Absorb, Block Control of Acoustics

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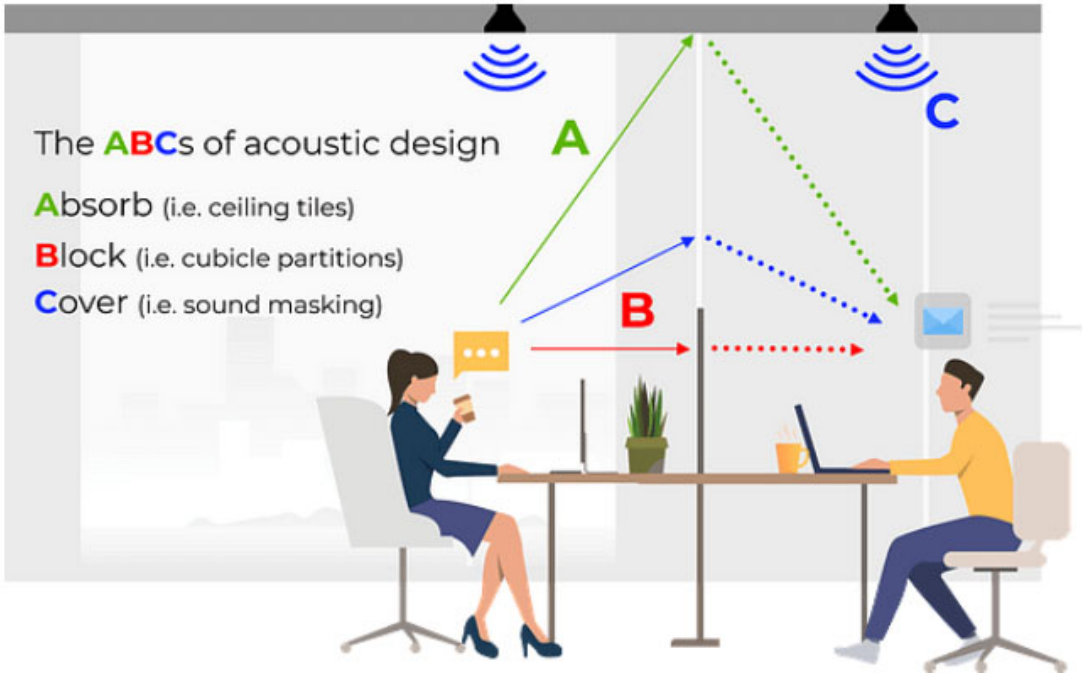
Alfa Acoustics
Silence through Science

An ISO 9001:2015 Company

ABC of Acoustics -

- **Absorb**: Minimize noise by absorbing it with the use of porous materials such as suspended ceiling clouds, acoustic lights, soft carpet, acoustical wall panels and fabric and draperies.
- **Block**: Manage noise via sound avoidance through smart space planning. Essentially blocking sound in select locations and/or separating noise-generation activities from more focused.
- **Cover or Control :** Mask noise with sound and increase sound privacy through sound-generation equipment (eg. sound masking).



Acoustics – Importance :

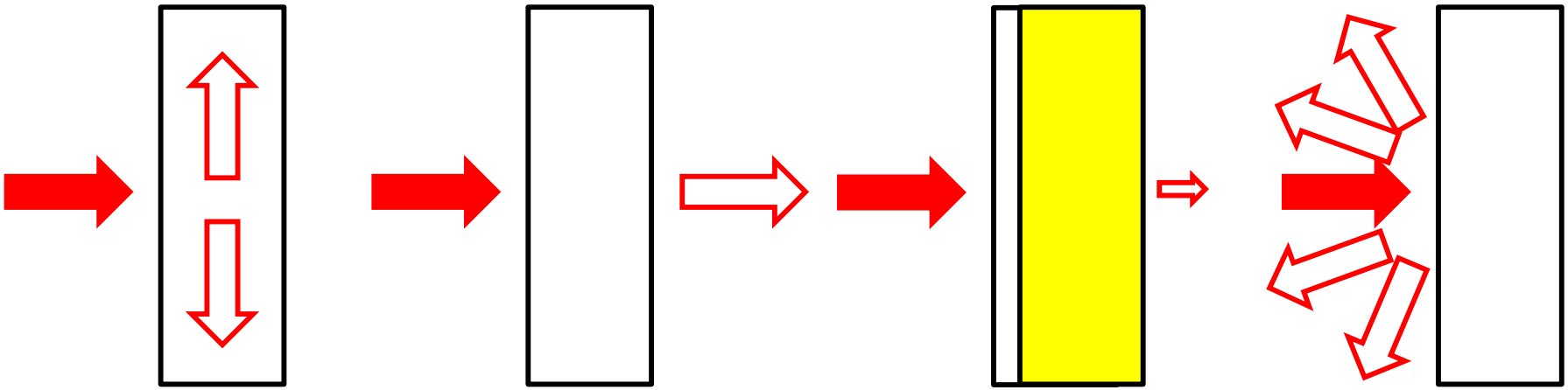
- Two conflicting Acoustic Market requirements
  - *Sound Comfort -Wanted Sound*
  - *Sound (Noise) Reduction – Unwanted Sound*

Sound Comfort

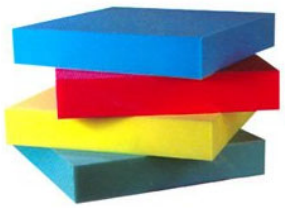
Noise Reduction

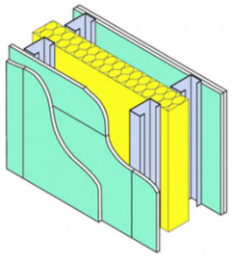
Acoustic Treatments:

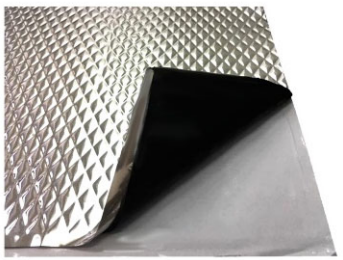
- Sound Absorption – Acoustic materials
- Sound Transmission (Insulation) – Barrier materials
- Sound (Vibration) damping – Rubber layers e.g. melt sheets, EVA
- Sound Diffraction – Diffusers

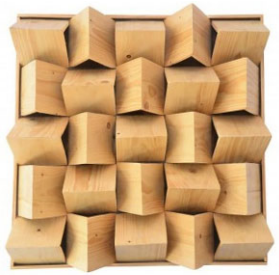


Absorption *Transmission* *Damping* *Diffraction*



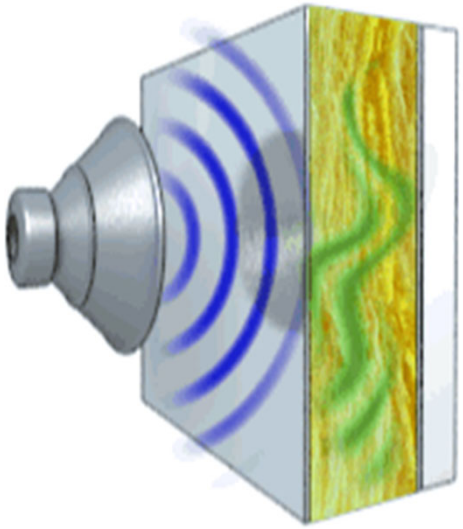




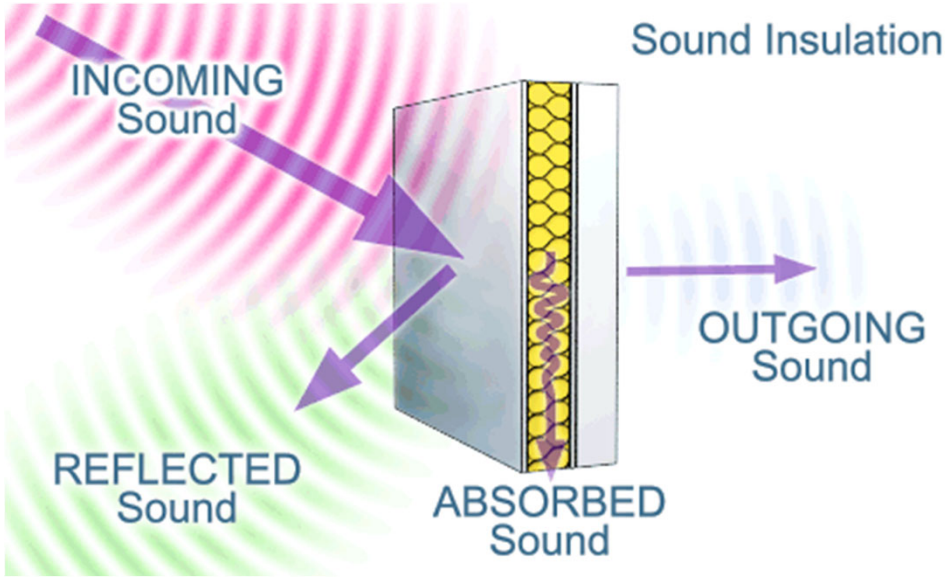


Acoustic Performance Criteria : Market Terms

- Sound Absorption Coefficient (NRC, SAA)
- Sound Transmission Loss (STC, Rw)



Sound Absorption

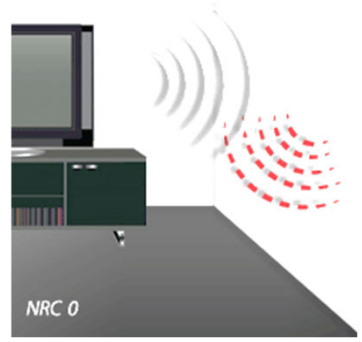


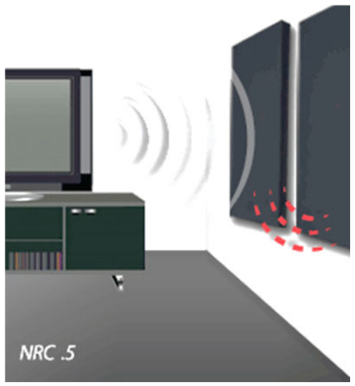
Sound Transmission Loss

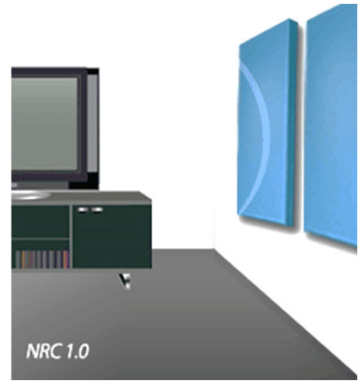
Noise Reduction Coefficient (NRC) :

- It is scalar representation of noise absorbed by any material.
- The range is 0 to 1, ‘0’ means complete reflection and ‘1’ means complete absorption.
- This is a dimensionless quantity.

$$NRC = \frac{250 + 500 + 1000 + 2000}{4} \; [-]$$





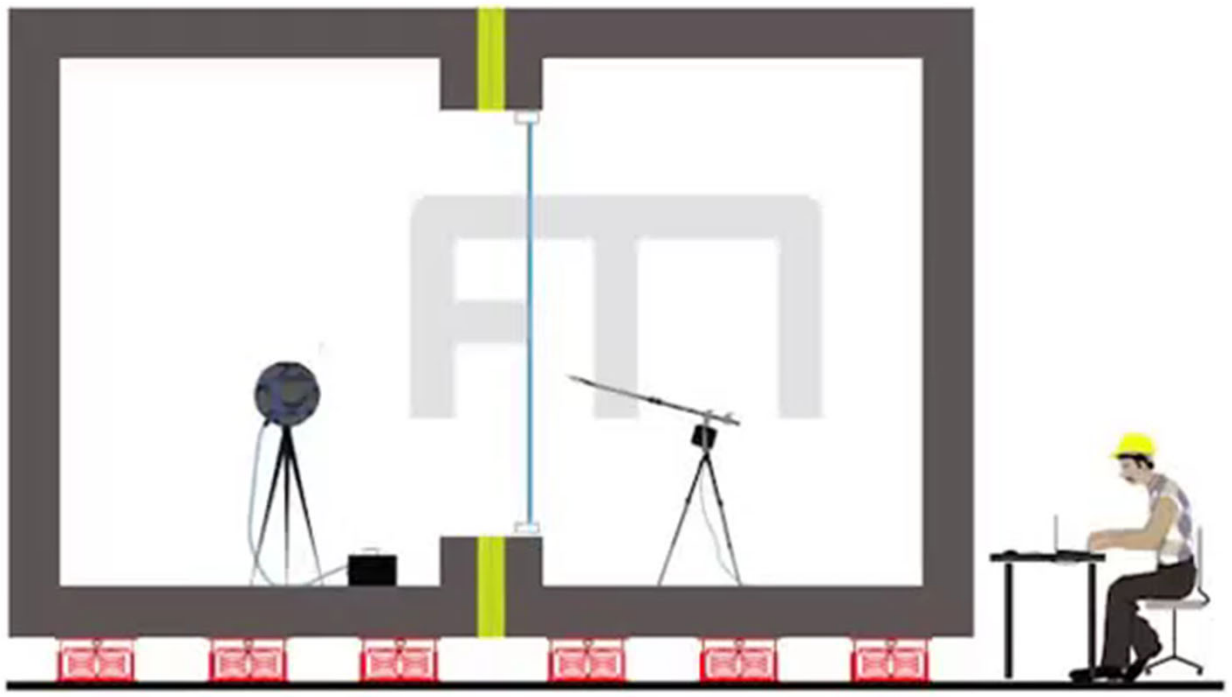


Sound Absorption Average (SAA):

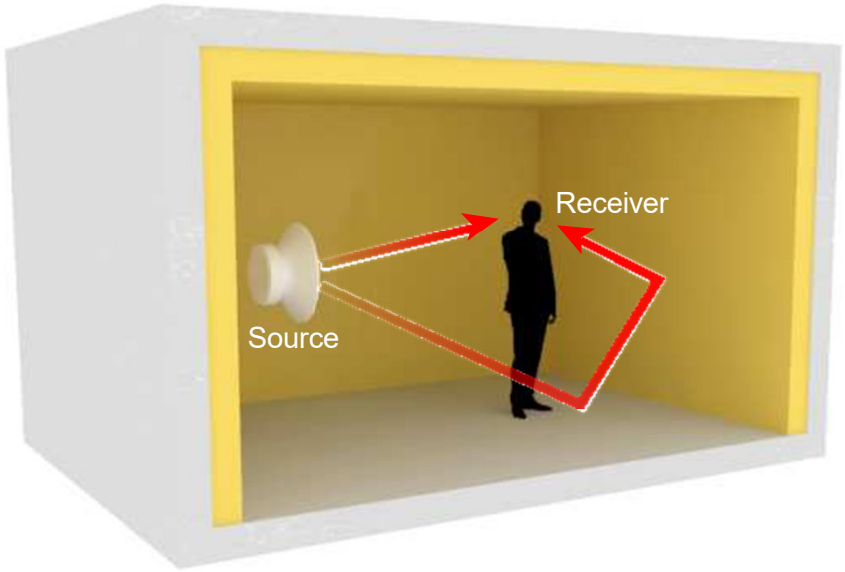
- It is single number rating calculated from sound absorption coefficients of a material for frequency range of 200 Hz – 2500 Hz .
- The range is 0 to 1, ‘0’ means complete reflection and ‘1’ means complete absorption.
- This is a dimensionless quantity.
- Higher is better

Sound Transmission Class (STC) :

- It is again a single number rating calculated in accordance with Classification E413 using values of sound transmission loss.
- It provides an estimate of the performance of a partition/materials in a certain common sound insulation problems
- This is a dimensionless quantity.
- Higher is better

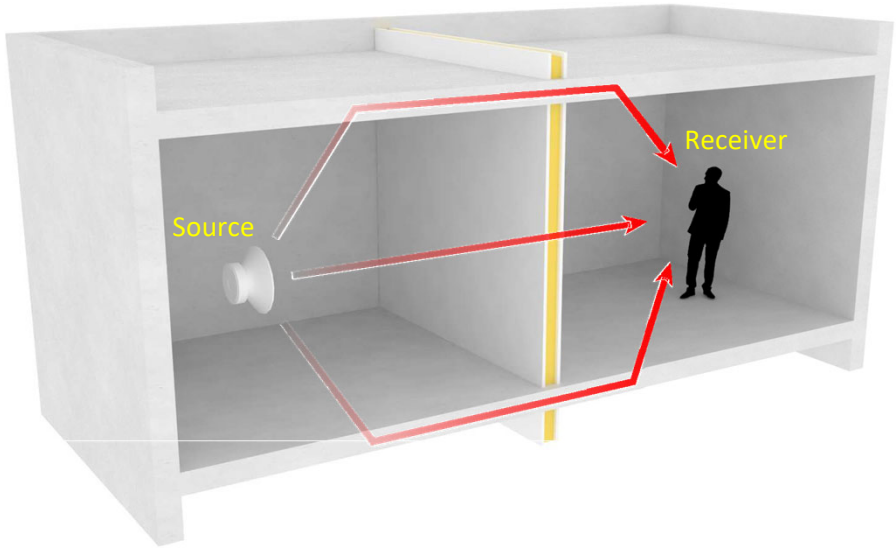


Sound Absorption and Insulation : Difference



Acoustical Absorption

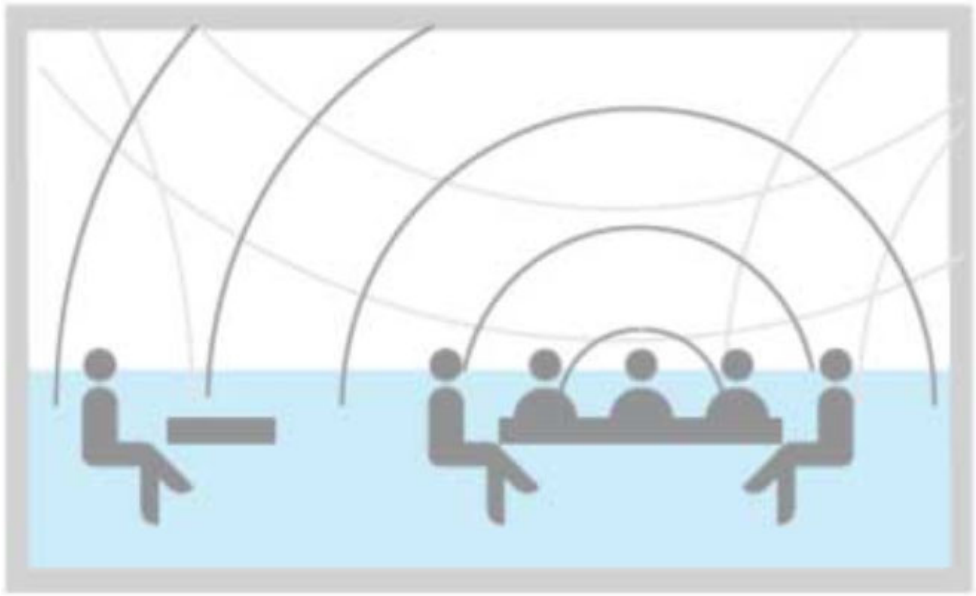
Source(s) and receiver(s) are in the same room



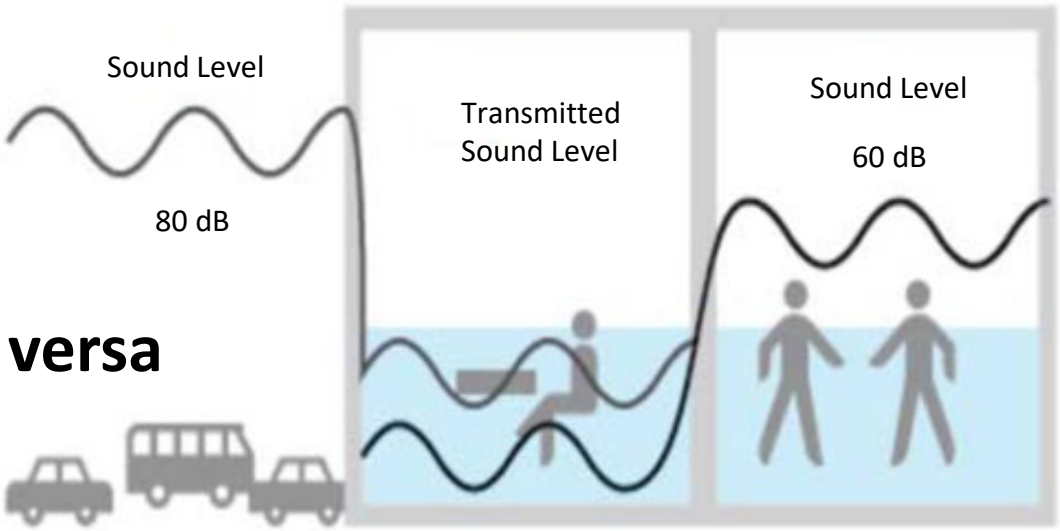
<u>Acoustical insulation</u>

Source(s) and receiver(s) are separated

Echo, Reverberation and Insulation – Material Selection :



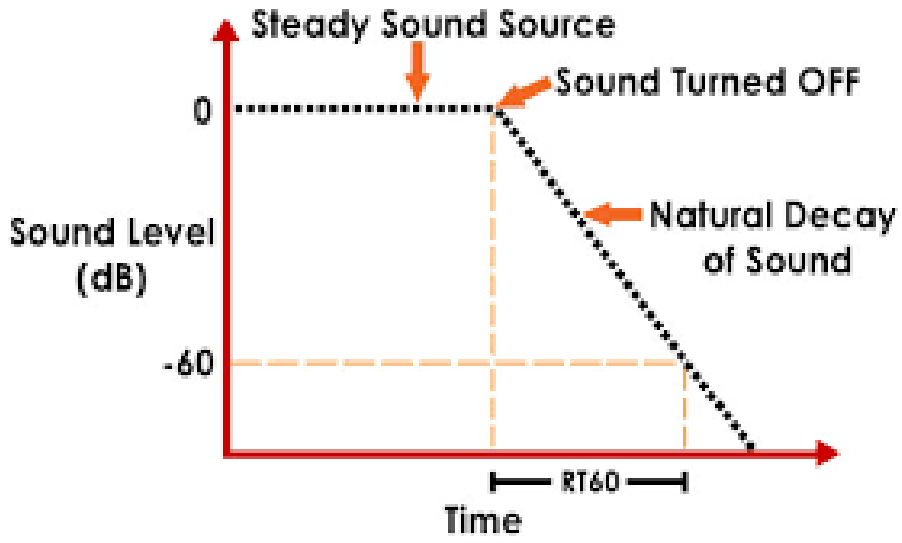
Echo or Reverberation
Only in Interior
Add – Sound Absorption



Noise Problem
Exterior to Interior or vice a versa
Add – Sound Insulation

Reverberation Time -

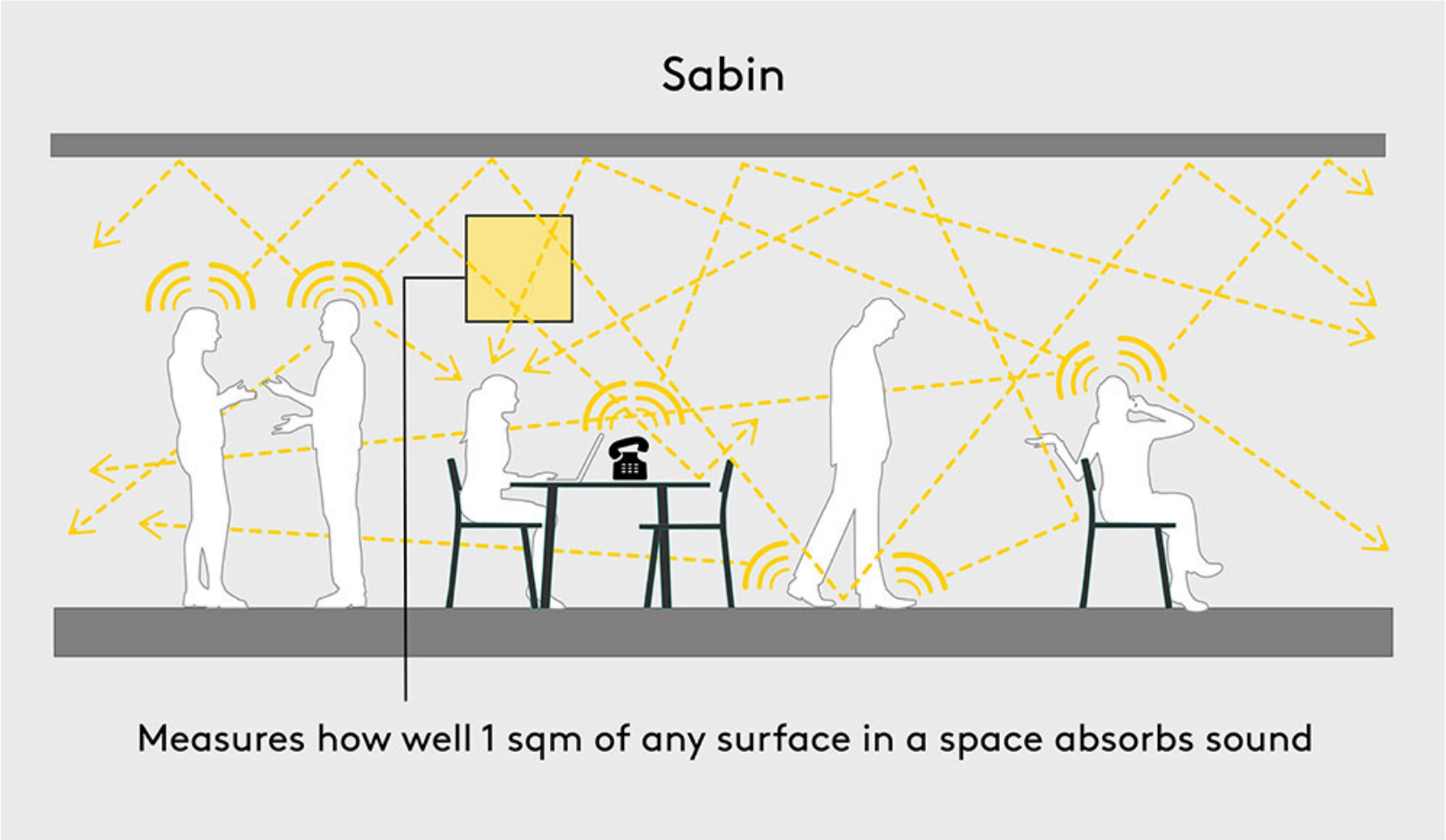
- Reverberation time is the time required for the sound to “fade away” or decay in a closed space.
- RT_{60} - The reverberation time is the time the sound pressure level takes to decrease by 60 dB, after a sound source is abruptly switched off



1. *ISO 3382-1:2009 Acoustics – Measurement of room acoustic parameters Part 1: Performance spaces*
2. *ISO 3382-2:2008 Acoustics – Measurement of room acoustic parameters – Part 2: Reverberation time in ordinary rooms*

Sabins-

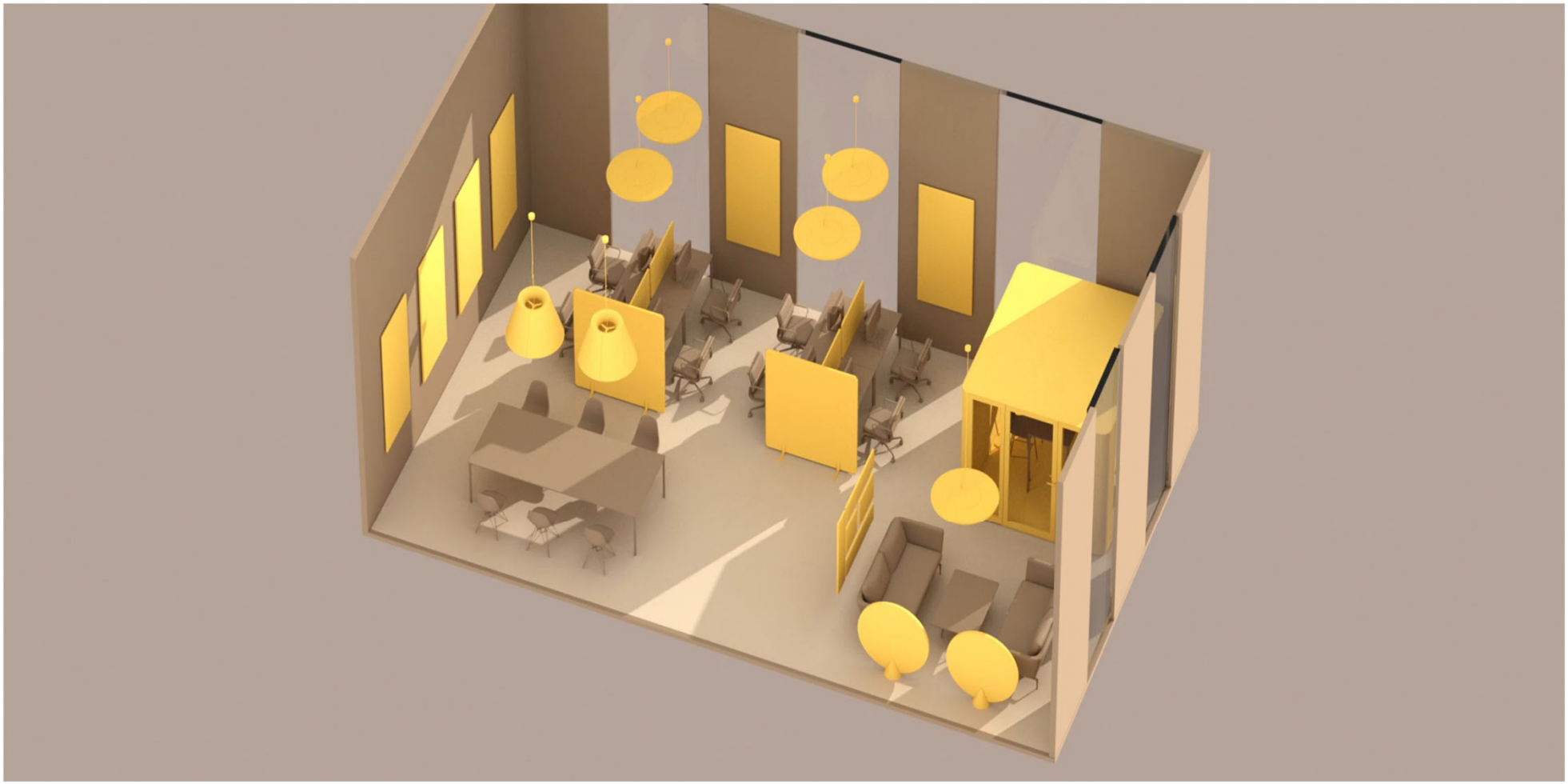
- **Sabin** measures how well one square meter of any surface in a room is able to absorb sound reflections.
- When the NRC of a material is multiplied by the area of the material, the result is Sabins of absorption.



Effect of Reverberation Time -

Effect of STC –

Effect of Acoustic Lights in Open Spaces -



Thank you for being with us. 

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