Electrolux new headquarter – from an acoustic perspective

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Electrolux new headquarter – from an acoustic perspective

Abstract

Electrolux headquarter is extended with a new extraordinary wood building integrated to the old office building creating a warm and welcoming entrance to Electrolux. It is also connected to a new multi storey residential building comprising more than 100 flats, all off them with access to high level of service including a SPA and gym on the top floor of the new office building. The building is erected using glulam columns and beams wih a CLT slab and a raised floor system. Despite challenging details and light structural materials and in addition a very densed surrounding the acoustic performance showed to fulfill all expectations so far, both for the office building and the connected residential building.

1. Introduction

The project started more than ten years ago and in 2019 they the project team involved Acouwood for the acoustic design. We recently finished it, in May 2025. The most challenging parts have been the extremely high environmental requirements and in addition combined with high acoustic expectations and requirements, sound class B according to the previous Swedish standard for commercial premises [1]. For the office building the room acoustic requirements together with a SPA and Gym on the top floor were a challenge and for the residential building the outdoor noise and limited building height created some extra acoustic measures to optimize the floor construction.

Figure 1. Electrolux new HQ in Kungsholmen, left: from the front, right: from the back with the connected residential building, Brf Gourmet.

2. Building construction

2.1. Office

The office has a structure of Glulam columns and beams. On top of this grid CLT slab is mounted on which a raised floor is mounted. Below the CLT slab a ceiling is mounted on a small distance from the CLT slab to improve the room acoustics, however not sufficient to fulfill the final room acoustic requirements. The walls between rooms are mainly light stud walls and glass walls facing the open areas. The requirements were set to a goal to reach sound class B according to Swedish standard SS 25268:2017+T1 2017 [1]. That means:

- $D_{nT,w}/R'_{w}$ varies depending on room type.
- $L'_{nT,w} \leq$ 56-60 dB
- Reverberation time 0,4 – 0,6 s depending on room type.

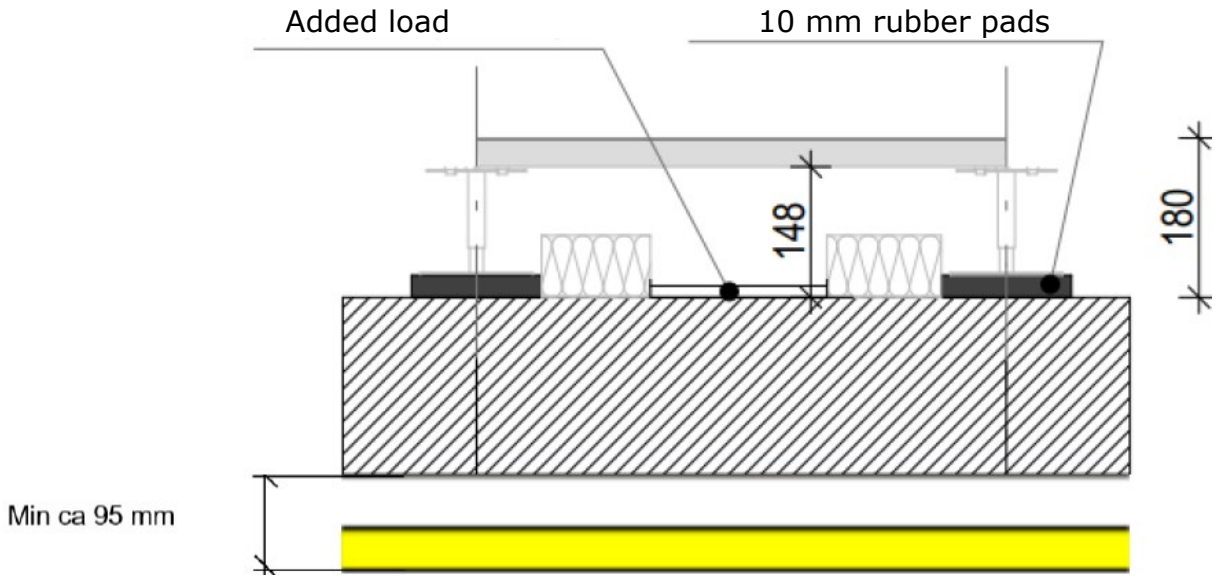

Figure 2. floor structure build up in Electrolux new HQ in Kungsholmen.

2.2. Dwellings BRF Gourmet

In BRF Gourmet a common solution for floor construction in Sweden was used. To reduce the thickness of the CLT slabs and minimize the number of assembly liftings, a continuous CLT slab stretching over several flats was decided to be the best solution. The floor, the partition wall and the basic junction solutions are shown in figure 3 below.

The requirements were set to a goal to reach sound class B according to Swedish standard SS 25267:2024 [2] for impact sound (or at least the building regulations with some margin) and minimum requirements for airborne sound insulation to avoid too much surface loss in the dwellings. That means:

- $D_{nT,w+}C_{50\text{-}3150} \geq$ 52 dB
- $L'_{nT,w}+C_{I,50\text{-}2500} \leq$ 52-54 dB (52 dB is sound class B and calculations ended up in 54 dB using ISO 12354 [3])

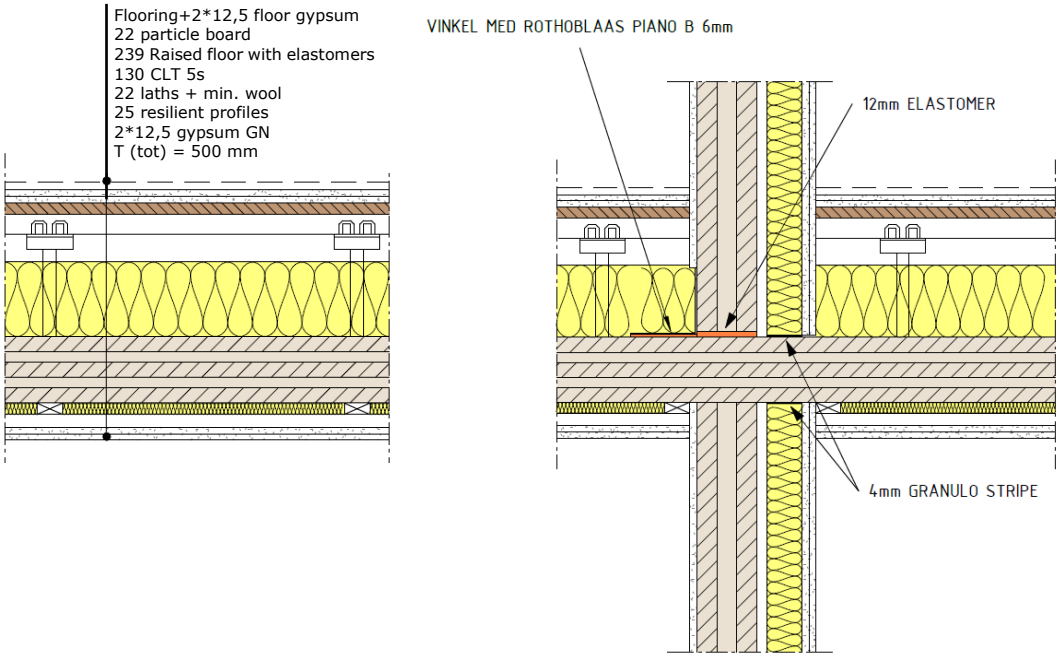

Figure 3. Floor structure, partition wall and junctions in BRF Gourmet.

3. Basic results

3.1. Office

Some basic results regarding impact sound are shown in table 1 below.

Table 1. impact sound levels in some spaces

Sending room	Receiving room	Direction	**Measured** $L'_{nT,w}$	Requirement $L'_{nT,w}$	Fulfil requirement
Meeting room 1	Meeting room 2	↓	56	60	Yes
Meeting room 3	Meeting room 4	↓	60	60	Yes
Gym overloaded elastomer	Chambre	↓	51	<52	Yes[1)]
Gym correct dim. elastomer	Chambre	↓	38	<52	
Open office	Open office	↓	53	56	Yes

1) Could be tricky with running band. Correct design is the key. LnT,w,50 =44 dB, LnT,w,25 = 45 dB.

3.2. Dwellings BRF Gourmet

Some basic results regarding impact sound and airborne sound are shown in figure 4 and figure 5 respectively, below.

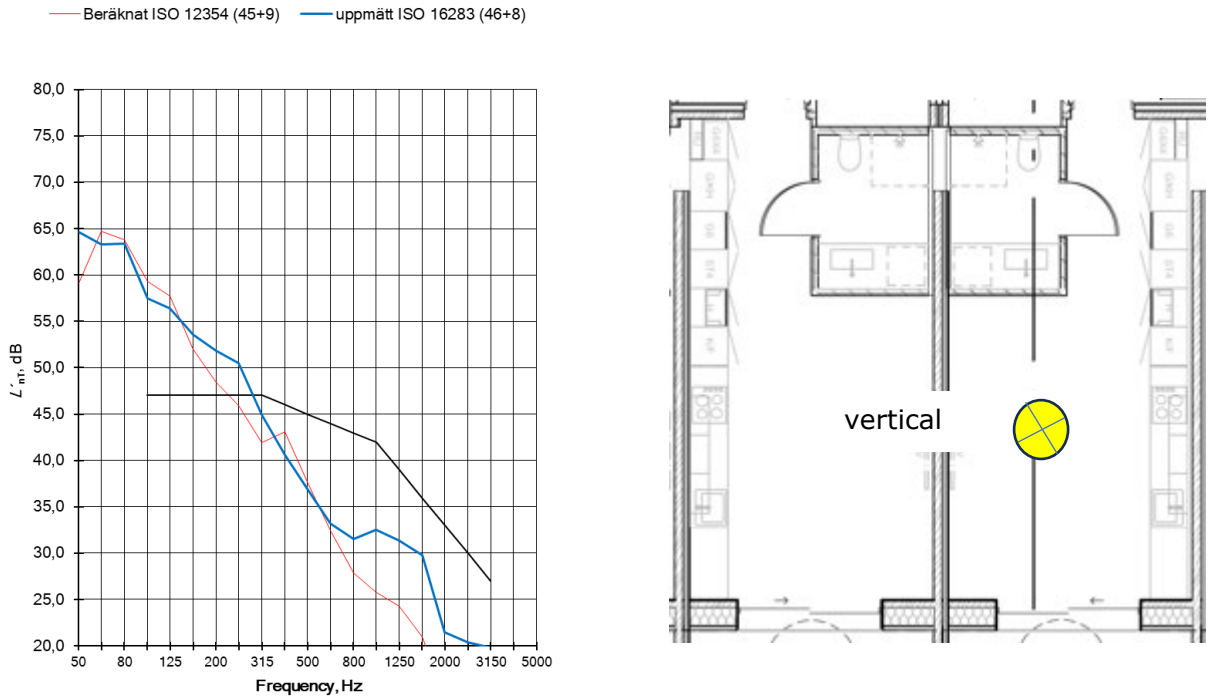

Figure 4. Calculated vs measured results in BRF Gourmet for impact sound.

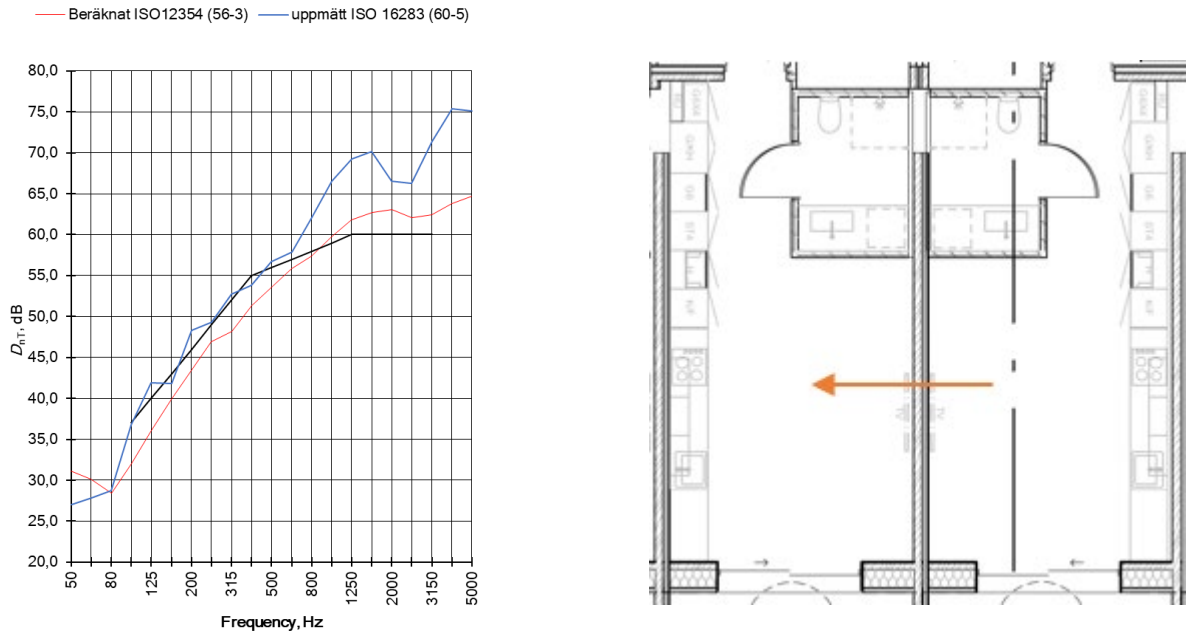

Figure 5. Calculated vs measured results in BRF Gourmet for airborne sound.

4. Summary

With modern acoustic design tools for sound insulation, predictions can be made accurately. Big general margins are not needed, instead optimize floor- and wall structures and their junctions to create buildings with economically competitive solutions. For that, knowledge regarding requirements and risk for annoyance are

necessary. By adapting the requirements (not generally only fulfilling sound class B), however still to always fulfill the building regulations, a good balance between impact sound and airborne sound can be created, avoiding dominating annoying sound sources. The standard requirements are not always fitted to expected annoyance in wood buildings.

References

[1] SS 25268:2007+T1 2017. *Byggakustik - Ljudklassning av utrymmen i byggnader - Vårdlokaler, undervisningslokaler, dag- och fritidshem, kontor och hotell.* Swedish Standards Institute 2017 Sweden, Stockholm.
[2] SS 25267:2024. *Byggakustik - Ljudklassning av utrymmen i byggnader - Bostäder.* Swedish Standards Institute 2024 Sweden, Stockholm.
[3] ISO 12354:2017, part 1 and 2. *Building acoustics — Estimation of acoustic performance of buildings from the performance of elements:*
Part 1: Airborne sound insulation between rooms
Part 2: Impact sound insulation between rooms
International Organization for Standardization, Switzerland, Geneva.