

The Danish 20 dB(A) limit for low-frequency noise cannot be compared to normal noise limits because

- it is an indoor limit and not an outdoor limit like usual limits for environmental noise
- the limit applies to the limited frequency range of 10-160 Hz - only frequencies in that range are included - the level of the full frequency range may be higher

Without an acoustical background, it may be difficult to understand how much 20 dB 10-160 Hz noise is, but the limit is the same as for industrial noise in Denmark, and it is in the same order of magnitude as the limit in most other countries that have low-frequency limits (the limit may be defined in completely different ways). Most people will easily hear a noise at that level, and some will find it annoying, in particular if it goes on round the clock.

At low frequencies, the perceived intensity, the loudness, increases more steeply above threshold than at higher frequencies. This means that when the level is a few decibels above the 20 dB limit, the consequences are more severe, than if a limit for higher frequencies is exceeded by the same amount. I guess that few people would accept 25 dB in their home at night and hardly anyone would accept 30 dB. Therefore, measurements must be accurate.

In the new Danish statutory order for wind turbines, the noise is not measured but calculated. This need not be a problem, if the calculations are correct. But they are not.

I guess, the main problem is the sound insulation used to obtain indoor levels. The statutory order gives values to be used in the calculation, and these values are based on measurements in 26 Danish houses. Unfortunately, wrong measurements.

Sound at low frequencies varies a lot in a room, and according to the Danish rules for industrial noise, the level should - briefly explained - be measured, where the annoyed person finds it loudest. The sound insulation must be measured the same way in order to be applicable for calculations of indoor levels from the outdoor level. But it was not. The indoor measurement positions were simply chosen randomly and not selected for the high level. Thus the obtained values of sound insulation are too high - by several decibels.

Furthermore, statistical sound insulation values were chosen (from the wrong data) so that 33% of the houses have poorer sound insulation, meaning that the limit may be exceeded in 33% of the cases.

And, finally, the calculated values may exceed the limit by a 2 dB uncertainty value. Measured levels from industrial sources are not allowed to exceed the limit.

All these errors sum up to probably not far from 10 dB, which means that the limit is suddenly not 20 but rather 30 dB. But the rules are claimed to give the same protection as for industrial sources, which is simply not true.

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