliquée …

ISO/TS 19488:2021
Classification acoustiques des logements

- Six classes de A à F sont définies, selon les indicateurs globaux généralement utilisés en acoustique du bâtiment :
  - Isolation acoustique aux bruits aériens
  - Isolation aux bruits d'impacts
  - Isolation acoustique aux bruits extérieurs
  - Niveaux de bruits d'équipements à l'intérieur des logements
  - Durée de réverbération et/ou aire d'absorption équivalente

Class	General
A	A quiet atmosphere with a high level of protection against sound. This class may be applied where a considerably better acoustic climate is asked for.
B	Under normal circumstances a good protection against sound without too much restriction to the behaviour of the occupants. This class may be applied where a better acoustic climate is asked for.
C	Protection against considerable disturbance under normal behaviour of the occupants, bearing in mind their neighbours. Newer building constructions in many countries are likely to fulfil or exceed this class.
D	Disturbance by noise may be expected more than occasionally, even in case of comparable behaviour of occupants, adjusted to neighbours. Newer building constructions in most countries are likely to fulfil or exceed this class.
E	A low protection is offered against intruding sounds. To be applied mainly for classification of existing housing (before renovation).
F	A very low protection is offered against intruding sounds. To be applied only for classification of older, existing housing (before renovation).
npd	No performance determined.

- Classes reposant sur une combinaison pragmatique de normes existantes et d'expériences recueillies dans de nombreux pays
- Deux types de vérifications possibles : in situ ou par calculs

ISO/TS 19488:2021
Classification acoustiques des logements

- Par exemple, pour les bruits aériens :

	Type of space	Class A dB	Class B dB	Class C dB	Class D dB	Class E dB	Class F dB
1	Between habitable rooms in a dwelling and rooms outside the dwelling in all directions	$D_{nT,50} \geq 58$	$D_{nT,50} \geq 54$	$D_{nT,A} \geq 52$	$D_{nT,A} \geq 48$	$D_{nT,A} \geq 44$	$D_{nT,A} \geq 40$
2	From common stairwells or access areas into habitable rooms in dwellings, where there is an entrance door in the separating wall	$D_{nT,A} \geq 46$	$D_{nT,A} \geq 42$	$D_{nT,A} \geq 38$	$D_{nT,A} \geq 34$	$D_{nT,A} \geq 30$	$D_{nT,A} \geq 26$
3	From premises with noisy activities into habitable rooms in dwellings[b]	$D_{nT,50} \geq 64$	$D_{nT,50} \geq 60$	$D_{nT,A} \geq 58$	$D_{nT,A} \geq 54$	$D_{nT,A} \geq 50$	$D_{nT,A} \geq 46$

[a] Different descriptors are applied to reflect use of different frequency ranges and weightings. Instead of $D_{nT,A}$, $D_{nT,w}$ may be applied if 2 dB is added to the limit value. If $D_{nT,A}$ is applied instead of $D_{nT,50}$, 2 dB should be added to the limit value of $D_{nT,50}$. For comparison between descriptors, see ISO 12354-1.

[b] Premises with noisy activities are rooms for shared services like laundries, central boiler house, joint/commercial kitchens or commercial premises like shops, workshops or cafés. However, in each case, noise levels should be estimated and the sound insulation designed accordingly, e.g. for party rooms, discotheques, etc. Then, the limits given in Table 4 for service equipment sound can be used as design goals.

ISO/TS 19488:2021
Classification acoustiques des logements

- Pour l'isolation acoustique aux bruits d'impacts :

	Type of space	Class A dB	Class B dB	Class C dB	Class D dB	Class E dB	Class F dB
1	In habitable rooms in dwellings from other dwellings in all directions	$L'_{nT,w} \leq 46$ and $L'_{nT,50} \leq 50$[a]	$L'_{nT,w} \leq 50$ and $L'_{nT,50} \leq 54$[a]	$L'_{nT,w} \leq 54$	$L'_{nT,w} \leq 58$	$L'_{nT,w} \leq 62$	$L'_{nT,w} \leq 66$
2	In habitable rooms in dwellings from: — common stairwells or access areas — balconies or terraces or bath rooms not belonging to own dwelling[b]	$L'_{nT,w} \leq 50$	$L'_{nT,w} \leq 54$	$L'_{nT,w} \leq 58$	$L'_{nT,w} \leq 62$	$L'_{nT,w} \leq 66$	$L'_{nT,w} \leq 70$
3	In habitable rooms in dwellings from premises with noisy activities[c]	$L'_{nT,w} \leq 40$ and $L'_{nT,50} \leq 44$[a]	$L'_{nT,w} \leq 44$ and $L'_{nT,50} \leq 48$[a]	$L'_{nT,w} \leq 48$	$L'_{nT,w} \leq 52$	$L'_{nT,w} \leq 56$	$L'_{nT,w} \leq 60$

[a] Experience has shown that when applying the low-frequency rating, potentially disturbing high frequency sounds are not rated appropriately, and for this reason, two descriptors are applied in order to account for both hard floor impact sounds as well as low frequency footstep sounds. The limit values for $L'_{nT,w}$ are 4 dB lower than those specified for $L'_{nT,50}$. For comparison between descriptors, see ISO 12354-2.

[b] Impact sound from small balconies and rooms (area less than 4 m^2) are not included, e.g. toilets and utility rooms.

[c] Premises with noisy activities are rooms for shared services like laundries, central boiler house, joint/commercial kitchens or commercial premises like shops, workshops or cafés. However, in each case, noise levels shall be estimated and the sound insulation designed accordingly, e.g. for party rooms, discotheques, etc.

ISO/TS 19488:2021
Classification acoustiques des logements

- Pour l'isolation acoustique aux bruits extérieurs :

	Type of space	Class A dB	Class B dB	Class C dB	Class D dB	Class E dB	Class F dB
1	Façades and roofs of habitable rooms in dwellings; in specific environment with sound sources characterized by L_{den}	$D_{nT,A,tr} \geq L_{den} - 20$	$D_{nT,A,tr} \geq L_{den} - 24$	$D_{nT,A,tr} \geq L_{den} - 28$	$D_{nT,A,tr} \geq L_{den} - 32$	$D_{nT,A,tr} \geq L_{den} - 36$	$D_{nT,A,tr} \geq L_{den} - 40$

[a] The sound insulation values are expressed as a weighted standardized sound level difference with a spectrum adaptation term for road traffic noise. For other types of sound source than road traffic noise, $D_{nT,A,tr}$ shall be determined from the relevant level and spectrum of the sources. $D_{nT,w} + C_{tr,50-3150}$ may be used where low frequency sound influences the indoor sound pressure level. e.g. where the sound comes from mechanical equipment placed outside the building.

[b] $D_{nT,A,tr} \geq 30$ dB applies as a minimum requirement to classes A–D.

ISO/TS 19488:2021
Classification acoustiques des logements

- Pour l'isolation acoustique aux bruits extérieurs :

	Type of space	Class A dB	Class B dB	Class C dB	Class D dB	Class E dB	Class F dB
1	Façades and roofs of habitable rooms in dwellings; in specific environment with sound sources characterized by L_{den}	$D_{nT,A,tr} \geq L_{den} - 20$	$D_{nT,A,tr} \geq L_{den} - 24$	$D_{nT,A,tr} \geq L_{den} - 28$	$D_{nT,A,tr} \geq L_{den} - 32$	$D_{nT,A,tr} \geq L_{den} - 36$	$D_{nT,A,tr} \geq L_{den} - 40$

[a] The sound insulation values are expressed as a weighted standardized sound level difference with a spectrum adaptation term for road traffic noise. For other types of sound source than road traffic noise, $D_{nT,A,tr}$ shall be determined from the relevant level and spectrum of the sources. $D_{nT,w} + C_{tr,50-3150}$ may be used where low frequency sound influences the indoor sound pressure level. e.g. where the sound comes from mechanical equipment placed outside the building.

[b] $D_{nT,A,tr} \geq 30$ dB applies as a minimum requirement to classes A–D.

ISO/TS 19488:2021
Classification acoustiques des logements

- Pour les niveaux de bruits d'équipements à l'intérieur des logements :

	Type of space and sources[ab]	Quantity	Class A dB	Class B dB	Class C dB	Class D dB	Class E dB	Class F dB
1	In habitable rooms in dwellings from outdoor and indoor service equipment producing continuous sound	$L_{A,eq,nT}$	≤22	≤26	≤30	≤34	≤38	≤42
2	In habitable rooms in dwellings from outdoor and indoor service equipment producing intermittent or irregular sound, from neighbouring spaces	$L_{AF,max,nT}$[c]	≤26	≤30	≤34	≤38	≤42	≤46

[a] Requirements relate to sounds that occur more than occasionally due to service equipment in neighbouring dwellings, equipment serving the whole building and service equipment within the dwelling for normal ventilation/heating/cooling.

[b] Sound with tonal components can be perceived more annoying and be subject to national regulations.

[c] $L_{AS,max,nT}$ may also be used, provided that 4 dB stricter limits (lower sound levels) are fulfilled, i.e. the same as $L_{Aeq,nT}$.

ISO/TS 19488:2021
Classification acoustiques des logements

- Et la durée de réverbération et/ou l'aire d'absorption équivalente :

	Type of space	Class A	Class B	Class C	Class D	Class E	Class F
1	In access areas (except common stairwells)[a]	$T \leq 0{,}6$ s	$T \leq 0{,}9$ s	$T \leq 1{,}2$ s	$T \leq 1{,}5$ s	$T \leq 1{,}8$ s	$T \leq 2{,}1$ s
2	In common stairwells[ab]	$T \leq 0{,}9$ s or $A \geq 0{,}45 \times S_{floor}$	$T \leq 1{,}2$ s or $A \geq 0{,}35 \times S_{floor}$	$T \leq 1{,}5$ s or $A \geq 0{,}25 \times S_{floor}$	$T \leq 1{,}8$ s or $A \geq 0{,}20 \times S_{floor}$	$T \leq 2{,}1$ s or $A \geq 0{,}15 \times S_{floor}$	$T \leq 2{,}4$ s or $A \geq 0{,}10 \times S_{floor}$

[a] The limits for reverberation time are maximum values, and the limits for equivalent sound absorption are minimum values, in both cases for each of the octave bands 500 Hz, 1000 Hz and 2000 Hz.

[b] For practical reasons, as an alternative to the requirement of a reverberation time in this type of spaces, a corresponding amount of equivalent sound absorption area according to EN 12354–6 has been added, using the equivalent absorption area $A \geq 0{,}16\ V/T$ and an approximately 0,3 s longer T-value, compared to the first row.

ISO/TS 19488:2021
Classification acoustiques des logements

- Enfin, comment classifier le logement ?

Acoustic characteristic	Class						
	A	B	C	D	E	F	NPD
Airborne sound insulation			X				
Impact sound pressure level				X			
Sound insulation against exterior noise			X				
Sound from building service equipment				X			
Reverberation time (or relative absorption area) in access areas, etc.				X			
The classification result for the entire building is Class D, which is the lowest class for individual acoustic characteristics.							

→ Classe D

Classe C ←

Acoustic characteristic	Class						
	A	B	C	D	E	F	NPD
Airborne sound insulation			X				
Impact sound pressure level			X				
Sound insulation against exterior noise		X					
Sound from building service equipment			X				
Reverberation time (or relative absorption area) in access areas etc.		X					
The classification result for the entire dwelling is Class C, which is the lowest class for individual acoustic characteristics.							

Réglementations européennes – Etude 2018

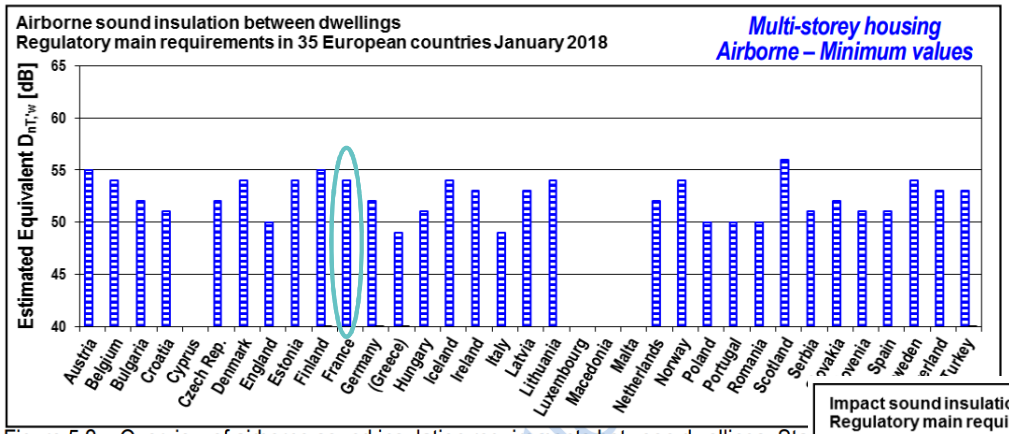

Figure 5.2 – Overview of airborne sound insulation requirements between dwellings. Sta
Graphical presentation of estimated equivalent values of $D_{nT,w}$.

Où se situe la France ??

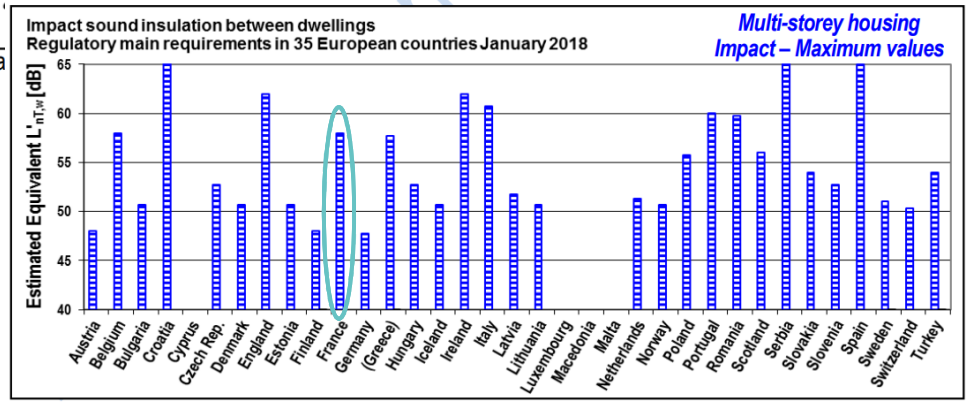

Figure 5.3 – Overview of impact sound insulation requirements between dwellings. Status January 2018.
Graphical presentation of estimated equivalent values of $L'_{nT,w}$.