Introduction

In rooms, which are primarily geared around noise reduction measures or where good audibility over long distances is desired, the DIN standard 18041 defines various planning characteristics.

With the room acoustics calculator it is easy to calculate reverberation times and execute room-acoustic plans for different kinds of room usage according to DIN 18041 (audibility in small to medium-sized rooms).

To start, information on the room itself and the furniture is needed. The tolerance range inside which the reverberation times should lie can be calculated from the room volume and the intended use. After each change in the input boxes, all calculated results are updated automatically.

We wish you the best of luck with your room acoustics project!
Should you have any additional questions on a specific project, you are welcome to contact us directly.

(acoustic@rehau.com)

Outline

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3. Room details
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7. Product information
8. Absorption level of product
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ROOM ACOUSTICS CALCULATOR
OPERATING MANUAL

   Usage: Office

2. Room shape: Rectangular
   Length: 12.0 m
   Width: 8.6 m
   Height: 3.0 m
   Volume: 100.0 m³

3. Bare ceiling: 98.0 m² massive construction
   Bare floor: 98.0 m² floating composite floor
   Floor covering: 98.0 m² parquet, laminate
   Walls: 100.0 m² massive construction
   Windows: 20.0 m² no curtains or blinds
   Equipment: 10 workspaces (office)
   Doors: -

4. Absorbers 1: 60.0 m² RAUVOLET acoustic-line 12 mm
   Absorbers 2: 24.0 m² Acoustical ceiling tile, 818 R, 200 mm d. of susp.
   Absorbers 3: 6.6 m² -
   Absorbers 4: 6.6 m² -

5. Selection: Absorbers 1
   Type: Doors for furniture
   Model: RAUVOLET acoustic-line 12 mm

6. Material: Polypropylene (RAU-PP 1482)
   Dimensions: maximum width 1600 mm, maximum height 1956 mm
   Mounting: Office cabinet filled with folders
   Fire protection: Non-flammability, class III to DIN 18056-1

7. Notes: The RAUVOLET acoustic-line tambour door profile represents an intelligent cabinet solution for the interior design and improves the room’s acoustics in particular in the immediate vicinity.
1. Usage

<table>
<thead>
<tr>
<th>Standard:</th>
<th>DIN 18041 (May 2004)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usage:</td>
<td>Office</td>
</tr>
</tbody>
</table>

Selection of standard and room usage.

2. Room definition

Select your room shape here.

<table>
<thead>
<tr>
<th>Room shape:</th>
<th>rectangular</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length:</td>
<td>12.0 m</td>
</tr>
<tr>
<td>Width:</td>
<td>8.0 m</td>
</tr>
<tr>
<td>Height:</td>
<td>3.0 m</td>
</tr>
<tr>
<td>Volume:</td>
<td>288.0 m³</td>
</tr>
</tbody>
</table>

On selecting the room shapes "rectangular" or "L-shaped", the room volume will be calculated automatically.
If you have selected "any shape", you will need to calculate the volume yourself.
3. Room details

You can enter the details of your room here.

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
<th>m²</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bare ceiling</td>
<td>96.0</td>
<td>m²</td>
<td>massive construction</td>
</tr>
<tr>
<td>Bare floor</td>
<td>96.0</td>
<td>m²</td>
<td>float, compos. floor</td>
</tr>
<tr>
<td>Floor covering</td>
<td>96.0</td>
<td>m²</td>
<td>parquet, laminate</td>
</tr>
<tr>
<td>Wall</td>
<td>100.0</td>
<td>m²</td>
<td>massive construction</td>
</tr>
<tr>
<td>Window</td>
<td>20.0</td>
<td>m²</td>
<td>no curtains or blinds</td>
</tr>
</tbody>
</table>

In doing so, the bare ceiling and the bare floor are automatically calculated using the previously entered details in "2. Room definitions".

4. Equipment for

In the Equipment section, select the number of persons who are usually in the room.

<table>
<thead>
<tr>
<th>Equipment for</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>workspaces (office)</td>
<td>10</td>
</tr>
<tr>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>-</td>
<td>0</td>
</tr>
</tbody>
</table>
5. Absorber area
In the "Absorber area" box, you can enter any square meter amount of absorbers:

<table>
<thead>
<tr>
<th>Absorbers</th>
<th>Area (m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absorbers 1</td>
<td>50.0</td>
</tr>
<tr>
<td>Absorbers 2</td>
<td>24.0</td>
</tr>
<tr>
<td>Absorbers 3</td>
<td>0.0</td>
</tr>
<tr>
<td>Absorbers 4</td>
<td>0.0</td>
</tr>
</tbody>
</table>

RAUVOLET acoustic-line 12 mm
Ac. heating a. cooling ceil. 8/18 R, 200 mm d. of susp.

The actual selection of the absorbers can be assigned and chosen in "6. Absorber details".

You can judge how many square meters you need with the help of the diagram.

Good room acoustics conditions are met when the orange or blue line in the speech-relevant frequency range (250 Hz - 2000 Hz) are above the dark-grey tolerance threshold.

When planning an office, the targets:
- Noise reduction (orange line)
- Average absorption coefficient (blue and red line)
will be in the foreground, which is based on DIN standard 18041.

Each of these has its own tolerance threshold.
This threshold needs to be met in one of these target variables, upon which the DIN standard is also accordingly fulfilled.
(Example: Level reduction is above the tolerance threshold and the average absorption level is under the tolerance threshold)

However, if a classroom or somewhere similar is selected, it will automatically switch to the reverberation time graphic.
6. Absorber details
You can select the possible absorbers in detail here. Four different absorbers can be installed in one room.

"Doors for furniture", the acoustically effective tambour door profile:
- RAUVOLET acoustic-line 8mm
- RAUVOLET acoustic-line 12mm

In the "Suspended ceilings" section, you can choose from the following acoustically effective heating and cooling ceilings:
- Acoustic heating and cooling ceiling 6/18 R, h 200mm
- Acoustic heating and cooling ceiling 6/18 R, h 200mm, 300mm mineral fibre layer
- Acoustic heating and cooling ceiling 8/18 R, h 200mm
- Acoustic heating and cooling ceiling 8/18 R, h 200mm, 300mm mineral fibre layer
- Acoustic heating and cooling ceiling 8/18 Q, h 200mm
- Acoustic heating and cooling ceiling 8/18 Q, h 200mm, 300mm mineral fibre layer

7. Product information
You can find the general product information in this section.

8. Absorption level of product
This diagram shows you how much sound is absorbed (that is, "swallowed").
When $\alpha_p=1$, the entire sound is absorbed, that is, there is no more reflection.
9. Illustration of reverberation time and level reduction / average absorption level

The diagram shows the level reduction (orange line), that is, by how many decibels (dB) the volume drops as a result of the acoustic measures applied.

This diagram indicates how the average absorption level changes depending on a number of conditions: with absorber, with furniture or persons (blue line) or without absorber, without furniture or persons (red line).

10. Result

- **DIN 18041 recommendations are not met!**  
  Prerequisites for acoustic comfort **not** in place - Noise creates stress*

- **DIN 18041 recommendations are nearly met!**  
  Prerequisites for acoustic comfort have **room for improvement***

- **DIN 18041 recommendations are met!**  
  Prerequisites for acoustic comfort are **met***

*The reverberation time, level reduction and average absorption level of the room are not the only characteristics when evaluating room acoustics.

11. PDF document

When you click on this button, a PDF document shall be generated which summarises all of the most important details like room size, absorber type and all of the diagrams.

In the window which opens, you can enter your project name, the person in charge and any comments.

You can have the PDF document display directly in front of you or have it sent to your email address.
### Abbreviation table

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\alpha_p$</td>
<td>Practical absorption level of the sound (basis: octave values)</td>
</tr>
</tbody>
</table>
| $\bar{\alpha}$ | **Average absorption level**  
Calculation:  
\[
\text{Sum of full surface area (m²) in the room} / \text{Room surface (m²)}
\]  |
| $\alpha_m$   | This is the same value as $\alpha$, but this value is only used with the "Ö-Norm" (Austrian standard) |
| $\Delta L$   | Level reduction after using absorbers, shows the difference/change in a room when using absorbers |
| **Tolerance size** | One of the charted tolerance sizes must be met. |

Should you have any additional questions, please contact REHAU directly. 
[akustik@rehau.com](mailto:akustik@rehau.com)
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The room acoustics calculator determines the reverberation time depending on the frequency, level reduction and average absorption level of the room based on the data entered using Sabine's formula and states tolerance ranges depending on usage. The user can then select REHAU products from the database of the room acoustics calculator in order to assess their effect on the room acoustics. The calculations are based on the following standards: DIN 18041 (May 2004), ÖNORM B 8115-3 (November 2005). (Alternatively, Arrêté du 25 avril 2003 (établissements d'enseignement et de santé) and Building Bulletin 93).

The reverberation time is only one of the indicators for assessing room acoustics and it is recommended that a qualified acoustics technician be consulted in order to ensure that the planning of the room acoustics meet the respective requirements.

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Contact: Email: info@rehau.com

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The result offered by the acoustic calculator is a calculation based on your input using a standard method.
The person entering the data is solely responsible for the accuracy of the data entered, in particular, for the physical data of the room and the usage profile.
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