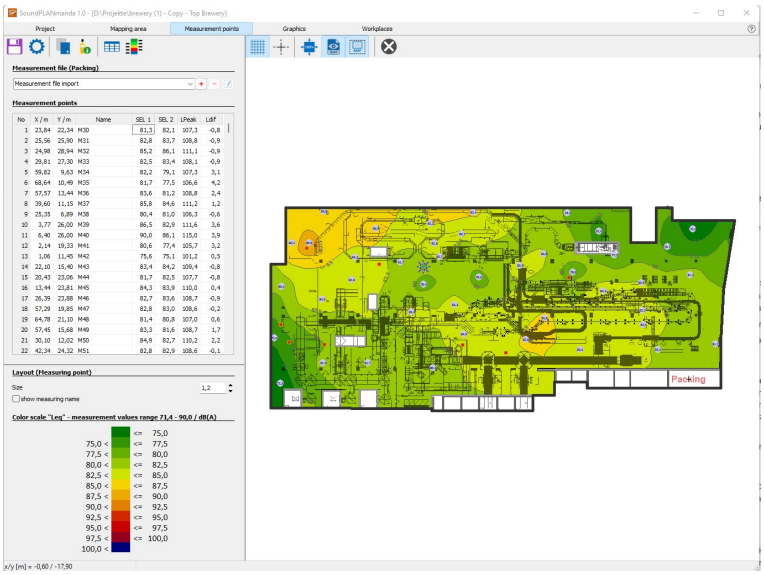
SoundPLANmanda **1.0**

Manual



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SoundPLANmanda 1.0 - 2023

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SoundPLANmanda – map and analyze

SoundPLANmanda was developed for mapping and analyzing noise exposure and other environmental hazards in the workplace.

Based on measurements, SoundPLANmanda creates color-coded isoline maps that show the distribution within the mapping area. The measured values can either be entered manually or imported quite conveniently.

In the noise exposure assessment area, workplaces are defined and the length of stay of the employees is evaluated for a risk assessment. If necessary, measures are suggested, such as the use of hearing protection.

SoundPLANmanda is designed to be easy to understand and intuitive to use. With the help of the clear program structure, you will find your way around quickly. Nevertheless, you will receive detailed instructions on the following pages, which will guide you step by step through the program.

Installation

SoundPLANmanda is protected with a HASP Key and a customized installation file (BABM*.007). To install, plug the HASP Key into a USB port on your computer and double-click the installation file. You will be guided by the installation program. During the installation you will be asked to select your license file. Enter the file path of your license file here.

At the end of the installation you will be asked which program language you want to set. Also select the language for the help and manual here.

Installing software updates

For SoundPLANmanda, program updates are regularly available online. You can find the corresponding button in the **project** section. If the installed version is older than the current version, a check mark is automatically set for **download**. Select **download** at the bottom and then, when the file has been down-

loaded, select **install**. SoundPLANmanda closes for the installation and opens again afterwards.

Check every now and then if a new update is available to be always up to date.

Data structure in SoundPLANmanda

Each project you create is saved in its own project folder. This way you always have all the files that belong to a project in one place.

In addition, a template directory is created on your computer, the so-called **GlobData directory**. The GlobData contains all the templates and settings that you define by default for your projects and that are set as default for every new project. The GlobData directory is located under **Documents - > SoundPLANmanda 1.0 -> GlobData.**

Support and information

 The online support is available for reference at any time. On the **project** tab, the help button is located at the top next to the settings. On each additional tab, the help is available to you via a small button at the top right of the screen.

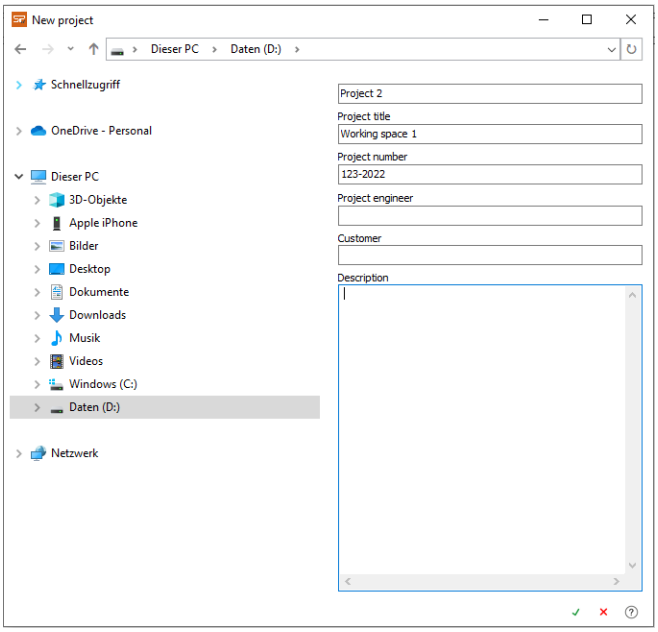
 The currently used version number, the update status and company information are displayed. With a left click on the window the display disappears again.

 On the SoundPLAN homepage, you will find information on software and guidelines as well as on our company.

Create or open projects

When you open SoundPLANmanda for the first time, you can ether load a demo project or create a new project right away. When you open SoundPLANmanda again, the last project used is always displayed. At the beginning you are always in the **project** tab.

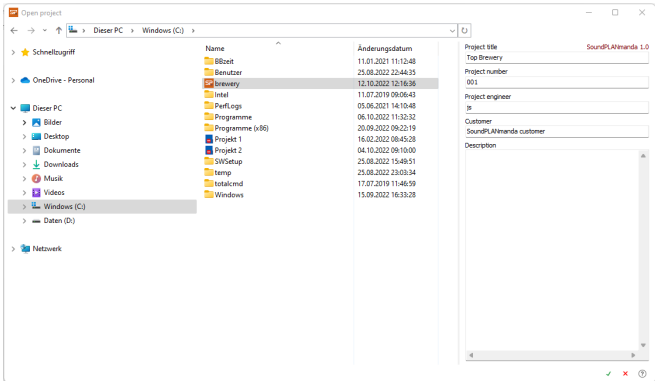
To create a new project, click the **new project** icon with the left mouse button.



You can then enter the file name, the project title and other optional project properties, such as a project number, the processor, the client and a description. Then click on the green **check mark**. A new project is initialized. The project information can also be added or changed later in the **project** tab.

Open an existing project

Existing projects can be reopened by clicking the **open project** icon. In the **open** dialog, select the file path where your project folder is located.



All project folders have an orange SoundPLANmanda icon and can thus be easily distinguished from the yellow Windows folders. The project information is displayed in the info field on the right. Double-click on the folder or select it and click on the green check mark to open the project.

For quick access to the most recently opened projects, click the arrow to the right of the **open project** icon.

Copy, rename, delete and zip projects

The **open project** icon allows you to access your entire project folders and rename, move, copy, zip or delete folders as needed. To do this, right-click on the folder in question and select the desired action. Once you have copied a project folder, you can paste it elsewhere.

Save projects as

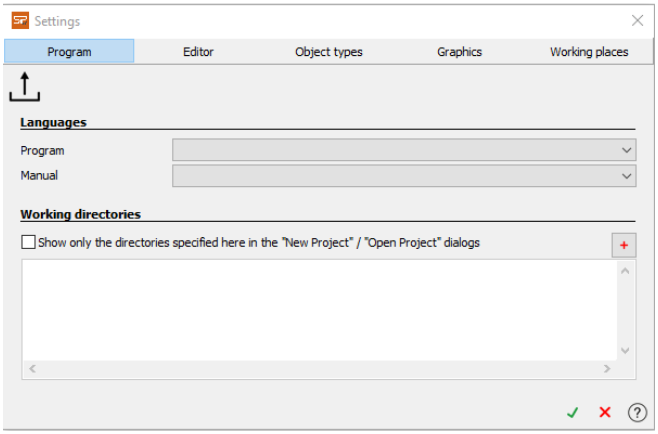
 A project can be saved with a different name. A copy of the opened project will then be created.

Project settings

You can use the **cogwheel** icon to make various settings. For some parameters, this can be useful at the beginning, for example for the **program**, for the **editor** and for the **workplaces**. All settings can also be adjusted later. Especially the settings for the object types and the graphics are of minor importance at the beginning of the processing and usually become relevant when all inputs and calculations have already been made and the graphical output of the results is about to start.

The different project settings can each be copied to the **GlobData-directory** and are then available for all new projects.

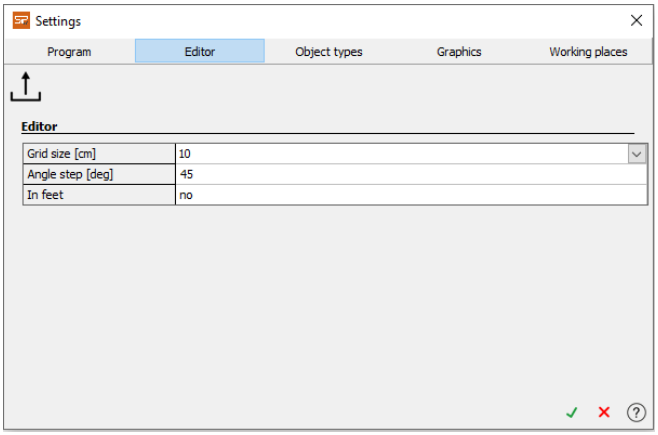
Settings - Program



In the **program** tab, the program language and the language of the manual can be set. Select your preferred language from the pull-down menu. Afterwards a restart of the program is necessary.

To get a more comfortable access to your projects, you can preset the project path for existing or new projects. To do this, first check the box and then click on the red **plus** icon. A new window will open where you can select the desired path. It is possible to store several paths.

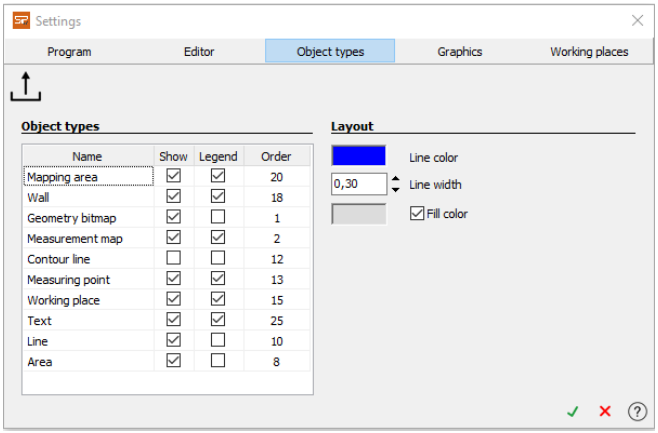
Settings - Editor



In the **editor** tab you can make various settings for a more comfortable graphical input. Firstly, you can preset a **grid size** (the permissible range is between 1 and 100 cm). When entering graphical elements, e.g. the outline of the mapping area, the grid is taken into account. In addition, you can define the **angle step** for the graphical input. For example, if you already know that you have only 45 ° angles as well as multiples of them, you can set 45 ° as the angle step and get cleaner results during graphical input.

An input in **feet** is also possible, for this purpose you can change over via the pull-down menu.

Settings - Object types

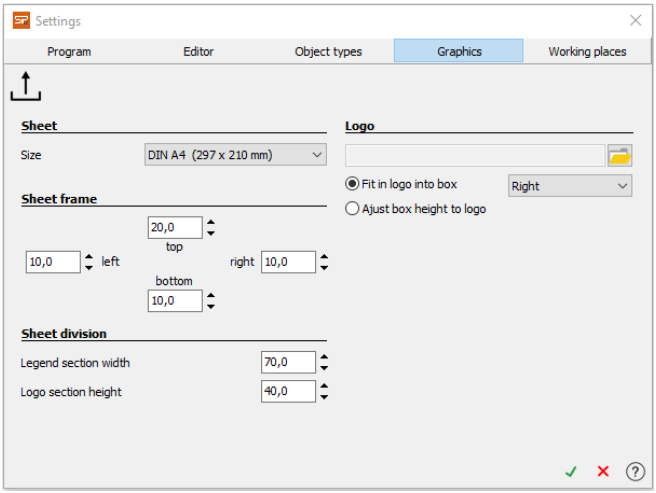


The graphical representation of the different objects (mapping area, wall, line...) is defined in the settings of the object types. All object types are listed by default. By setting the check marks you can determine whether an object type should be displayed or not. In addition, you can set for each object type whether it should be listed in the legend of the graphical output.

The **Order** determines which object types are drawn first and which are drawn second. If one object is obscured by another, you can fix this by increasing the order of the obscured object type.

On the right side in the input window you can define the layout for each object type. Here you can define e.g. the colors for the display as well as define the line width and fill. The line width can be changed either by manual input, by the up and down arrows or with the scroll wheel of the mouse.

Settings - Graphics



You can make various sheet settings for the graphical output of your isoline map. In addition to the sheet size and sheet division, you can determine the frame width and add a logo if required.

Sheet size

Four different formats are available and can be selected via a pull-down menu. In addition to the formats DIN A4 and DIN A3, there are the North American formats Letter and Ledger.

Sheet division

For the legend box and the logo, the height and width can be changed.

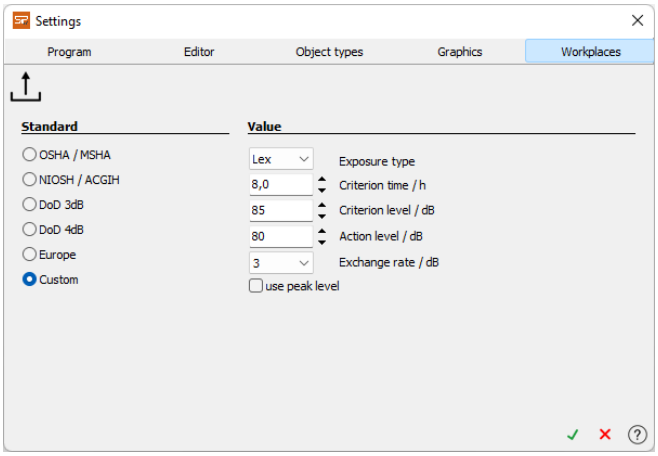
Sheet frame

For each side (top, bottom, left, right) the frame width can be set. Either enter the desired width directly or change the preset width with the up and down arrows.

Logo

Click on the folder icon and select your desired logo. Then decide whether the logo should be fitted into the existing box or the box should assume the size of the logo. Use the pull-down menu to specify whether the logo should be placed on the right, left or in the center.

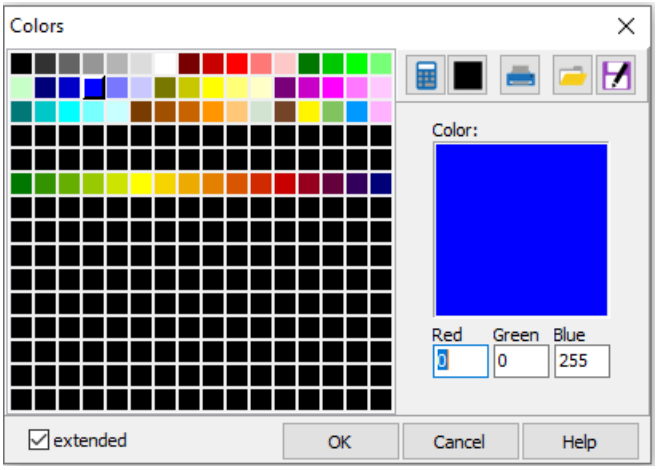
Settings - Workplaces



For the evaluation of the noise exposure, you can either choose between different guidelines, or alternatively define your own defaults (**custom** setting). The corresponding parameters are displayed in each case. If you also want to consider peak levels in addition to the time-weighted average levels, you have to check the corresponding box and set limit values.

Colors

If you click on a color field in the layout, the color dialog opens. Various colors are already preset here. These are the **color favorites**. They are available to you with one click. However, you can define or edit these favorites yourself.



How to define colors

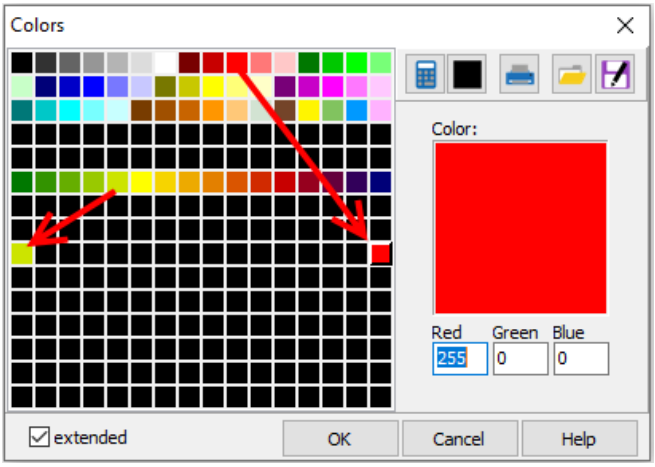
By setting the check mark **extended** the window enlarges and you have the possibility to enter your own colors. To do this, enter the RGB values (red-green-blue components each between 0 and 255) of your desired color and assign it to the object by clicking **ok**. If you want to save a color with the color favorites, drag it while keeping the left mouse button pressed to a free field on the left side. You can also click on existing colors and change it to your liking. It is also possible to adjust using the scroll wheel of the mouse. If you click on the large color field on the right and then turn the scroll wheel of your mouse, the RGB values of the color change proportionally. On the other hand, if you click only in one color value (red, green or blue), you can change it separately with the scroll wheel.

Colored cells in the favorites can be copied to other cells by holding down the left mouse button.

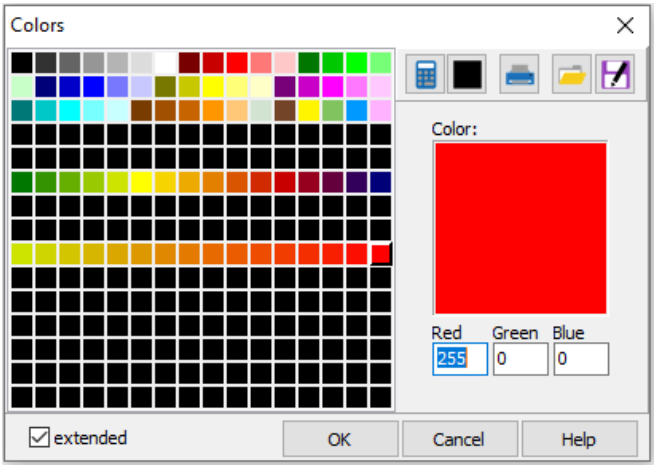
 Likewise, it is possible to change colored cells to black by first clicking on the respective color field and then on the black icon.

Interpolate color values

 Color gradients can be created with the help of the calculator. Define two color fields, e.g. by dragging existing colors into one line.



Then click on the right of the two (the red one in the picture) and then on the calculator. The black fields between the two colors are interpolated. The interpolation is also possible over several lines. If you want to use the color black in the interpolation, take a very dark gray (RGB = 5,5,5), because black itself is not evaluated.



Print, open and save color favorites

 You can print out your color favorites. The color favorites are displayed in an overview both graphically and with the associated RGB value.

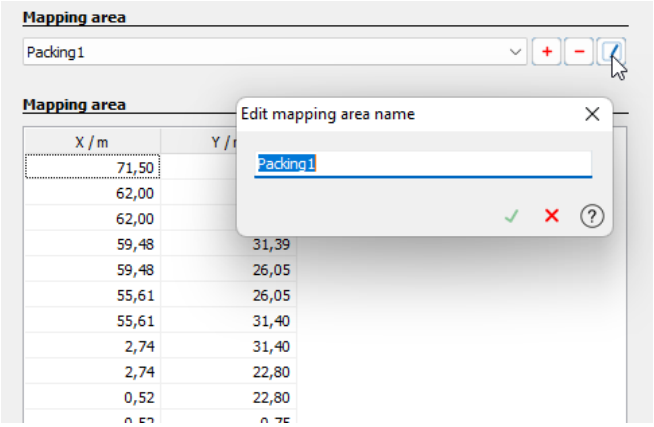
 Saved color favorites can be opened from any directory and are then available in the project.

 Color favorites can be saved in the GlobData directory and are then used by default for each new project. However, any other directory can also be selected when saving.

Mapping area

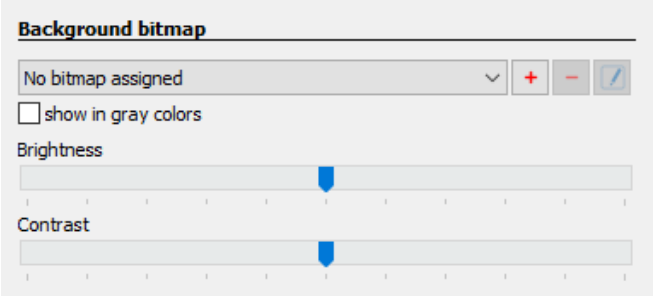
In the **mapping area** tab, you define the area in which the calculations are to be performed. This can be an entire hall, a single room or even an area outdoors. There are two different options available to you for this: Either you draw your mapping area "free" or you use a background graphic, e.g. a floor plan, which you draw off. Both input types are explained below.

You can freely choose the name of your mapping area and change it at any time. Confirm the entry with the green check mark or cancel the entry with the red cross.



How to use background bitmaps

In most cases it is of advantage to use floor plans or other graphics of the mapping area. For example, walls and workplaces can be entered accurately and easily. In one project you can manage several bitmaps and select them via the pull-down menu. Via the red **plus** you load new bitmaps into the project, via the red **minus** you can delete bitmaps from the project.



If you want to display your bitmap in grayscale, set the corresponding check mark. Additionally you can adjust the brightness and contrast of your bitmap.

There are different display modes for bitmaps:

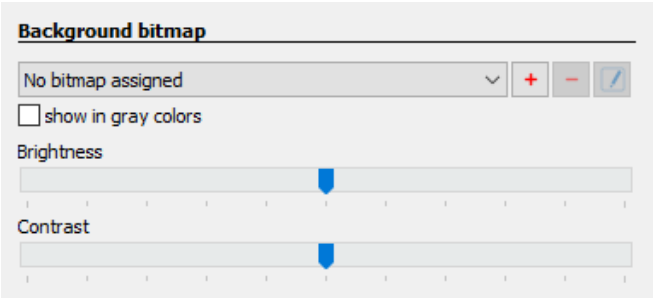
 Show bitmap /Hide bitmap

 Show bitmap completely or only within the mapping area (clip bitmap).

How to import a background bitmap

The following describes how to import a digital plan of your mapping area (e.g. floor plan of a factory building) and use it as background graphic. If no plans are available to you, simply digitize the mapping area freely. The procedure for creating the mapping area without background graphics is described here.

First, you will see a red rectangle in the center of your display, which represents the input area. In the background bitmap area (on the left), click on the red **plus**.

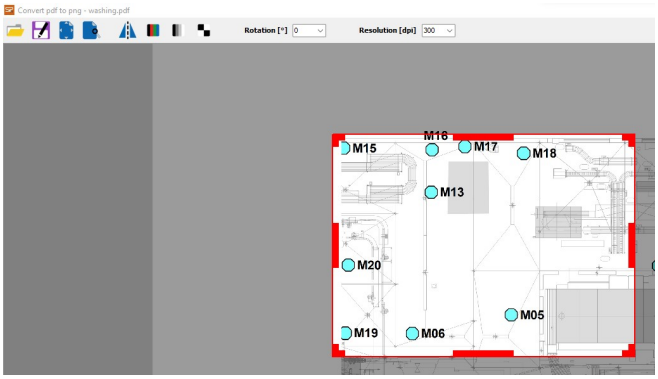


 Alternatively, if there is no background bitmap yet, you can click the bitmap icon at the top to open the windows directory.

Then select the directory where your background graphic is located. Acceptable formats are Windows Bitmap (*.bmp), JPeg (*.jpg), PNG format (*.png), TIFF (*.tif, *.tiff), and PDF (*.pdf).

PDF-converter

If a graphic in PDF format is used, it is first converted into a bitmap. A PDF converter opens automatically.



If you want to use only a **section** of your graphic, draw a frame around the desired area. The areas outside the frame will be grayed out. The section can be changed at the red bars and the corners. By keeping the left mouse button pressed, the entire frame can be moved. The section is reset if you press **Esc** or click outside the frame in the bitmap.

For using several sections of a graphic, select **Save as** to keep the original file and save several sections temporarily.

The graphic can be edited within the PDF converter, e.g. **mirrored, color adjusted or rotated**. During conversion, the bitmap is initially drawn in 24-bit, since it is unknown how many colors actually occur in the PDF. Therefore, you can con-

vert the bitmap to **256 colors, grayscale or black and white** accordingly to avoid taking up memory unnecessarily.

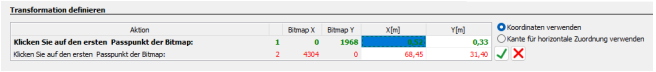
You can change the **resolution** as well as the **rotation** angle according to the preset values, or enter your own values. The status bar at the bottom shows the resulting bitmap size for each setting. Exit the converter with the green check mark at the bottom right and assign a file name. With the red cross you leave the converter without saving.

The selected graphic is now displayed in your editing interface.

By turning the scroll wheel you can zoom, by keeping the scroll wheel pressed you can move the graphic.

Georeferencing bitmaps

Bitmaps must be georeferenced. You can reference your bitmap either by a horizontal line (**edge length**) or by **coordinates**. If you just have a mapping area and want to add a bitmap, also look here for more information.



In the editing area you will see a red and a green reference point. Use the two points to reference the bitmap. First, set the **green** reference point to a known location in your bitmap and enter the corresponding x and y coordinates in the table. These can be local coordinates (e.g. 0.00/0.00) or world coordinates (e.g. from the UTM coordinate system). Then click in a **red** x or y cell in the table to activate the red point. Also place the red point at a position in the bitmap where you know the coordinates and enter the corresponding x and y values in the table.

For an input via coordinates, both points can be set freely. For an input via a horizontal line (edge length) only the first point is set free, for the second point the edge length is entered as x-coordinate, while the y-coordinate is taken from the first point.

As soon as you confirm with the green check mark, the editing interface is initialized and you can enter your mapping area.

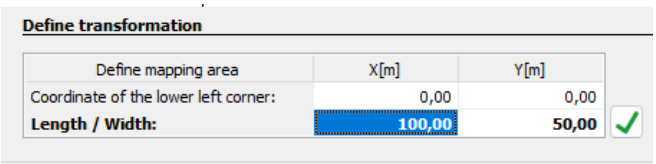
Add bitmaps afterwards

If you have already entered a mapping area and would like to add a background bitmap, first proceed as described above. During georeferencing, the background graphic is now brought into line with the existing mapping area. Two windows are used for this purpose. One window shows your mapping area, the other the background graphic. In each of the two windows, there are two reference points that should correspond in position. Place the red reference point from the left window at the corresponding position of the red point in the right window and proceed with the two green points accordingly.

Creating a mapping area without a background bitmap

When you are in the **Mapping area** tab, you will first see a red rectangle symbolizing the input field. This is the area where you will later digitize your mapping area. This can be a simple rectangle or a more angled room geometry. First, however, you should define a coordinate system.

How to define coordinates



First define the x and y coordinates of the lower left corner of your mapping area. If you do not want to work in world coordinates, you can simply keep the default 0.00 m /0.00 m. Then enter the length and the width of your mapping area (imprecise is sufficient in most cases). As soon as you confirm with the green check mark, the editing surface is initialized and you can then draw the mapping surface.

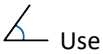
For rectangular areas, you can also enter the exact coordinates, then hold down the **ctrl** key and click the green check mark. A mapping area with the entered coordinates will then be created directly.

How to enter the mapping area

Once the coordinates are defined, you can enter the mapping surface. To enter the mapping area, the object type must be active.

 It is activated or deactivated by left-clicking on the icon. This applies equally to all other icons.

There are several tools available for entering the mapping area, which can be optionally used:

 Use fixed angle increment: The angle mode only allows you to enter specific angle increments or multiples of them. You can define which angle steps you want to allow in the settings. For example, if you enter 45 ° as the default, you can set the next point relative to the previous line only at angles of 45 °, 90 °, 135 °, and so on. If there is no preceding line yet, the angle refers to the x-axis. The fixed angle increment is only used if the angle mode is active (highlighted in light blue, activated by left-clicking on the icon).

 Snap to grid: When the grid is activated, the entered point is always set to the nearest grid point. Above a certain size, the grid points are displayed. You define the grid size in the **settings**.

The two modes **fixed angle increment** and **snap to grid** are mutually exclusive. If one of these two modes is active, it can be cancelled for the next point by pressing the **ctrl** key, i.e. you can freely set a point, or snap a point or edge. For line and area inputs, the distance to the previous point in the X and Y direction is displayed in the status line (dx/dy), additionally the distance (length) and the angle.

 The crosshairs can be activated and deactivate by clicking on the icon. It also supports the drawing input.

 Finish entering your mapping area either by clicking on the **complete** icon, or by double-clicking on the last coordinate while drawing. An area will then be automatically completed and the first point will be snapped.

You can press **esc** to abort the entry and restart. Alternatively, you can finish drawing the mapping area and move individual coordinates later.

If you want to insert additional points after you have finished the mapping area, you can do this afterwards. Click with the left mouse button on the corresponding position of your mapping area, then a small **plus** appears and you can (also by left click) enter a new coordinate point.

It is also possible to move coordinate points. When you move the cursor over a coordinate point, an **arrow** icon appears next to the mouse pointer. By keeping the left mouse button pressed, you can move the corresponding point.

You can **zoom** your graphic by turning the scroll wheel.

After scrolling, the mapping area can be easily **fitted** back into the screen.

Move coordinate origin


After creating the mapping area, you can redefine the origin of your used coordinate system by first activating the button by clicking and then clicking in the mapping area on the position where the new origin (x=0, y=0) should be located. The remaining coordinates will adjust accordingly.

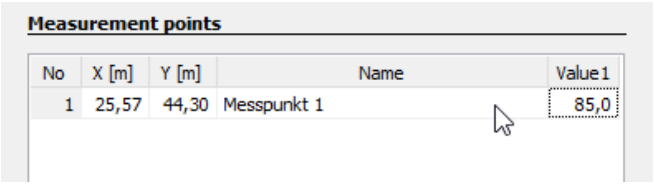
Measurement points

Enter measurement points

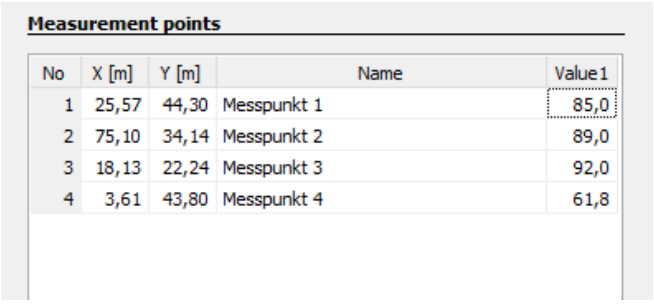
SoundPLANmanda uses existing measurement results to calculate areal isoline maps. You can enter your measurement results in the **measurement points** tab. There are two possibilities: **Manual input** of measurement points or **import of measurement results**. The more measurement points are available, the more accurate the level distribution will be. If only a few measurement points are entered, the result will be coarser and more suitable for an initial assessment. The required number of measurement points depends on the room geometry and size.

Manual input of measuring points

In the mapping area, click on the location where you have the first measured value. You can use the familiar tools **grid** and **crosshairs**. A line with the corresponding coordinates is then entered in the **measuring point table** on the left. Add the name of the measuring point and the measured value here.



Proceed in the same way for each additional point.

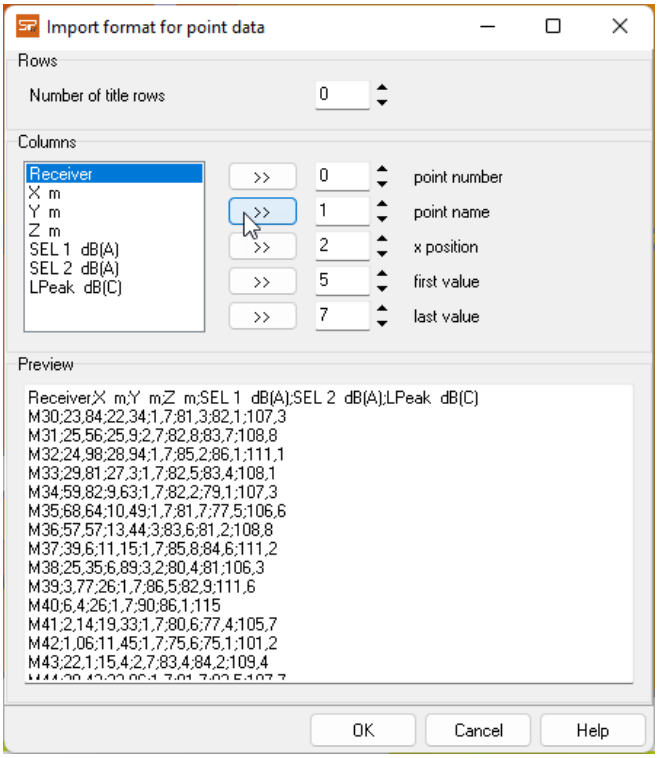


As soon as the **enter** key is pressed, the level values are interpolated and displayed graphically as an area isoline map.

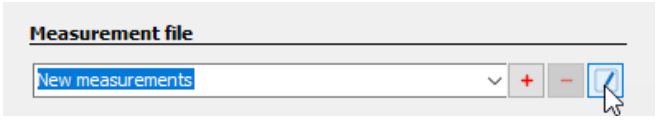
 Selected measuring points can be deleted. The selection is made either by clicking on the measuring point in the mapping area or on the respective row in the measured value table.

Import of measurement results

 Existing measurement results can be imported in SoundPLANmanda. The **ASCII format** is supported. In the explorer, select the file to be imported and then assign the columns from the table to the properties in SoundPLANmanda. First enter the number of header rows contained in your measurement file. Then assign the individual columns from the measurement file (left) to the properties (right) using the respective **double arrow**. If, as in our example, no measuring point number is available, a number will be assigned automatically. It is not always necessary to assign all columns. For example, it is not necessary to assign the y-coordinate, because it is automatically assumed that the column after the x-coordinate contains the y-coordinate. In the same way, only the first and the last measured value need to be assigned.



Name, add and delete measurement



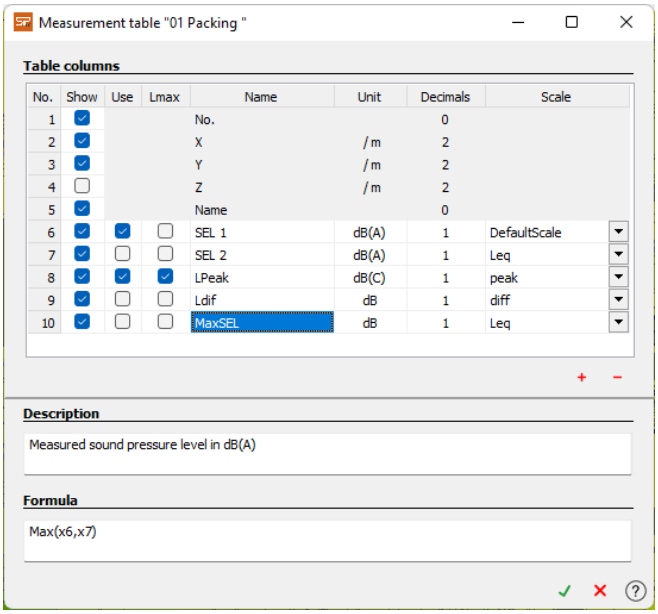
If you want to store several measurement files in one project, it may be useful to give the different measurement files a suitable name. To do this, click on the **blue pencil** and enter the desired name. With the **red plus** you can add further measurement file. With the **red minus** you delete individual measurement files. In case you want to use only one measurement, you can skip this point.

Working with the measurement table

The measurement table can be **edited** as well as **extended**. The columns can be shown and hidden via the checkmarks in the **Show** column. In the **Use** column, you decide whether a value is to be used for the risk assessment (in the **Workplaces** tab). In the **Lmax** column, you specify whether the measured value is a peak level. Because the peak level is considered differently in the assessment than the time-weighted average level, this setting is mandatory for a correct evaluation when using the peak level.

If required, you can extend the measurement table with further value columns. Click on the **red plus** to create another column. You can also remove the columns you have added yourself by clicking on the **red minus**. All other columns cannot be deleted, only hidden.

For each column of measured values, you can define its own name, a unit, the number of decimal places and an associated color scale.



Formulas in the measurement table

In the example above, another column is created that maintains a value that is 3 dB above the measured value 1. This is realized via a formula. Measured value 1 is in column 6, therefore the formula is

x6+3

If you want to display the difference of two level columns, you can also realize this via a formula (e.g. **x6-x7**)Special formula symbols are e.g.:

++ adds the entries energetically (level sum).

-- forms an energetic difference (level difference).

Max(columns) evaluates the entries from the specified columns and takes the higher value in each case. e.g. **Max(x6,x7)** determines the highest value of columns 6 and 7.

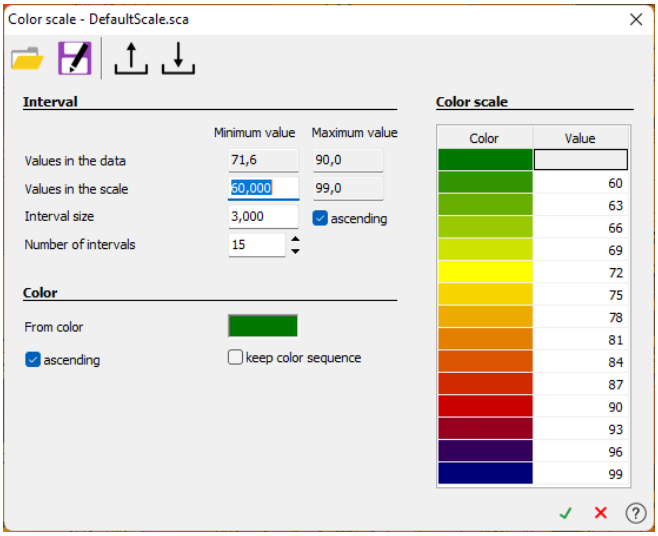
Min(Columns) evaluates the entries from the specified columns and takes the lower value in each case. e.g. **Min(x6,x7)** determines the lowest value of columns 6 and 7.

Measuring point layout

On the left below the measurement value table you can change the size of the measurement points in the mapping area and additionally select via a check mark whether the measurement point name should be displayed.

Edit color scale

 The color scale is initially automatically adapted to your measurement results. However, you can change both the display range and the color scheme if required.



The value range of your measurement is displayed with a gray background. It only changes when your measured values change.

Below this, the value range of the scale is displayed. You can adjust the lower value as required. The upper scale value results from the interval size and the number of intervals.

At the bottom of the same window you can adjust the color gradient in the scale. If you click on the color field, the color dialog with the color favorites opens. Further information about the color favorites can you find here. Click on a color field in the color favorites and then select **ascending**. The colors will be taken from the favorites accordingly. Alternatively, you can also click on the individual color fields in your scale and assign colors manually.

You can open and use existing color scale from the project directory.

You can create and save any number of color scales.

If you want to have a color scale available in future projects as well, you can store it in the GlobData.

If you have already saved a color scale in the GlobData you can load it.

Graphics

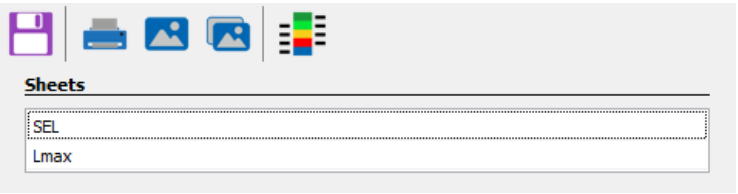
Graphic output

The colored isoline map and the underlying measured values can be documented in the form of a plan. To do this, go to the **graphics** tab.

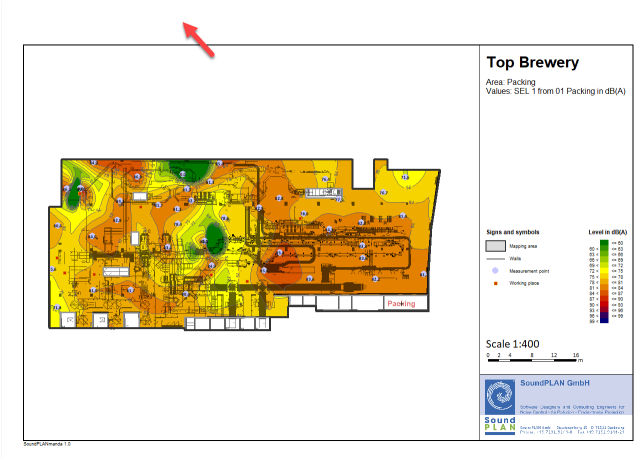
On the top left you will find an overview of the created measured variables.

If you have **several mapping areas**, please first select the one you want to display **in the mapping area tab**. The same applies in case there are several measurement files in the project. The data that are active in the tabs **mapping area** and **measurement points** are always displayed.

If the selected measurement file contains several measurement values, these are automatically created as individual sheets. You can switch between the individual sheets by left-clicking.



Define general sheet properties



Click on the frame of your sheet to set the general sheet properties. On the left side of the screen you have various setting options.

Sheet size: Using the pull-down menu, you can choose between four different sheet sizes.

Sheet frame: The width of the sheet frame can be adjusted manually for each side (top, bottom, left, right). To do this, you can either enter the desired value (in mm) manually, use the arrows to adjust the value, or use the mouse scroll wheel to change the value.

Sheet division: The width of the legend area can be adjusted, as well as the height of the logo area.

Moving and fitting the geometry into the plan

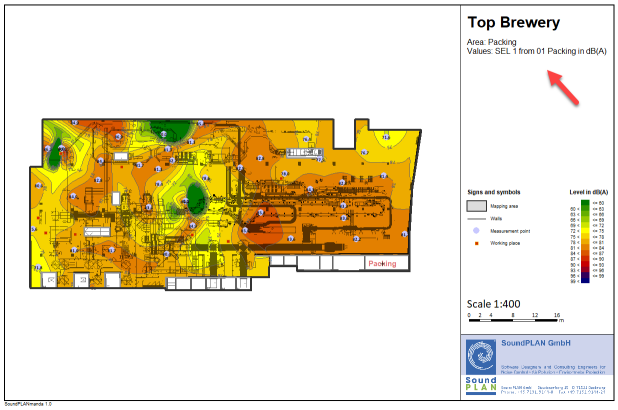
You can use the mouse scroll wheel to zoom the entire plan.

To quickly get the overall view of the sheet again, you can press the **overview icon** at the top.

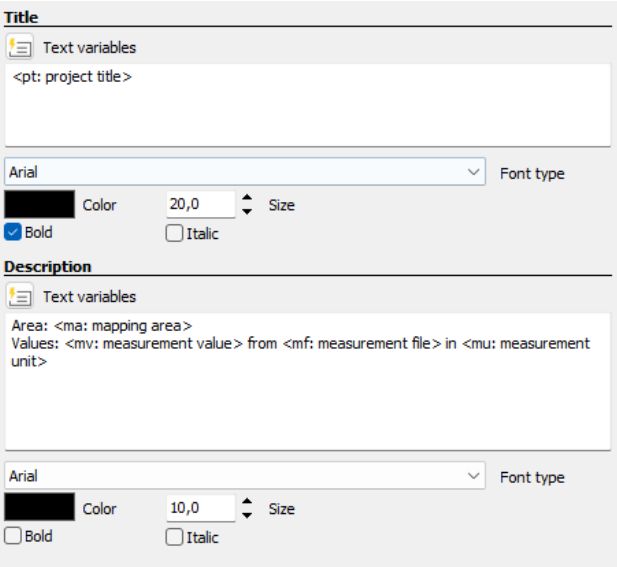

If the button is activated, geometry can also be **moved** within the plan.


After the geometry has been moved, it can be conveniently **fitted** in the center.

Enter title and description



Click on the title in the upper right corner of your sheet. On the left you can then enter the title and the sheet description.



In addition, select the font, color and size of the title. You can set check marks if you want the font to be bold and / or italic.


Various **text variables**, such as the project title and the name of the measurement file, are available via the right mouse button or the icon. In this way you can create the sheet description comfortably and quickly.

For the sheet description you proceed analogously.

Legend and color scale

In the right plan area, a legend and a color scale are automatically created for each sheet. The legend results from the **settings** made for the object types. Only object types that have been selected for the legend are displayed. The object types can be set by **clicking on the plan content** or the scale.

The color scale that was selected in the **measurement points** tab is displayed.

If you click on the color scale or the legend, a window opens on the left side with setting options for the font and color.

Scale

The scale is initially preset based on the geometry. It is often useful to edit the value. You can do this by left-clicking on the scale and setting on the left side.

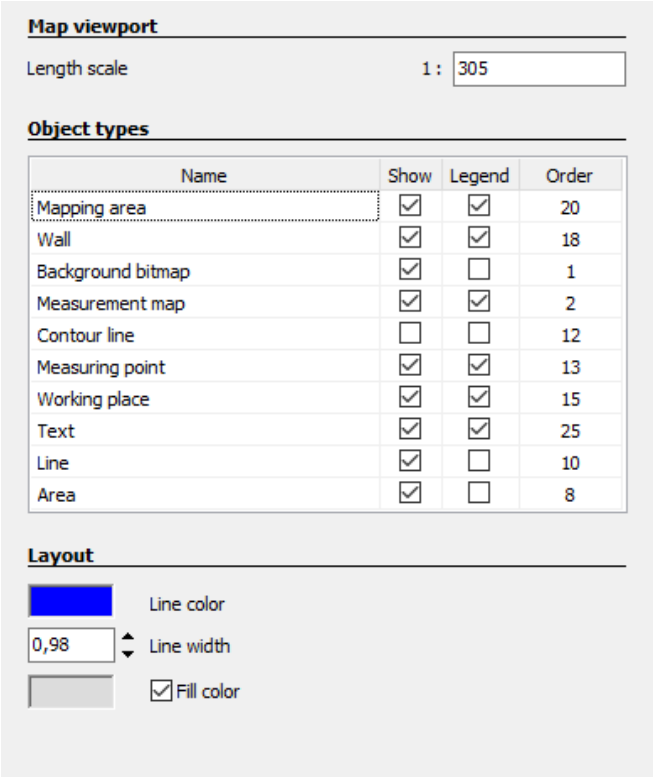
Logo

Click on the logo area at the bottom right or on the sheet frame to select a logo. By clicking on the yellow folder icon, you can select the appropriate file path

and insert your desired logo. There are two different options for the display: Either the logo is fitted into a box, or the box adjusts to the size of the logo. For the latter setting, a selection can be made as to whether the box should be placed on the right, left or in the center of the sheet.

Isoline map

Click on the isoline map in your graphics sheet. On the left side you now have various setting options for the result display.



Scale: Confirm your entry with **enter** so that it is accepted in the sheet.

Object types: All object types (mapping area, wall, line...) are listed by default. By setting the check marks you can determine whether an object type should be displayed or not. In addition, you can set for each object type whether it should

be listed in the legend. The output order decides which object types are drawn first and which are drawn second. If an object is obscured by another, you can remedy this by increasing the output order of the obscured object type.

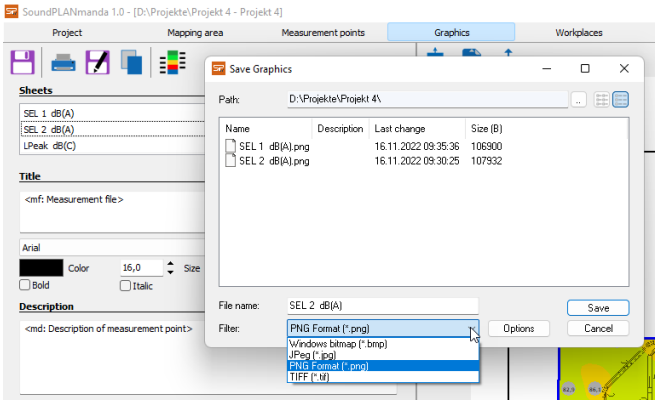
Layout: You can activate each object type in the list by clicking on the corresponding line and set the associated layout below. Depending on the object type, these are colors, line width and filling or other settings.

Save and print graphic

The sheets created in the graphics area are saved.

Save sheet as graphic file

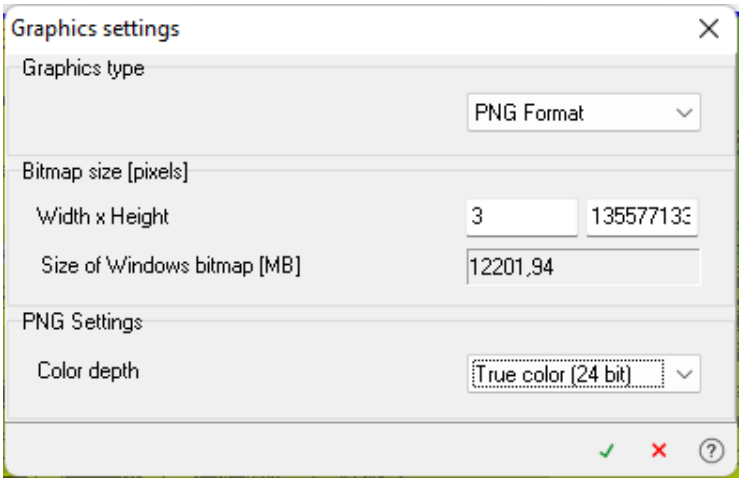
Each graphic sheet can be saved as a file in an image format (e.g. JPEG, PNG).



At the top of the screen you will see the file path of your project. By default, the graphic file is saved in the project folder. The location can be changed by clicking on the button with the two dots (on the right) and selecting the desired location.

Enter the desired file name and file format (via the pull-down menu).

You can use the **options** button to make further settings for the graphic resolution.



Copy graphic sheet to clipboard

The graphic can then be inserted into another document, e.g. Word or Excel.

Print sheet

The sheet can be printed directly from the graphic. If you have a pdf printer installed, you can also generate pdf files.

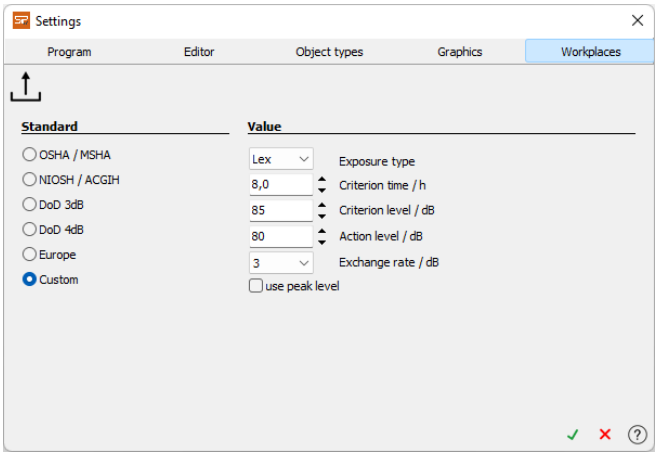
Noise exposure assessment

Workplaces

In the **workplaces** tab, the noise exposure of employees is determined, analyzed and evaluated. If necessary, required measures are indicated.

Directive

Set the standard to be used. You can find more information about setting the standard here.



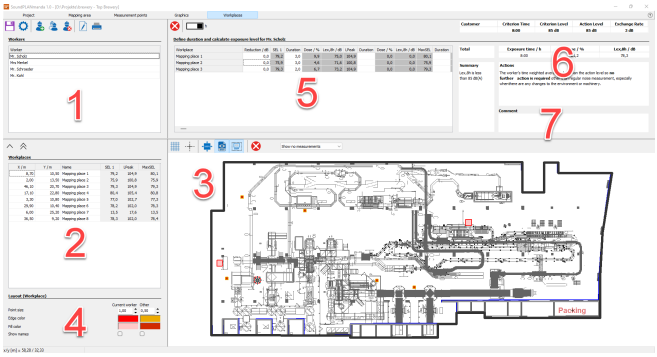
Use of peak levels

If you want to take a peak level into account in the assessment, two steps are required:

1. Set the check mark at **use peak level** in the project settings (workplaces) and define the limit values if necessary.

2. In addition, place a check mark in the column containing the peak level in your measurement table.

Definition of employees and workplaces



The screen is divided into different areas, which are described below according to the numbering in the image above.

(1) Workers

All employees for whom a risk assessment is to be carried out are listed. First enter the name of a person in the table.

 You can **add more employees** and also enter the names. The calculation is possible for any number of employees.

 Existing employees can be **duplicated**. This makes sense especially if **workplaces** have already been assigned.

 Employees can be **removed** from the list.

(2) Workplaces

All workplaces in the mapping area are managed in a common table, regardless of which employees they are assigned to. The advantage of this is that you can assign the same workplaces to different people. To add a new workplace, click with the left mouse button on the corresponding places in the mapping area (3).

 If a workplace is to be deleted, first activate it by left-clicking in the mapping area (or in the list) and then delete it using the corresponding icon above the mapping area.

You set the layout of the workplaces at the bottom left **(4)**. The look distinguishes between the workplaces assigned to the currently selected employee and others.

Assigning workplaces

 First, activate the worker you want to regard in the table above. Then select a workplace from the list of workplaces and click on the arrow button. For assigning further Workplaces act in the same way. A table **(5)** is then created for the employee, in which all assigned workplaces are listed.

 Alternatively, you can also **assign all** created workplaces to the current worker.

 If you hold down the strg-key when creating a workplace, it will be assigned directly to the current worker.

(3) Mapping area

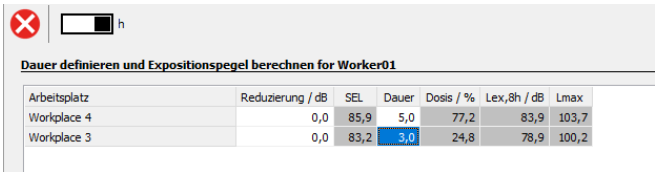
The active mapping area selected in the **mapping Area** tab is displayed. Via a pull-down menu you can select whether measured values are to be displayed. Only measured values for which **use** is checked in the **measurement table** will be displayed.

For the graphical input of the workplaces the familiar tools are available, such as crosshairs, overview, show/hide bitmap and clip bitmap. By using the scroll wheel of the mouse you can zoom the graphic and by keeping the scroll wheel pressed you can move it.

(5) Define duration of stay and calculate noise exposure

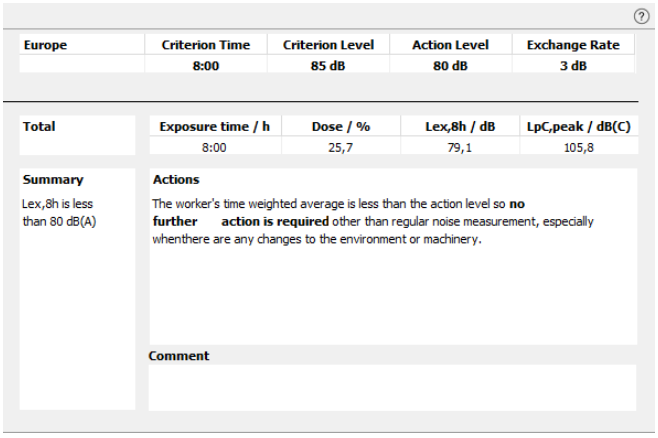
If workplaces have been assigned to employees, you will see a table at the top center with an overview of the assigned workplaces. For each assigned workplace, a column is created for a probably existing reduction (in dB). Further columns show the level values at the respective workplaces. For each workplace in the list, enter the duration of stay of the employee at this workplace. If several measured values are used for one workplace (see measurement table), they are listed one after the other. The respective durations of stay are always added. At the top, you can switch whether the entry is to be made in hours or minutes.

In the table, you can see the calculated dose as well as the noise exposure at the respective workplace in each line.



The sum of the individual durations of stay at the workplaces should correspond to the assessment period. This is usually 8 hours. A different assessment period (e.g. 40 hours) can be entered in the project settings-workplaces using the **custom** input type.

Evaluation



(6) The evaluation is located at the top, on the right side. Here you see the set assessment basis. This can be a standard or a custom setting. Below this, the total duration of stay, the total dose and the noise exposure for the respective active worker are displayed. If the noise exposure exceeds the lower or upper action value, measures are formulated.

In the text field below you have the possibility to enter your own comment **(7)** for each employee.

Please note:

The pre-formulated measures do not replace the conscientious review of the respective national regulations. Due to the diverse, international assessment bases, SoundPLANmanda cannot guarantee the directive conformity and completeness of the measures mentioned. Please check your country-specific requirements and supplement via the comment function if required.

Page setup and printing

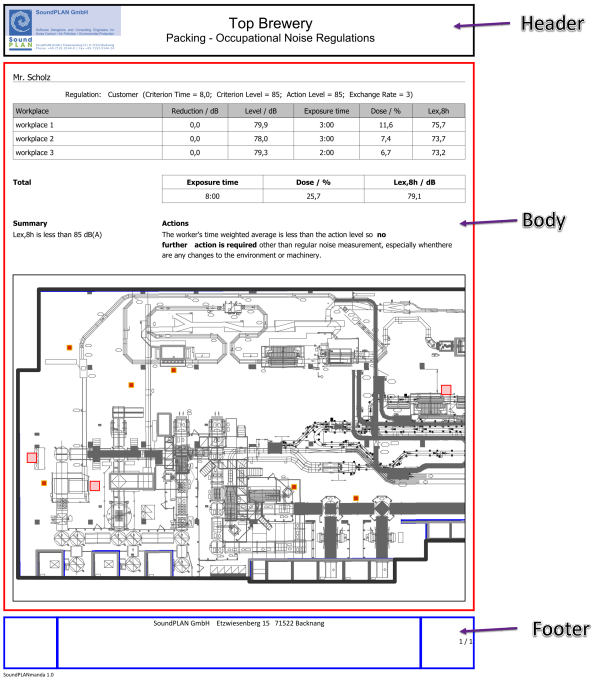
 To document the calculations, you can print out the noise exposure calculation with the assessment. It is recommended to edit the page layout first.

 To edit the layout of the printout, please open the **page layout** dialog. Here you have the possibility to adjust the **paper size** and the **margin widths** as well as the headers and footers and to fill them with text variables (e.g. project title, date) if required.

 You can save a page layout in your GlobData directory to use it for future projects.

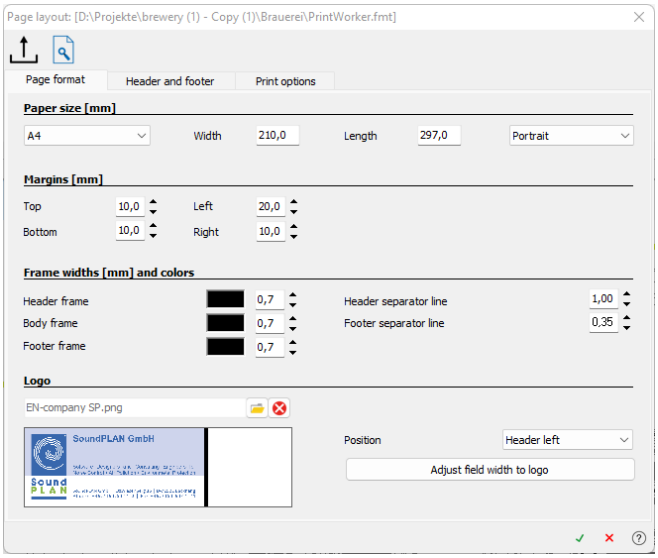
Page format

In the **page format** tab you define the appearance of the page. The printout is divided into three areas: page **header**, page **content** (body) and page **footer**.



Paper size

The DIN A4 format is preset. You can choose between other formats via the pull-down menu. These are **DIN A3, DIN A5, Letter, Ledger, Legal or Custom**. The corresponding length and width of the paper is displayed. If necessary, the values can be adjusted. Additionally, enter whether the printout should be in portrait or landscape format.



Margins

The margins can be adjusted to the millimeter for each border. You can either enter the value manually, use the up and down arrows, or move the mouse pointer to the value and then use the scroll wheel to adjust the value.

Line widths and border colors

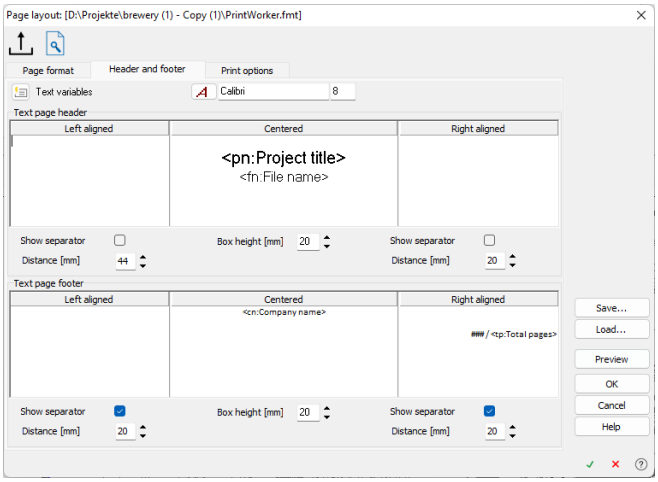
For each of the three areas you can set the border colors and widths. If separator lines are set in the headers and footers, the widths of these separator lines can also be set.

Logo

A logo or other graphic can be inserted into the printout. Select the corresponding directory and then use the pull-down menu to set the position. If necessary, you can set the selected field to adjust to the size of the logo.

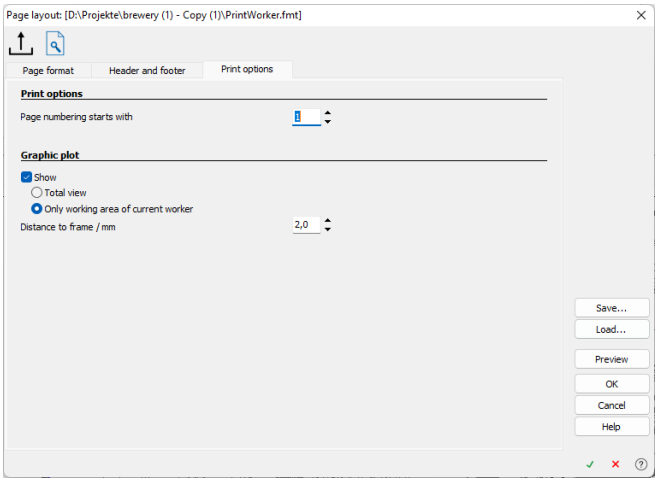
Header and footer

In the **header and footer** tab you define the size and content of the two top and bottom sheet areas.



You can either enter the label manually or use predefined text variables. If necessary, adjust the width of the left and right areas and change the height of the boxes. You can use check marks to specify whether separator lines are to be displayed.

Print options



In the **print options** tab, you can set the number to start the page numbering. In addition, you select which section the graphic output should show. It is either

possible to print the entire overview, i.e. the entire mapping area, or only the area where the workplaces of the considered employees are located. In this case, select a buffer area (frame) around these workplaces. The displayed section will then be adjusted automatically.

Calculations

Isoline maps

For the calculation of the isoline maps, the entered measured values are interpolated using a triangular mesh. Walls and boundaries are treated as **non-reflective** and **soundproof**. Diffraction is not taken into account.

Noise exposure at the workplace

The assessment parameters for the calculation of the noise exposure of individual employees are either based on various stored guidelines or on your own specifications (custom). The guidelines stored in the program differ in principle only by different requirements or parameters.

The following parameters are used in the calculation and are either dependent on the selected guideline or can be entered by the user:

Criterion time

The criterion time is normally 8 hours. It can be adjusted in the custom input and then also assume values other than 8 hours, e.g. 40 hours for a weekly assessment.

Criterion level

The lower criterion level is also referred to as the lower action level. It is defined in the respective guideline and can alternatively also be entered manually (custom setting). If the noise exposure level exceeds the criterion level, initial measures become necessary, e.g:

- Reduce noise at source wherever possible.
- Provide training to the employee on hearing damage and hearing protection.
- Provide appropriate hearing protection to be used if desired.
- Monitor noise levels regularly to ensure they have not increased.

Please note:

These pre-formulated measures do not replace the conscientious review of the respective national regulations. SoundPLANmanda cannot guarantee the directive conformity and completeness of the mentioned measures due to the diverse, international assessment bases. Please check your country-specific requirements and supplement via the comment function if required.

Action level

The action level, also known as the exposure limit value, is the noise exposure level $L_{EX,8h}$, above which further occupational safety measures must be taken. These are supplementary to the measures taken when the criterion level is exceeded:

- Provision of hearing protection, which **must** be worn.

Please note:

These pre-formulated measures are no substitute for a conscientious review of the respective national regulations. According to some country-specific guidelines, additional measures are already required when the upper action value is reached. Please find out about your country-specific requirements and take them into account in your evaluation. If necessary, use the comment function.

Exchange rate R (3, 4, 5 or 6 dB)

The exchange rate R specifies which level change should correspond to a doubling or halving of the effective time of a constant level. Usually the value is R= 3 dB. Some guidelines, such as OSHA, define exchange rates that deviate from

this. Depending on the selected guideline, the value defined there is used. It can also be defined in the custom input itself (values between 3 and 6 dB).

Appendix

Glossary

Term	Definition
Lp	The measured or calculated sound pressure level is an immission variable that describes the noise impact at a specific location.
dB(A)	dB(A) is the unit of measurement of the sound pressure level using the frequency weighting curve A. This takes into account the different loudness perception of sound of different frequencies by human hearing.
TWA, $L_{EX,8h}$	The TWA (time-weighted average) corresponds to the $L_{EX,8h}$ and denotes the daily noise exposure level. It is the A-weighted noise exposure level averaged over time, based on an 8-hour shift.
$L_{pC,peak}$	The peak sound pressure level $L_{pC,peak}$ is the maximum value of the instantaneous sound pressure level.

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