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HOTEL

6.2 – ASSESSMENT OF AIRBORNE SOUND INSULATION

DIPLOMA THESIS
DIPLOMOVÁ PRÁCE

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1. Calculation of the airborne sound insulation

1.1 General procedure for calculation of airborne sound insulation (based on manufacturer's data)

Construction airborne sound

$$R_w': R_w' = R_w - k \text{ [dB]},$$

where:

Rw … weighted laboratory sound insulation [dB] k …correction [dB]

Rw´ … weighted construction sound insulation [dB]

Rw,N … the standard value of the weighted building noise sound insulation [dB]

Design under consideration must therefore meet the standard requirement:

$$R_w' \geq R_{w,N} \text{ [dB]}$$

Note:

Standard requirements:

Requirements for soundproofing between rooms:

Inner wall: Rw,N = 47 dB

Inner wall (office): Rw,N = 37 dB

Requirements for sound insulation properties of peripheral walls and their parts:

Daily time: Rw, N = 30 dB

Night time: Rw, N = 30 dB

Filling holes (windows, doors): Rw, N = 27 Db

Calculation of airborne sound insulation (based on manufacturer's data)

Internal load-bearing wall:

Rw´ = 54 – 3 = 51 dB ≥ Rw,N = 47 Db → **Satisfactory**

≥ Rw,N = 37 Db → **Satisfactory**

Internal partition:

Rw´ = 45 – 3 = 42 dB ≥ Rw,N = 37 Db → **Satisfactory**

Peripheral wall (lime-sand bricks + thermal insulation):

Rw´ = 54 – 3 = 51 dB ≥ Rw,N = 30 Db → **Satisfactory**

1.2 Calculation of the measured building sound insulation Rw´ of the ceiling

	Material	d (m)	Density (kg/m3)	m´(kg/m2)
m´2	Laminate flooring	0,01	30	0,3
	PE foam layer	0,05	20	1
	Grouting concrete	0,07	2500	175
	Step insulation	0,04	18	0,72
	Grouting concrete	0,06	2500	150
				327.02
m´1	HELUZ ceilings	0,19	1550	294.5

1.2 .1.Airborne qualities

Rw´= (37,5 log*(m´1/1kg/m2)) - 42
R´w = 52.29 dB

Fo = 160*(s´*(1/m´1)+(1/m´2))^½
Fo = 32.04 Hz ≤ 70 Hz

ΔRw = 35 - (Rw1/2)
ΔRw = 8.86 dB

R´w = Rw1+(ΔRw -k)
R´w = 58.15 dB ≥ 52 dB

m´= d*density	Rw1= 52.29 dB
m´1= 327.02 kg/m2	k1= 3
m´2= 294.5 kg/m2	s´=12 MN/m3 (Isover)

1.2 .2.Sharp sound insulation

Ln,w,eq = 164- 35*log(m´1/1kg/m2)

Ln,w,eq = 75.99

Fo= 160*(s´/m´2))^½
Fo = 32.30 Hz ≤ 70 Hz

ΔLw = 33 dB from the standard according to s´

L´nw = Ln,w,eq – ΔLw + k
L´nw = 44.99 dB $\leq$ 58 dB

m´= d*density	Ln,w,eq = 75.99 dB
m´1= 327.02 kg/m2	k1= 2
m´2= 294.5 kg/m2	s´=12 MN/m3 (Isover)

2. Conclusion

All calculations satisfy the given requirements.