SoundPower Plugin

DEWESoft®

SOFTWARE USER MANUAL

SoundPower Plugin V24-1

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2. About this document

2.1. Legend

The following symbols and formats will be used throughout the document.

Important
It gives you important information about the subject.
Please read carefully!

Hint
It gives you a hint or provides additional information about a subject.

Example
Gives you an example of a specific subject.

3. Installation

3.1. Download

DEWESoft® homepage
http://www.dewesoft.com
you can download DEWESoft® plugins when you go to: Support – Downloads – Plugins

3.2. Compatibility

The plugin is compatible with DEWESoft® X1 and X2.

It has been tested on Windows 7 (32-bit and 64-bit).

3.3. Licensing

In DEWESoft® an additional license for the plugin is needed, it can also be written into the Dewesoft® license.

The plugin requires a valid DEWESoft® license.
To test the plugin you can use a 30-days-*Evaluation license*.

3.3.1. Requesting an evaluation license

You can request an an *Evaluation license* from our homepage: http://www.dewesoft.com/registration

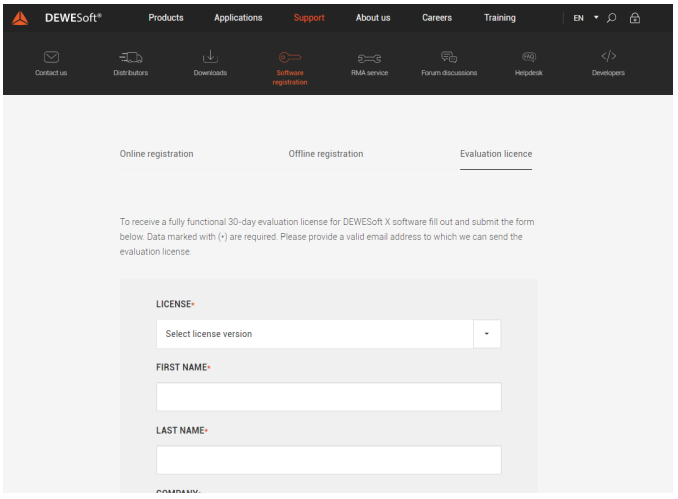


Illustration 1: Request Evaluation License

Click on Evaluation license, fill out all the required fields, then click the “Request license” button.

3.3.2. Activating the evaluation license

When you have received your trial licence key, open DEWESoft, go to Settings → Settings, then select the Licensing tab sheet, click Create new license and enter the license code.

Now enter the license code and click the forward icon to proceed the registration	Then your new license key will show up in the list and should have the *Status Valid*.

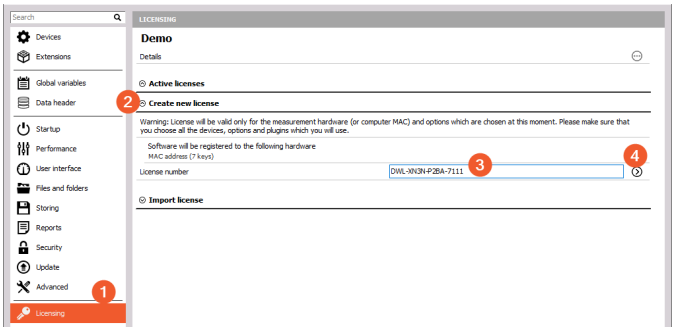
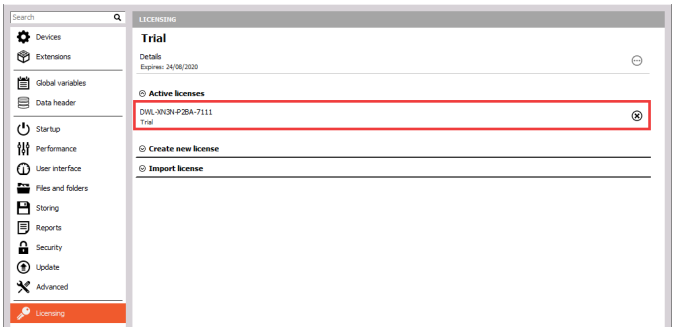

	

Illustration 2: Enter license key	*Illustration 3: Valid trial license*

3.4. Plug-in installation

The file SoundPower vXX.zip contains the file SoundPower.dll. Please copy the file into the Addons folder of your DEWESoft installation. (e.g. D:\DEWESoft\Bin\X2\Addons\), then start DEWESoft. In Settings → Settings → Extensions, click the "+" button and add the plugin, click the checkbox (red boxes in below picture). The plugin will show up in the list.

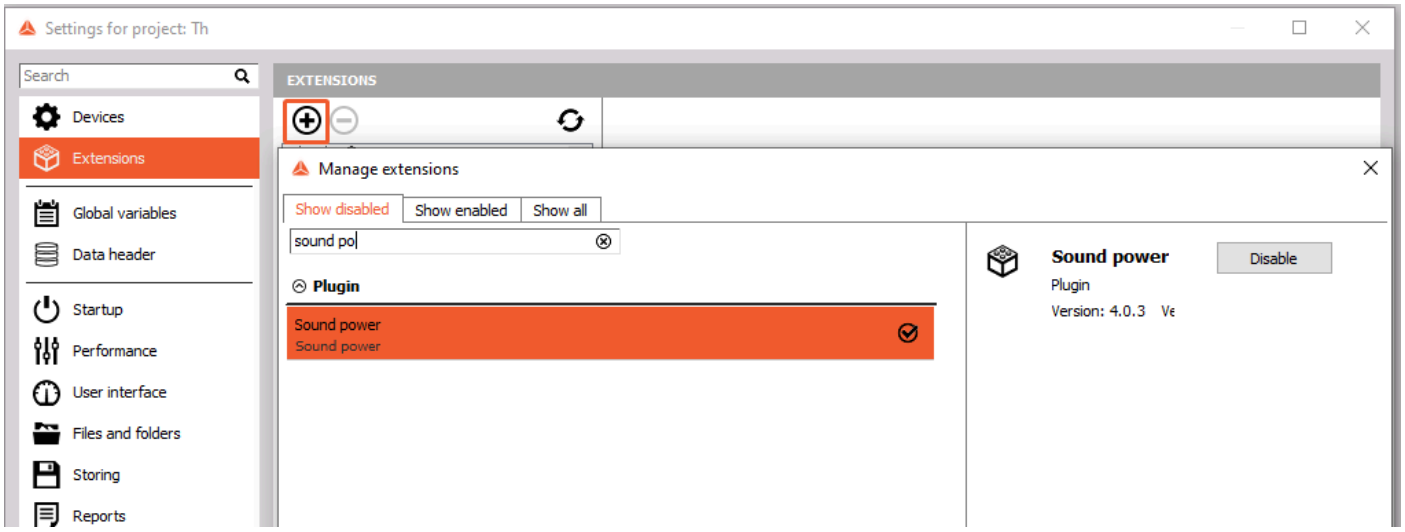


Illustration 4: Plugin in Hardware setup

Hint

If there are no plugins shown at all you have to click the refresh button first (green box in picture above). This will add all plugins to the Windows registry (executes the program DCOMReg.exe). First ensure that you have admin rights in this computer.

4. Introduction

Sound power is a characteristic of the sound source, it is independent of the distance and therefore a practical way of comparing various sound sources. Sound Power can be measured in different ways (by Sound Pressure or by Sound Intensity). The SoundPower-Plugin performs the calculation by measurement of Sound pressure.

Sound Power is calculated by following equation:

$$L_w = \overline{L_p} + 10\,log_{10}\left(\frac{S}{S_0}\right) - K1 - K2 + C1 + C2$$

where:
L_W .... Sound Power Level
L_p ... Sound Pressure Level
S .... Measurement Surface
S_0 .... Reference surface (is by standard 1 m^2)
K_1 .... Background noise correction
K_2 .... Room noise correction
C_1 .... Meteorological correction
C_2 .... Meteorological correction

For example, if we have a free-field measurement, and the microphones are aligned in a sphere, then L_p is the Sound Pressure Level measured by 10 microphones, the surface S is $4\pi r^2$, the background noise K_1 is the noise emitted from the machinery around the sphere, and there is no K_2 because we have free-field. C_1, and C_2 also stay zero, because the outside temperature is around 23°C and the altitude of the test site is below 500 meters sea level.

5. Setup microphones

5.1. Microphone calibration

Connect the microphone(s), then in Channel Setup, select “Sound Pressure” as Physical Quantity, then the following scaling options will appear:

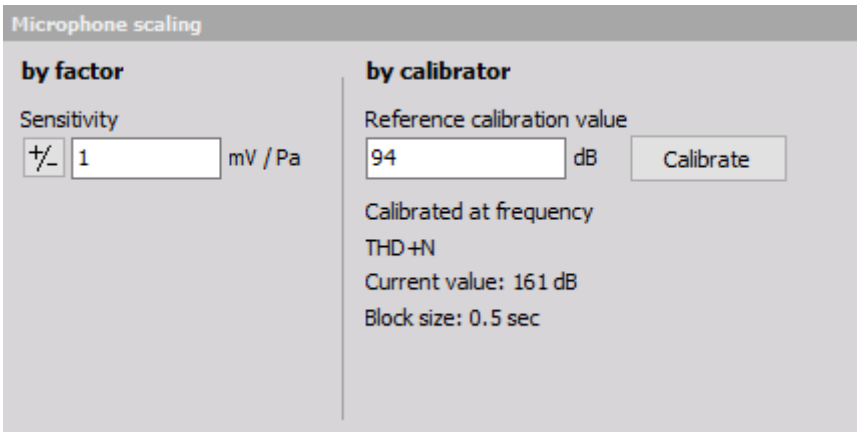


Illustration 5: Calibration options in DEWESoft® Channel Setup

To calibrate the microphones there are two options:

- by sensitivity factor:
  Enter the sensitivity factor from the calibration sheet of the microphone.
- by calibrator:
  Put the microphone tip into a Sound Calibrator and click the “Calibrate” button; the Sensitivity will be automatically determined and written into the field on the left side.

Illustration 6: Calibration with Sound Calibrator (1 Pa = 94 dB at 1 kHz)

6. Setup SoundPower

The SoundPower-Plugin Setup can be splitted into following sections:

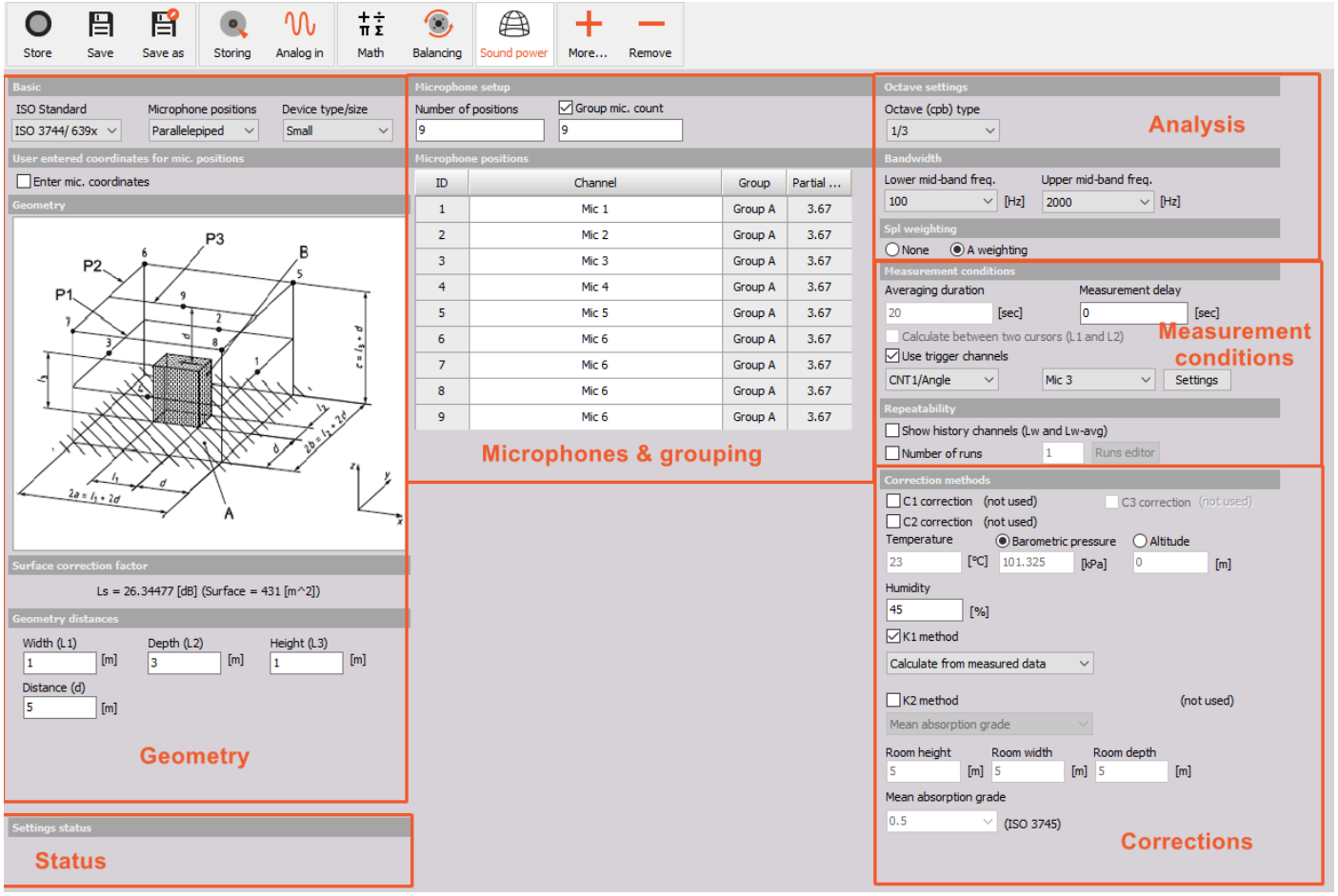


Illustration 7: SoundPower-Plugin Setup

- Geometry
  Choose according to which standard you are measuring (ISO 3741, ISO 3744, ISO 3745), choose microphone arrangement and distances, as well as details about measurement surfaces.
- Microphones & Grouping
  As some standards require 20 microphones and more – in order to save costs for equipment – you can align e.g. 5 microphones in a group and then move them through all 4 positions step-by-step during measurement, after that all data is combined automatically.
- Measurement conditions
  Define the duration of the measurement. The start and the end of the sound power measurement can also be triggered with trigger channels (e.g. light barriers). If you want to measure at multiple modes of operation, use the option Runs.
- Analysis
  Select CPB resolution as well as bandwidth, frequency weighting and measurement time. It is also possible to change and recalculate these offline after the data file is stored.
- Corrections

If you need to apply correction factors, K1 can be determined by background noise measurement, K2 takes care about room correction, C1 and C2 correct deviations due to meteorological reasons (temperature and barometric pressure).

The parameters are described in more detail on the following pages.

6.1. Basic

6.1.1. ISO standards

In the Plugin you can choose between the standards:

- ISO 3741 noise source in reverberation test room
- ISO 3744/639x free-field over reflective plane (engineering grade)
- ISO 3745 anechoic or hemi-anechoic room (precision grade)
- ISO 3743 Determination of sound power levels and sound energy levels of noise sources using sound pressure

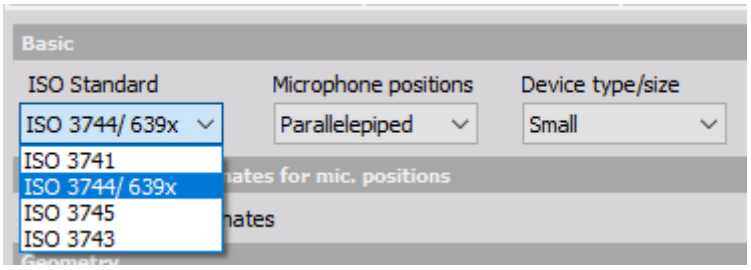


Illustration 8: Basic section

6.1.2. Microphone positions

Each standard describes different microphone arrangements:

- ISO 3741: user-definable positions
- ISO 3744/639x: Parallelepiped, Cylindric, Hemisphere

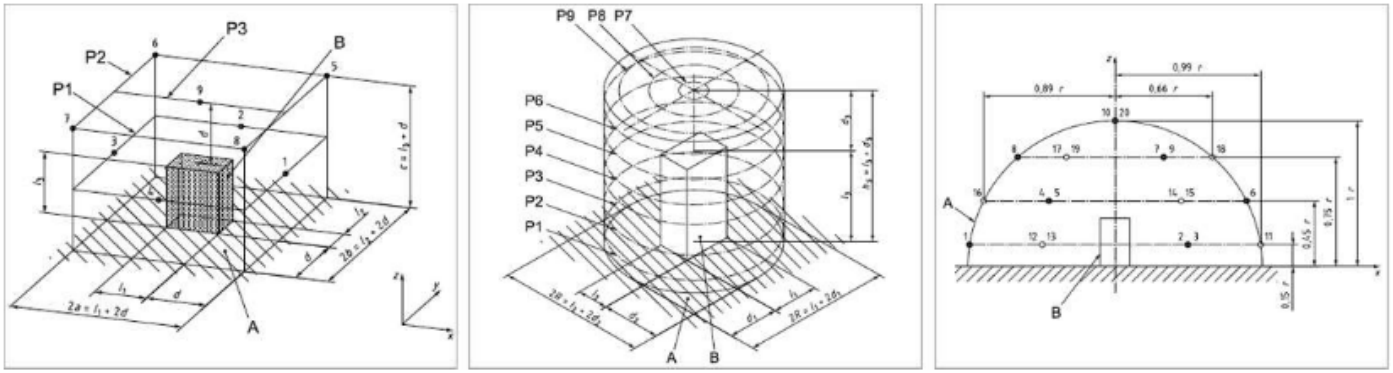


Illustration 9: ISO 3744 microphone positions

- ISO 3745: Hemisphere, Sphere

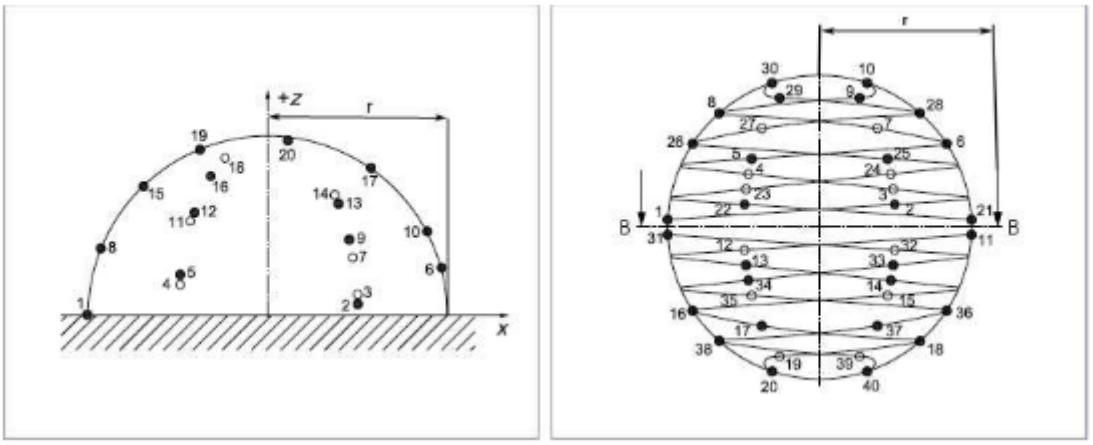


Illustration 10: ISO 3745 microphone positions

6.1.3. Device type/size

The ISO 3744 also gives specifications related to the location of the measurement surface.

The device type/size can be “Normal” (only floor), “1 Wall” (floor and 1 wall) or “2 Wall” (floor and 2 walls, which means D.U.T. placed in a corner). All the required microphone positions will be shown. - Parallelepiped in ISO 3744 has besides Wall and Corner also other types/sizes (Small, Tall, Long, Medium, Large). These types/sizes have the same equation for measuring surfaces. The only difference is the number of microphones. That means that you can choose Small type/size and measure Large type/size device but you need to enter the correct value for Number of microphones of Large type/size.

ISO 3741 is applicable to noise sources with a volume not greater than 2 % of the volume of the reverberation test room.

6.1.4. Geometry distances

In order to calculate Sound Power we need the surface of the reference box (device). Depending on the microphone positions the parameters change. If you have selected parallelepiped, we have L1, L2, L3 which represents width, depth, length of the measured device and D, which is the distance between device and measured surface.

In case you have selected Sphere or Hemisphere in standard ISO 3745 or Hemisphere in ISO 3744 you need to insert the radius of the measurement surface.

If you selected Microphone positions Cylinder then you need to insert values L1, L2, L3 which represents width, depth, length of measured device and D1, D2, D3, which are width, depth and length distances between device and measurement surface.

ISO 3741 does not require geometry parameters.

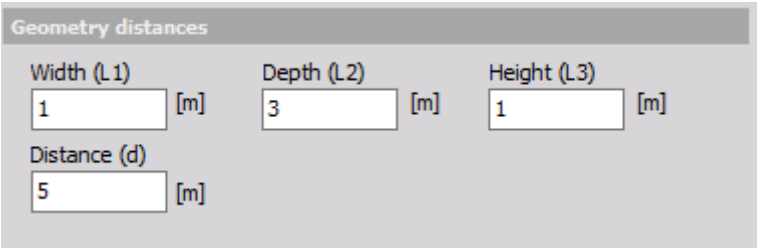


Illustration 11: Geometry parameters

6.2. Microphone setup

ISO 3744 and ISO 3745 also specify the number of microphones, depending on the geometry setup chosen.

Per ISO 3741 you should use at least 6 microphones and can work with user-definable positions. The minimum distance between source and nearest microphone must therefore be at least 1,03m below 5000 Hz and 0,516 over 5000 Hz.
If the number of microphones differs from the standard, you will get a warning but you can continue. If you have less physical microphones than microphone locations, you can align them in groups and move through them step-by-step during measurement (e.g. rotate them through four positions in cylindrical arrangement). At the end all data will be combined.

6.3. Microphone positions

In the “Microphone positions” section you can assign the analog channels to the positions, just click on the text fields and select from the dropdown menu. The X, Y, Z coordinates of microphones, as well as the groups are shown.

In case the number of microphones is bigger than maximum in standard ISO 3744 or ISO 3745, then the coordinates will become zero.

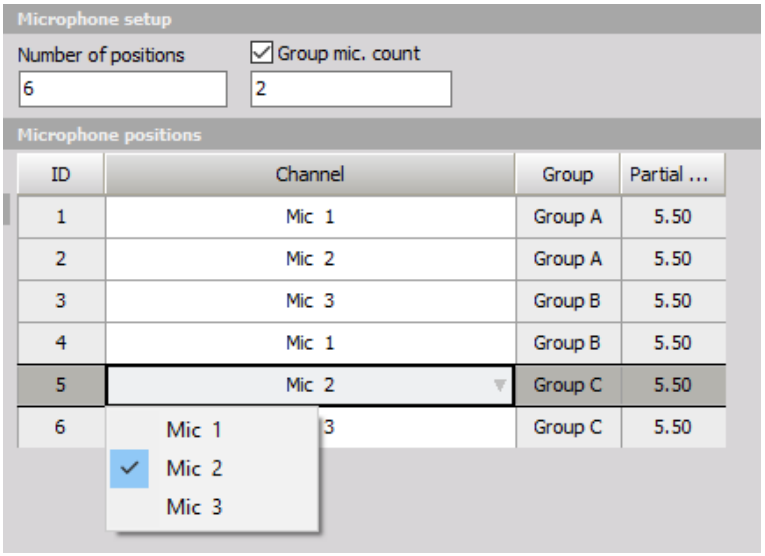


Illustration 12: Microphone positions and grouping

6.4. Triggers

The start and the end of the sound power measurement can be triggered with trigger channels (e.g. light barriers). Check the Use triggers checkbox and select the first and second trigger channels from the drop-down menu. Trigger channels can be synchronous, asynchronous or single value channels.

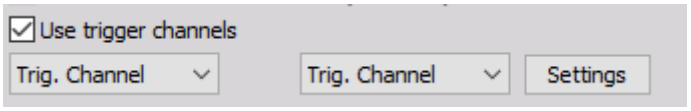


Illustration 13: Trigger channels

When you enter the Settings, you can define the trigger edge direction (positive or negative) and the trigger level (by default, trigger level is set to 0.9 and retrigger level is set to 0.1).

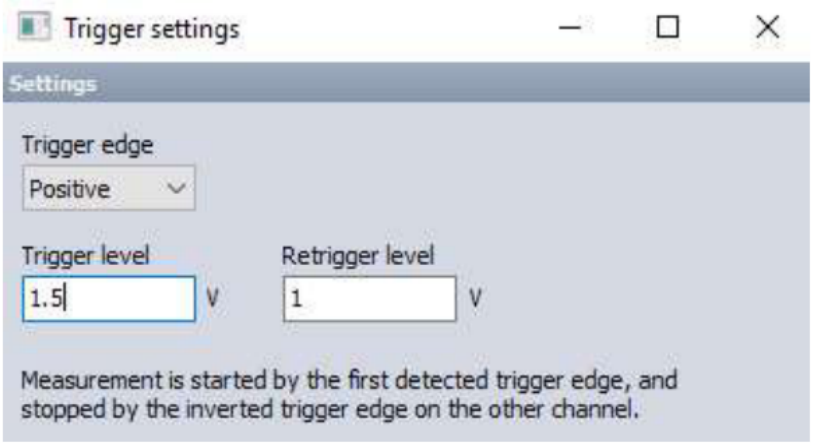


Illustration 14: Trigger level settings

The measurement is started by the first detected trigger edge and is stopped by the inverted trigger edge on the other channel.

6.4.1. One trigger channel

If the same channel is selected as the start and stop channel, the measurement is started by the first detected edge on the trigger channel and is stopped by the retrigger edge on the same channel.

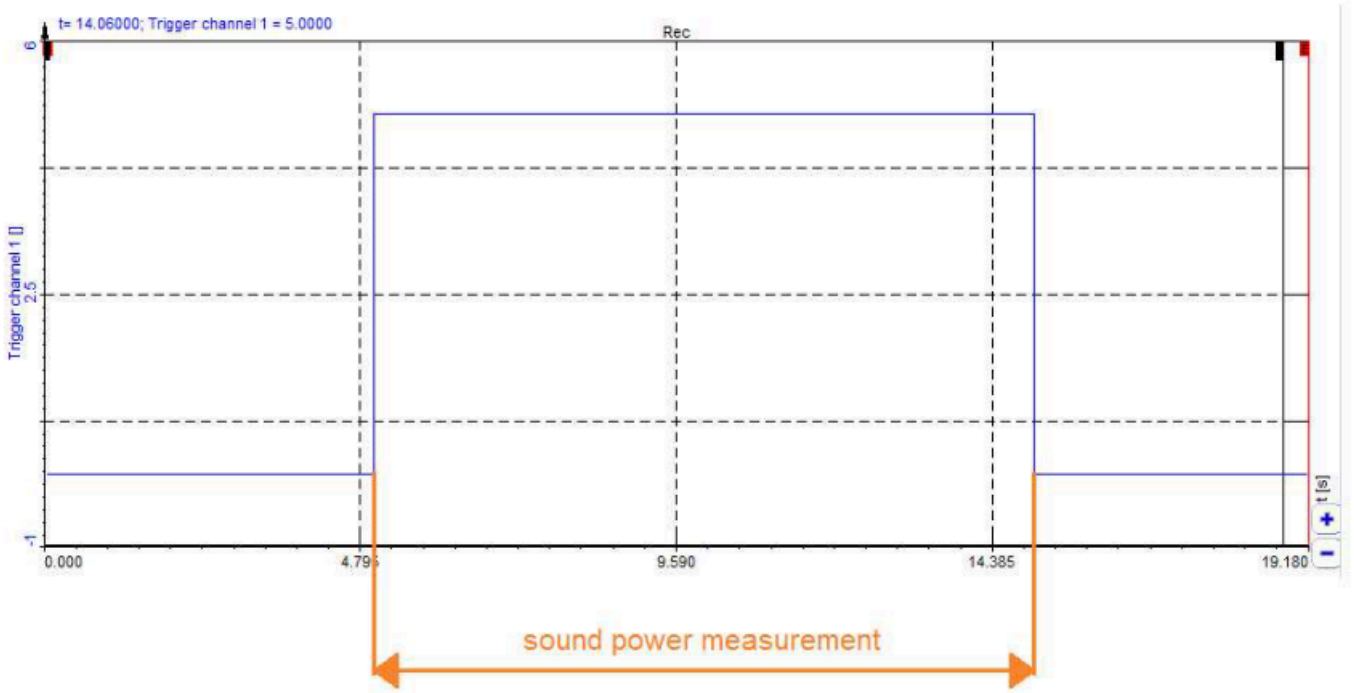


Illustration 16: One trigger channel
Illustration 15:

6.4.2. Two trigger channels

If one channel is selected as the start channel and one channel is selected as the stop channel, the measurement is started by the first trigger edge on the first channel and is stopped by the inverted trigger edge on the second channel.

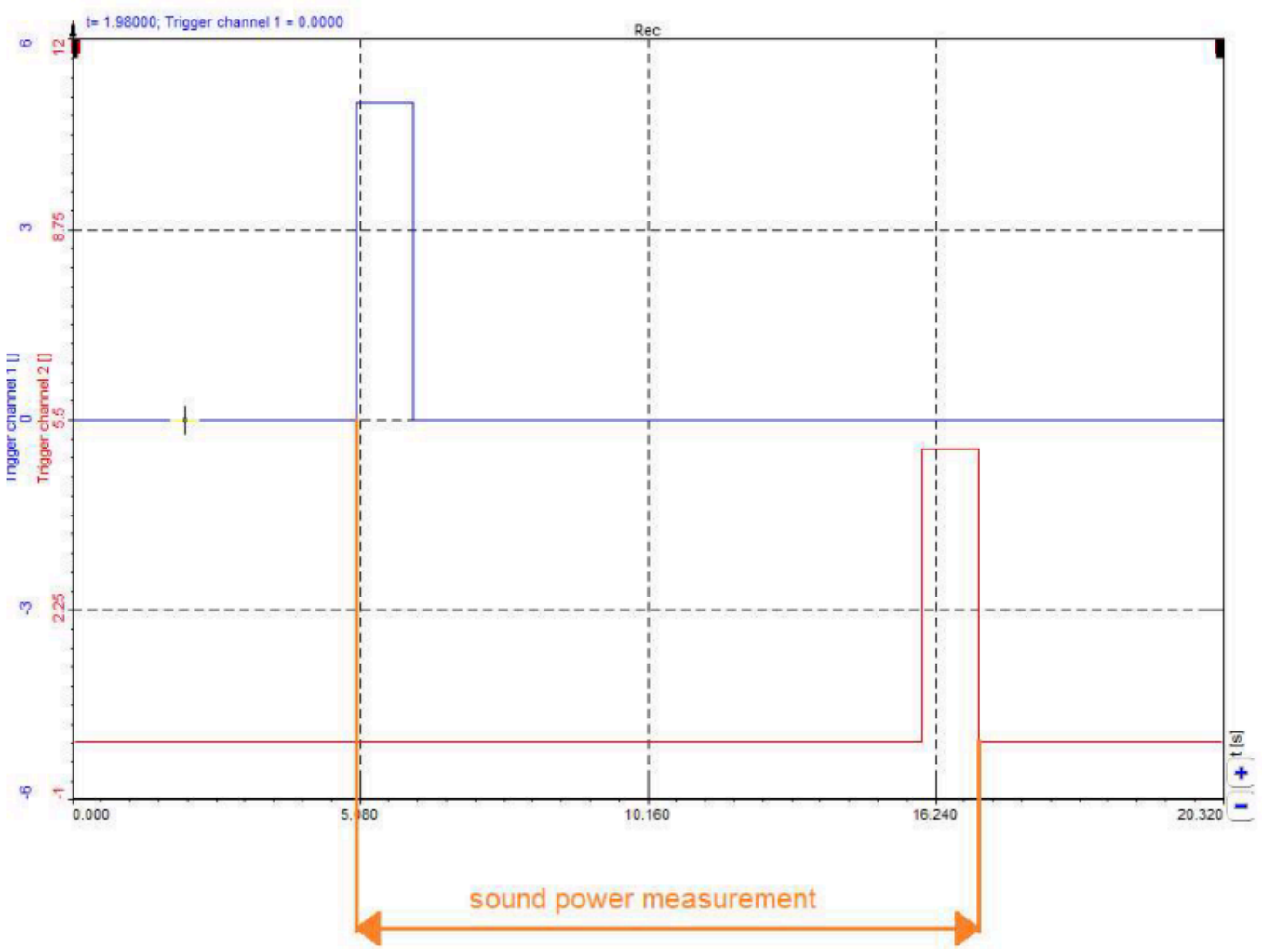


Illustration 16: Two trigger channels

6.5. Octave settings

For the frequency analysis usually the Constant Percentage Bandwidth (CPB) is used. You can choose between 1/1 or 1/3 octave type.

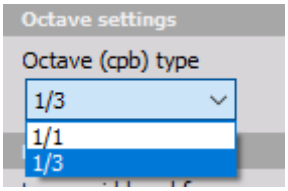


Illustration 17: Octave settings

6.6. Bandwidth

In the Bandwidth section you can choose the frequency band for the calculation. Values are chosen from the drop-down menu. They depend on (and will change with) the selected acquisition rate.

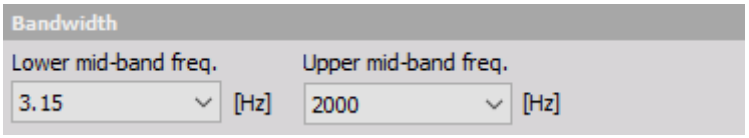


Illustration 18: Bandwidth settings

6.7. SPL weighting

Because the human hearing is non-linear, it is required to apply frequency-weighting. The plugin supports type A weighting and no weighting.

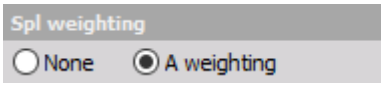


Illustration 19: Sound pressure level weighting

6.8. Measurement time

Measurement time affects the certainty of the measurement. ISO 3741, 3744 and ISO 3745 recommend that the measurement time should not be less than 10 seconds and should be more than 20 seconds.

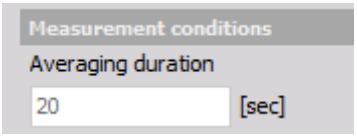


Illustration 20: Measurement time

6.9. History channels and runs

Select the number of runs (e.g. number of operation modes of the machine) you want to measure sound power level and sound pressure level.

Illustration 21: Defining the number of runs

During the measurement easily select the run from the drop-down menu.

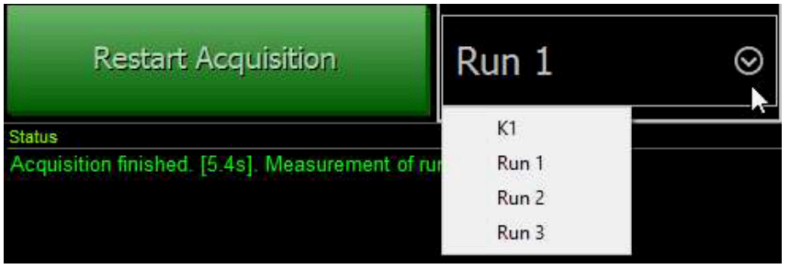


Illustration 22: Drop-down menu for the runs during the measurement

If you want to change the name of the runs, enter the Runs editor in the setup.

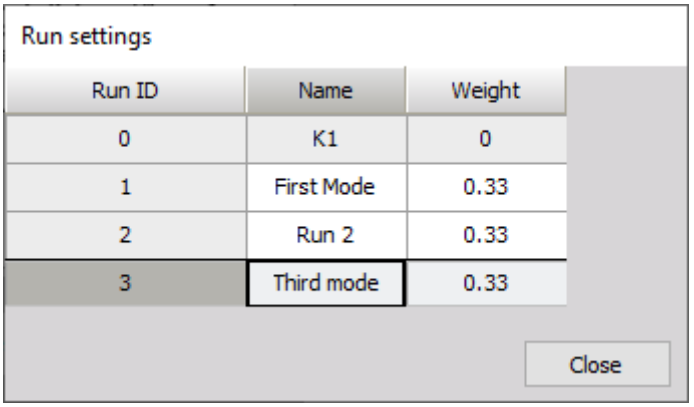


Illustration 23: Defining the name of the runs

Time	Lw history dBA	Run ID
37.34000	118.3893	Third mode
27.34000	117.0018	Second mode
17.34000	115.3718	First mode

Illustration 24: Lw history of runs and run ID

In the exported matrix of results you can display the results for each microphone and for each run.

	A	B	C	D	E	F
1	Results Matrix	dBA				
2	Mic/Run	First mode	Second mode	Third mode	Avg.	K1 (Spl)
3	Mic. 1	100.55452	102.07919	103.39577	102.16243	89.474136
4	Mic. 2	100.53933	102.03765	103.38631	102.14119	89.387657
5	Mic. 3	100.53943	102.06599	103.37711	102.14638	89.449532
6	Mic. 4	100.48953	102.04311	103.36516	102.12215	89.365288
7	Mic. 5	100.54063	102.07155	103.38702	102.15286	89.436813
8	Mic. 6	100.55885	102.06483	103.38413	102.15359	89.472183
9	SPL	100.5371	102.06041	103.38259	102.14645	0
10	Lw	115.37183	117.00178	118.38928	117.09274	0
11	Time	4.6199994	4.6199994	4.6199994	0	4.6199994

Illustration 25: Exported matrix of results

6.10. Correction methods

6.10.1. C1 and C2 meteorological correction

C1 and C2 meteorological corrections are used in the case that the air temperature at the test site is below 23°C or the altitude is higher than 500 meters above sea level. When you activate the option, it will be immediately calculated and written next to the label. You can either enter barometric pressure or altitude, the other value will be calculated automatically.

6.10.2. K1 background noise correction

K1 is by standard defined as the background noise correction. This is applied in different situations, please refer to the standard. K1 can be measured before switching on the sound source, or afterwards calculated by correctly placing the cursors on the measured data.

6.10.3. K2 room correction

K2 corrects the influence of the room noise. Three methods are implemented in the SoundPower plugin.

- Mean absorption grade:
  Please enter the room size and the mean absorption grade according to the standard
- Reverberation time:
  These parameters can be determined by acoustic measurement.
- Enter values:
  An editor is provided, click first “Create K2 table”. Please ensure you have selected the correct bandwidth first, otherwise the table will be reconfigured when changing bandwidth and values would get lost. The entered values in the table will be saved to the DEWESoft® setup.

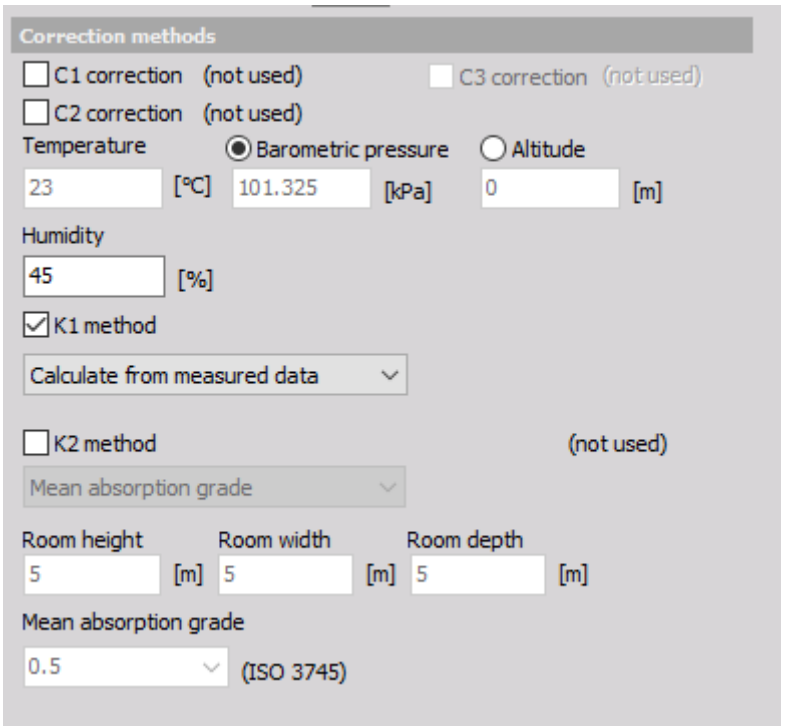


Illustration 26: Correction methods

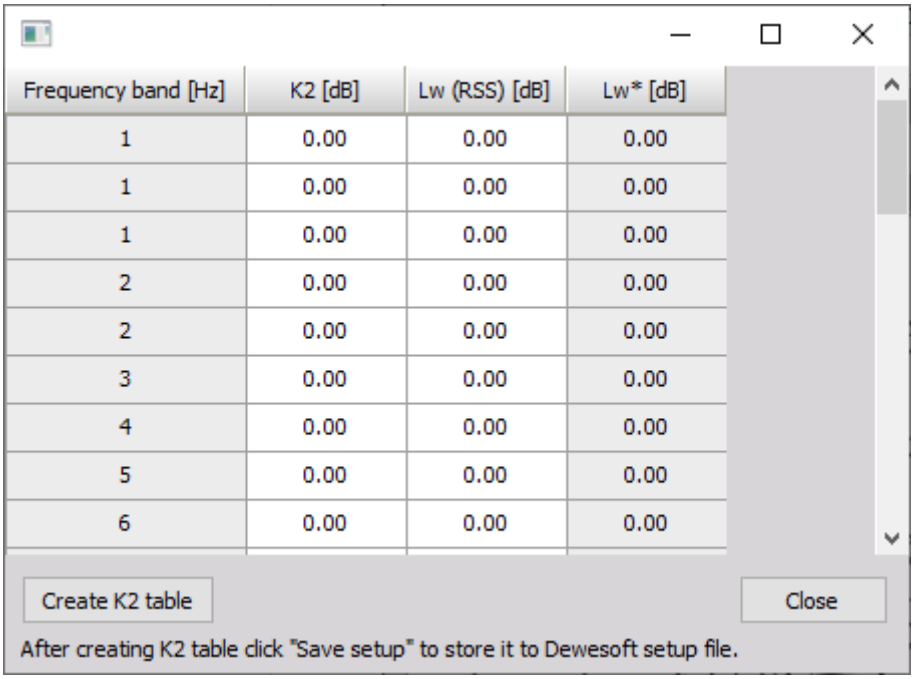


Illustration 27: Editor for K2 values

Hint

For ISO 3741 the corrections C1, C2 and K2 are obligatory, and therefore it is not possible to deselect them (locked).

7. Measurement and visualization

When you go to Measure mode, there is an auto-generated display called “SoundPower”. At first all the graphs are empty.

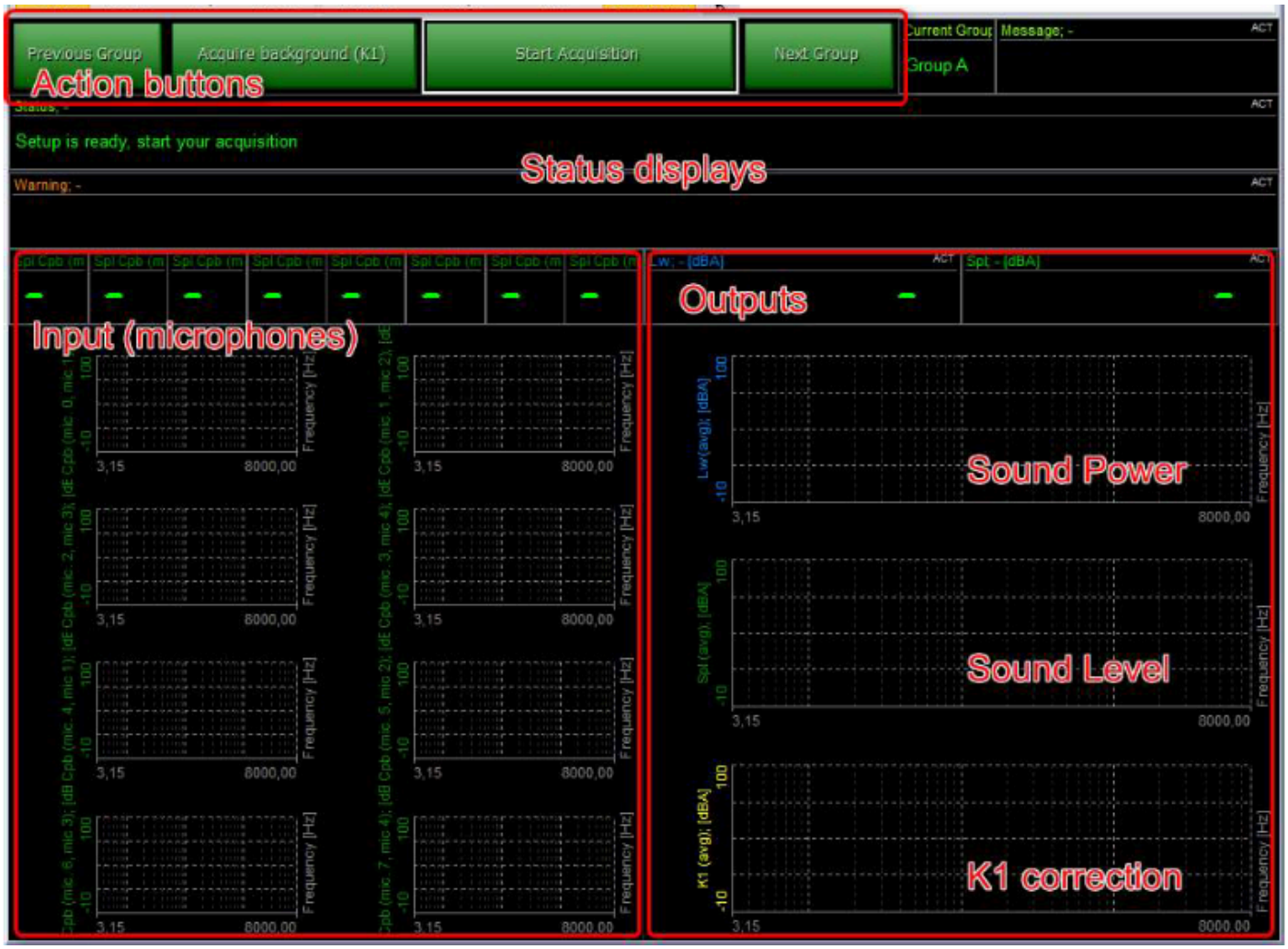


Illustration 28: Auto-generated SoundPower screen

Action buttons are provided on top to enable the user to go through the different steps of acquiring background noise and then start the real measurement, as well as switching between microphone groups.

- The Message, Status and Warning displays show the progress (e.g. “17,2 / 20 sec done”; “K1 background acquiring…”) and warnings if certain conditions are not fulfilled (e.g. “Acquisition finished early.”…).
- On the left side the input signals are shown: overall sound pressure levels of the microphones in the digital meters and CPB plots below.
- On the right side the output signal shows SoundPower and Overall Sound Pressure of all microphones in the digital meters, and the CPB plots of SoundPower, SoundLevel and corrections.

On the next pages an example measurement is shown to explain the order of the steps to be done.

7.1 Example measurement

For this example 4 microphones are used and aligned in 2 groups, which means the setup has to be changed once between. The measurement time stayed at 20 sec, which is the default value.

Microphone setup

Number of positions: 9

Group mic. count: 4

Microphone positions

ID	Channel	Group	Partial ...
1	Mic 1	Group A	57.44
2	Mic 2	Group A	57.44
3	Mic 3	Group A	57.44
4	Mic 4	Group A	57.44
5	Mic 5	Group B	57.44
6	Mic 6	Group B	57.44
7	Mic 7	Group B	57.44
8	Mic 8	Group B	57.44
9	Mic 1	Group C	57.44

Illustration 29: Example microphone setup

The flowchart for the following example looks like below. With the “previous” and “next” buttons you can switch between the groups and also repeat a measurement, as long as not all the data is acquired.

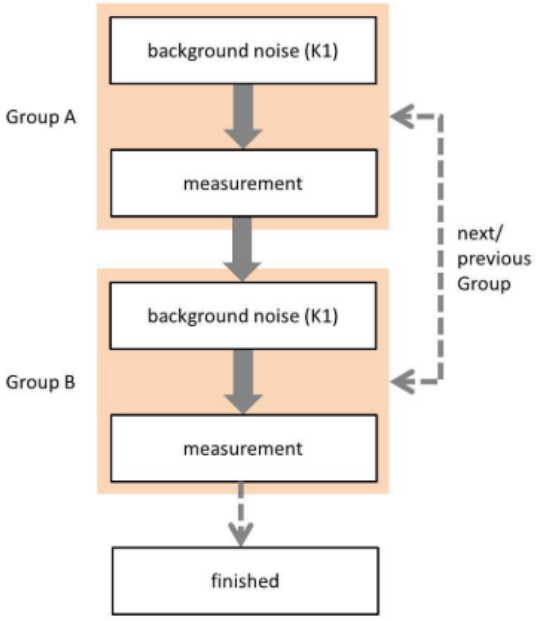


Illustration 30: Example measurement process

1. Start storing (sound source is switched off!); next to the four buttons you see that “Group A” is active.

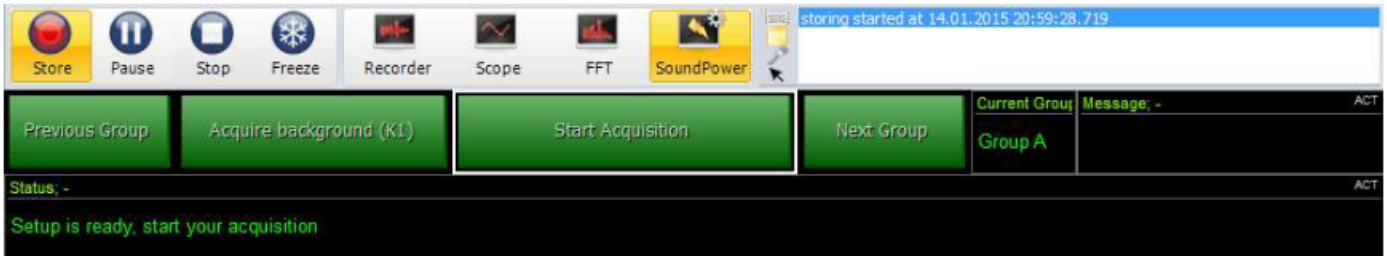


Illustration 31: Ready for acquisition

2. Then click “Acquire background (K1)”, wait for 20 sec, progress is shown in the status display.

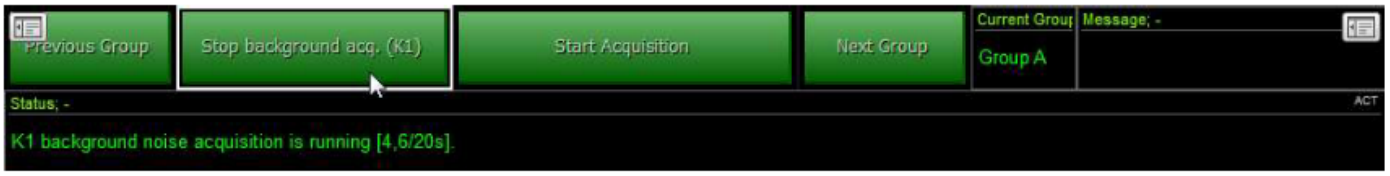


Illustration 32: Stop background acqusition

3. After K1 Acquisition is finished, switch on the sound source.
4. Click “Start Acquisition”, wait again 20 sec. The four microphone CPB plots (Group A) below should fill with data.

Illustration 33: Group A: Measurement

5. After acquisition is done, switch off the sound source.
6. Change the microphone setup. The four microphones should move to their second position.
7. Then change to “Next Group”. Display on the right will show “Group B”.

Illustration 34: Change setup, switch to next group

8. Click “Acquire background (K1)”, wait 20 sec. Sound source must stay switched off. As the microphone positions change, we have to repeat the K1 measurement for this position.

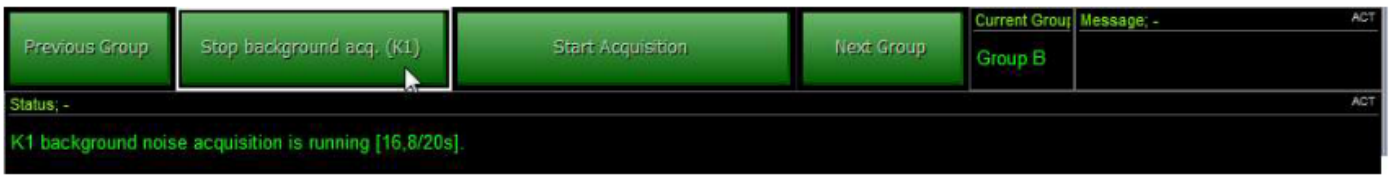


Illustration 35: Group B: K1 measurement

9. Now switch on the sound source again.
10. We click “Start Acquisition” and wait 20 sec. After that, also the other four displays on the left side (Group B) should fill with data.
11. At the end the text “Sound power measurement finished” should be shown. The display below gives more details if something went wrong (Warning). The CPB displays on the right side show SoundPower, SoundLevel and K1 factor results.

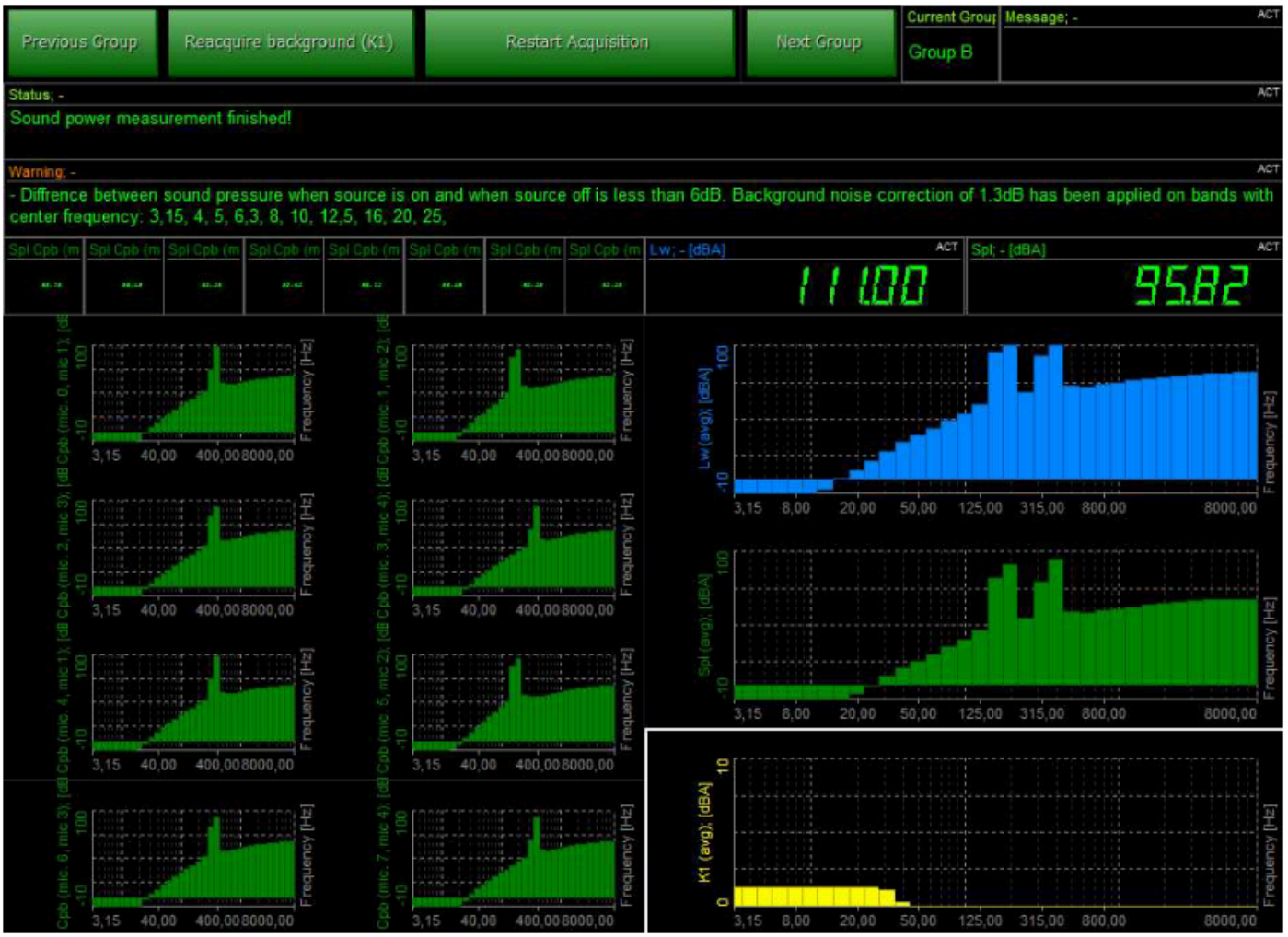


Illustration 36: Measurement finished

8. Offline calculation

The SoundPower Plugin also supports offline calculation, that means changes in calculations can be done on the measured data (changing of microphone groups however is not possible).

It's even possible to only collect raw data at the test site and perform all calculations afterwards in the office. Therefore one should be aware to have enough data, for the standard 20s noise and 20s with sound source switched on. Below you see an example with the minimum data (here with 3 microphones):

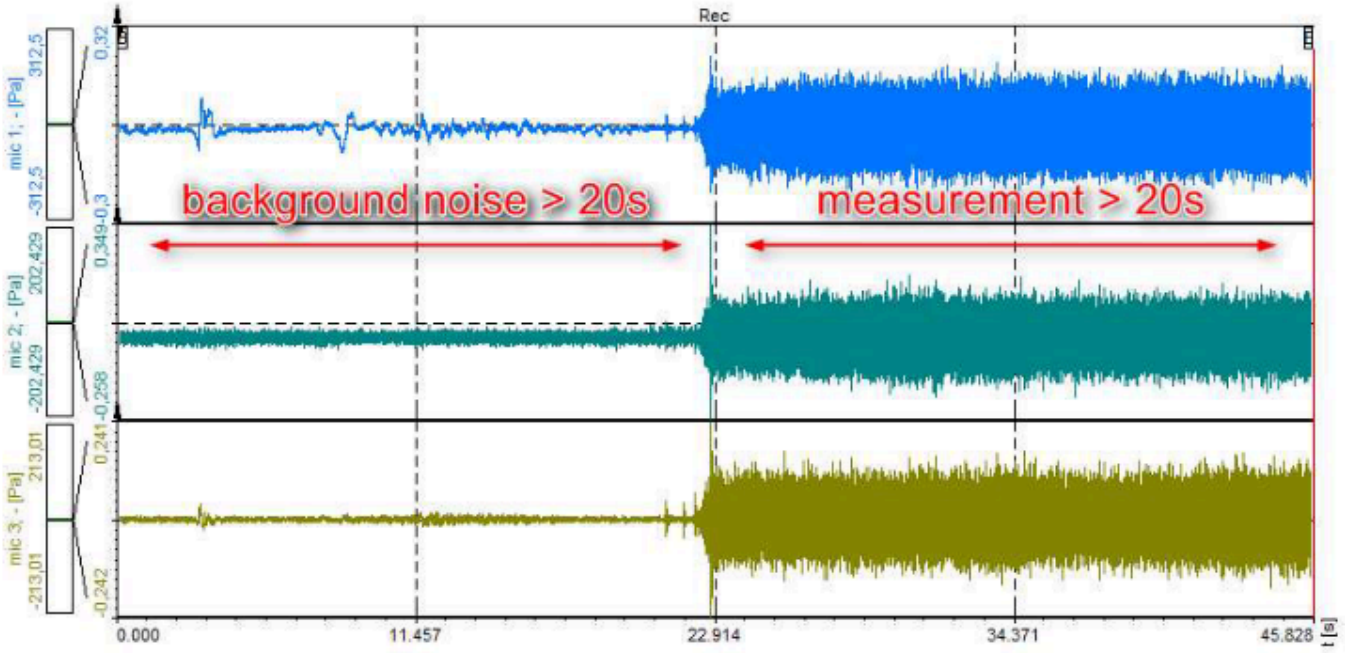


Illustration 37: Datafile containing only raw data of 3 microphones

In Analysis mode, when the datafile is open, go to Offline math...

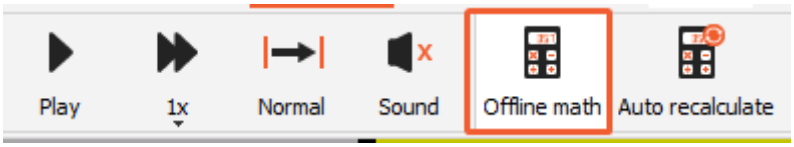


Illustration 38: Offline math

.... and add the SoundPower module. Do all the settings, ...

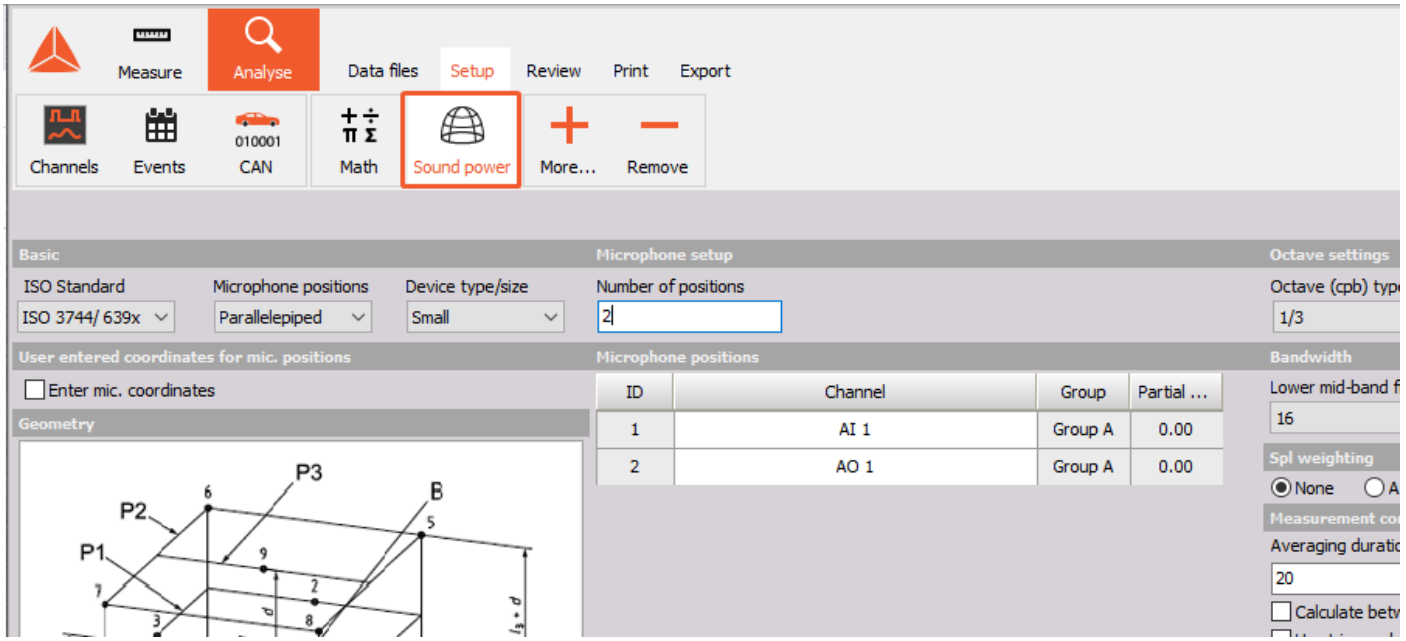


Illustration 39: Add SoundPower module offline

... then return with “Review” and do “Recalculate”.

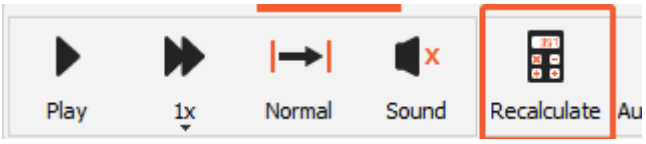


Illustration 40: Recalculate

Probably the calculation did not work yet, and you got a warning if you were using K1 correction. Please see next chapter how to place the cursors.

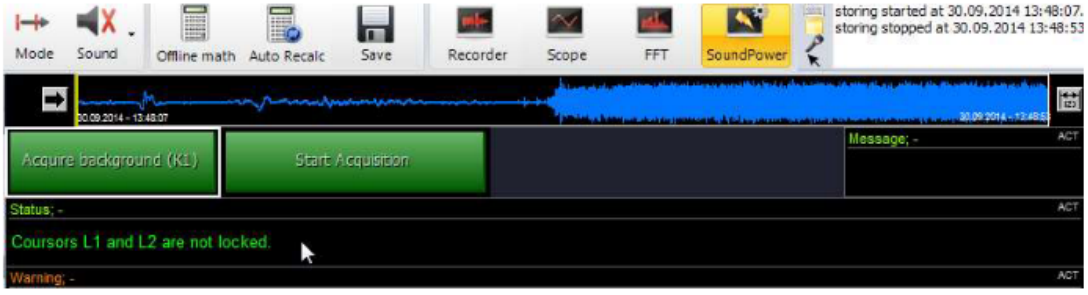


Illustration 41: Cursors not locked - Warning

8.1. Placing the cursors

We need to provide the plugin the information where is the background noise, and where to look for the sound source data. Position the white Cursor I at the start of the background noise and Cursor II at the start of the sound.

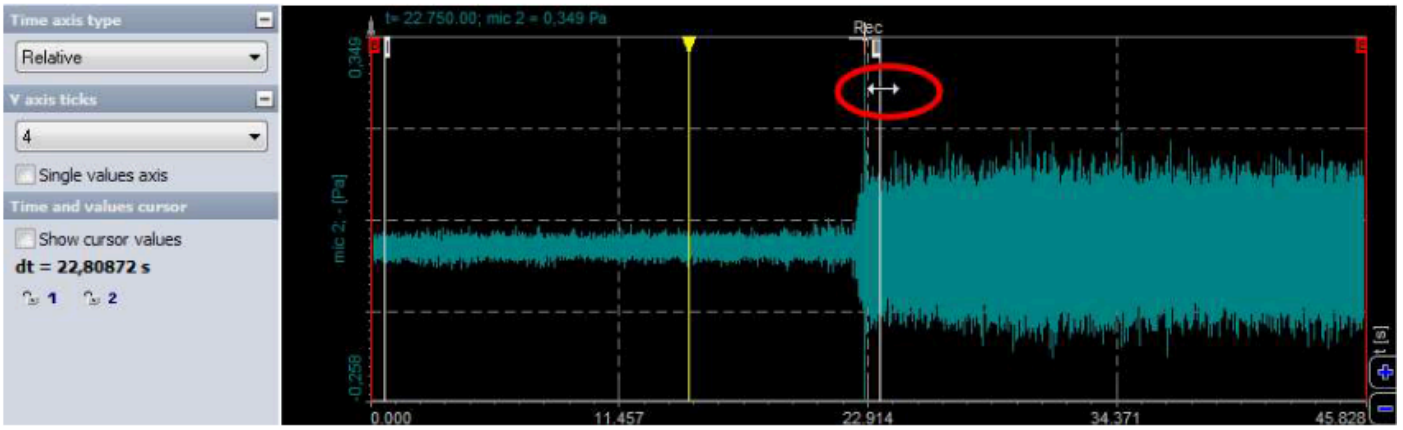


Illustration 42: Position the cursors

Then click on the cursor symbols to the left. The cursors change to green color, indicating they are locked now.

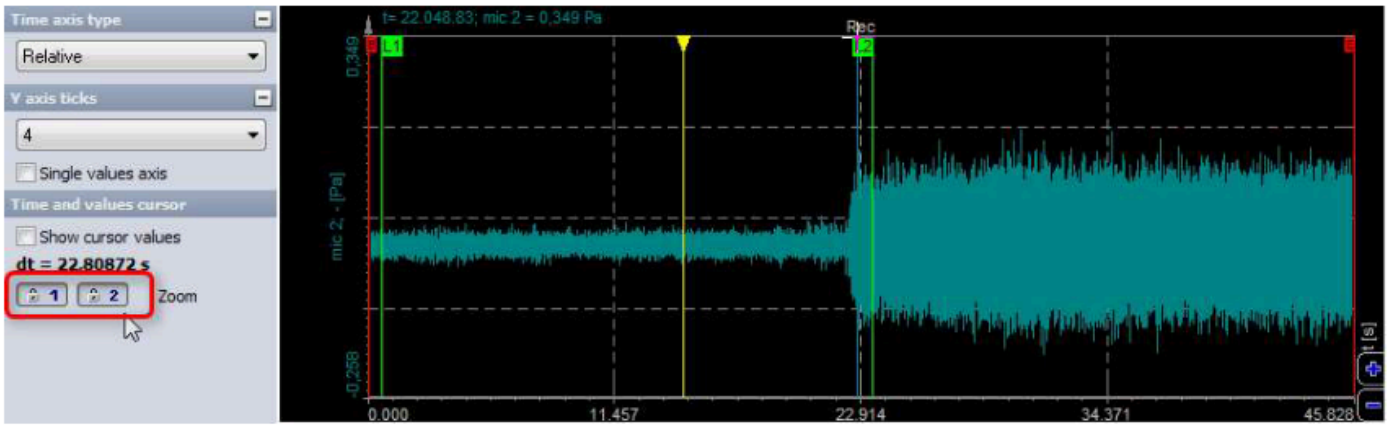


Illustration 43: Lock the cursors

Recalculate again, now the calculation is performed.

Hint

You can also perform the c on only one specific part of the data. Use the recorder instrument and zoom into the interesting area.

9. Export

When the calculations are finished, there are multiple options how to export the data out of DEWESoft® print the current display arrangement or export to clipboard or to external software.

For the first option just click on the button “Print”, and select the printer, which can also be a PDF.

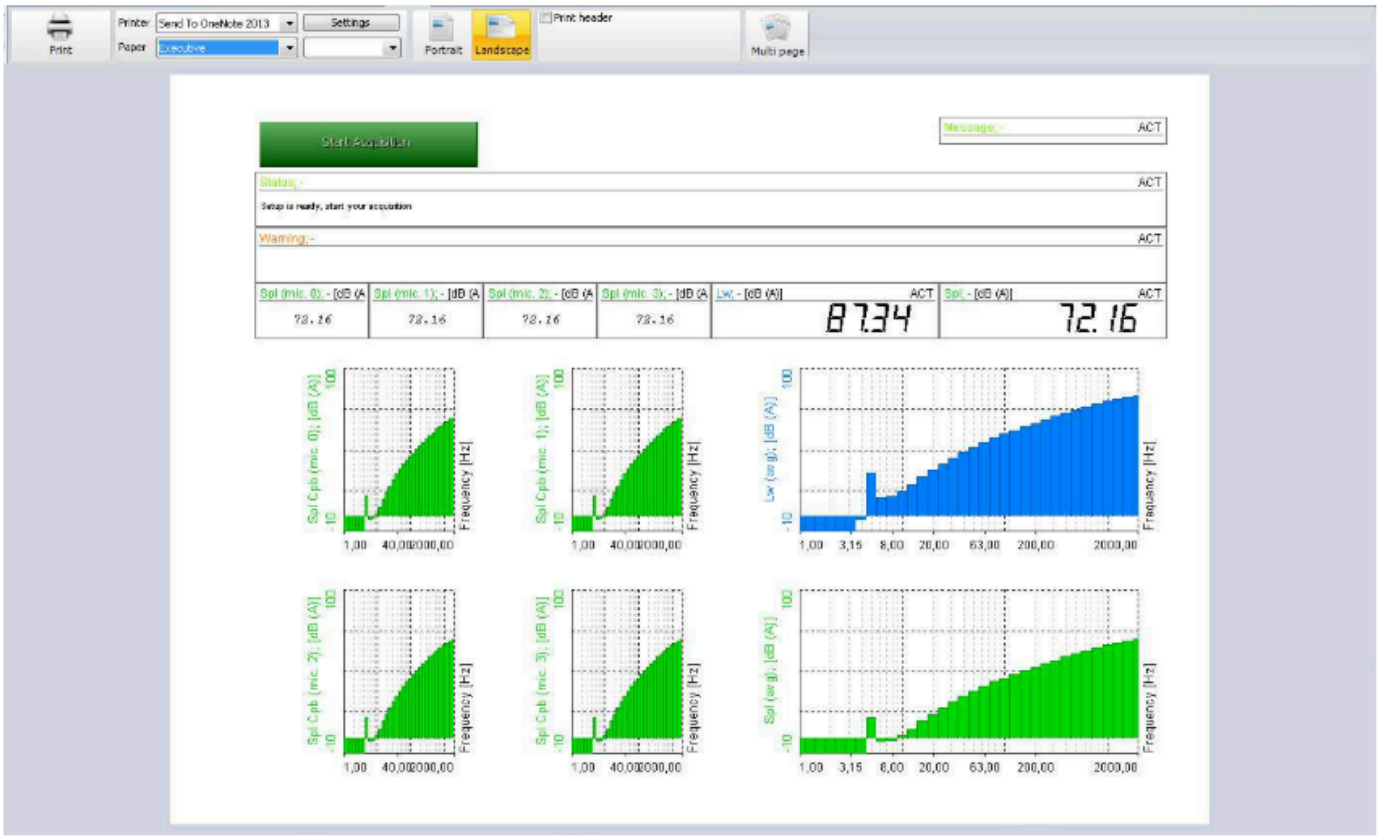


Illustration 44: Print current screen

A quick way to export the data is by using the clipboard. Click on the instrument, e.g. the Octave plot showing the K1 correction data, to set it active. Then select “Copy data to clipboard” from the Edit menu.

Start Excel and paste the data into, the columns and rows will be filled exactly with the data you see.

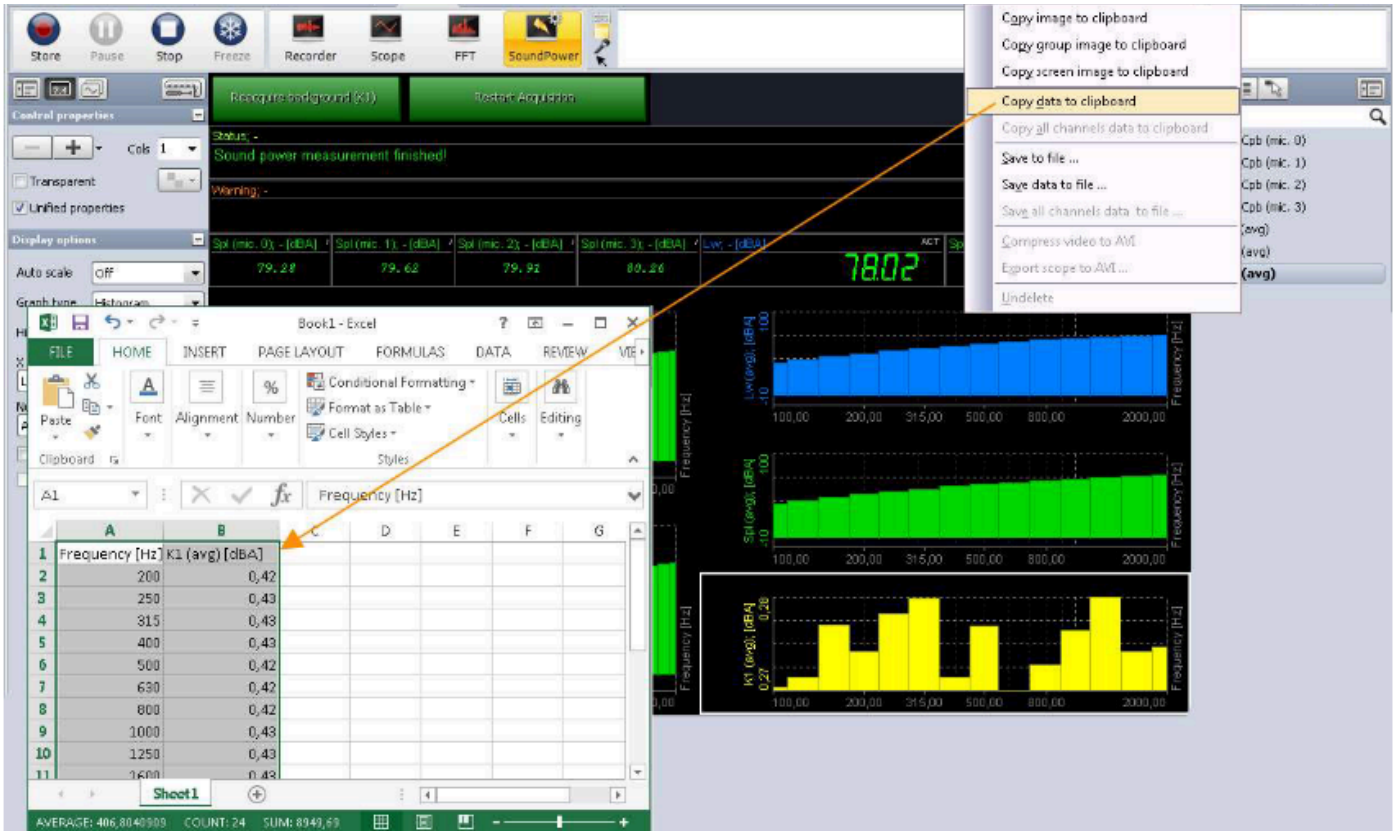


Illustration 45: Print current screen

Or use the default export into a lot of different file formats, such as Matlab, Excel, Diadem, RPCIII, CSV, etc..

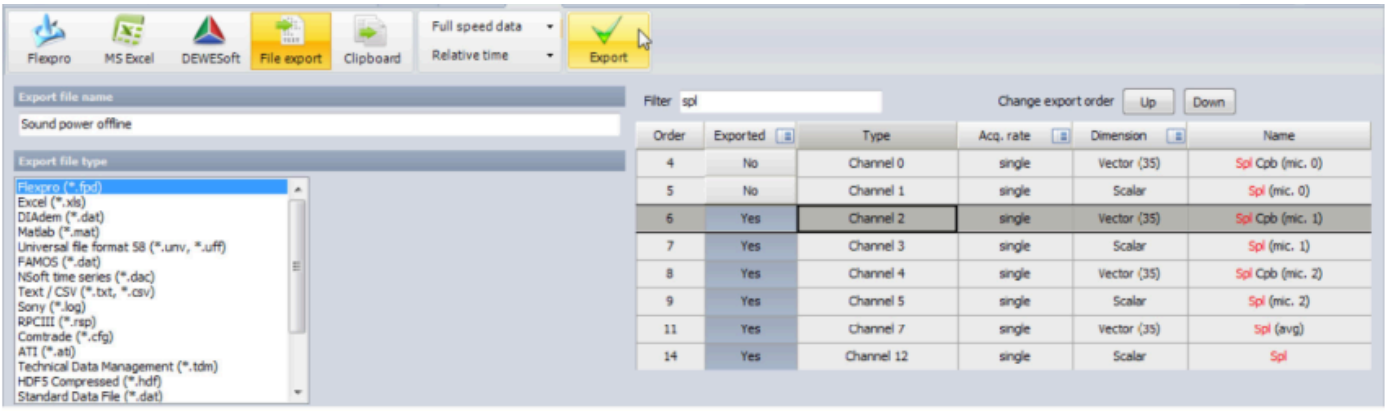


Illustration 46: Export formats

11. How to generate a Sound Power report

After the Sound Power measurement has been done, you can easily export into a prepared Excel template to automatically create your report by just pressing a button. This How-to guide shows how to install and modify the DEWESoft's example report.

11.1 Needed prerequisites

1. Microsoft Excel has to be installed!
2. Please import the data header file SoundPowerDataHeader.xml in DEWESoft® Settings > Settings -> Data Header. Then select when to ask the user to enter the details, e.g. "Ask for header on start"

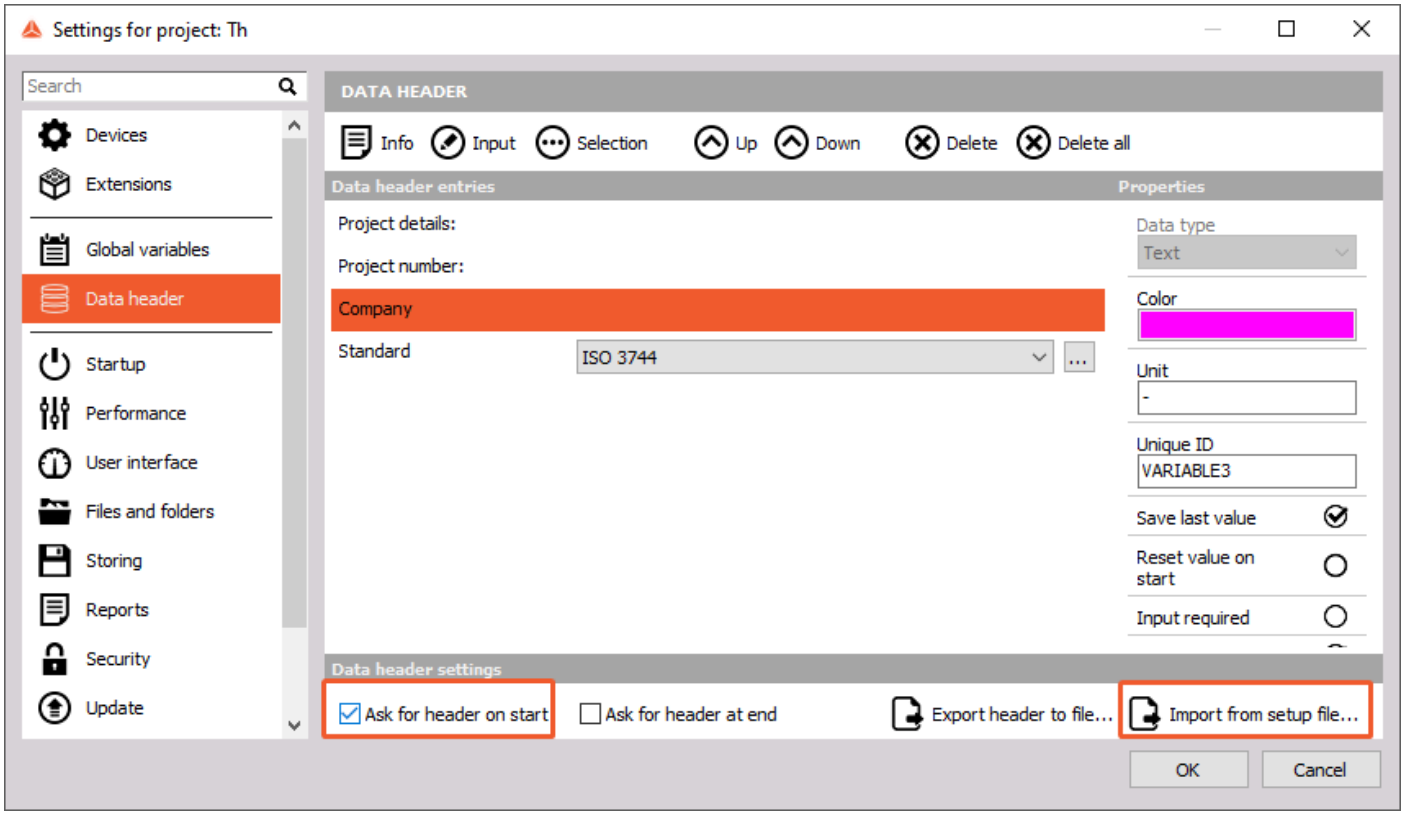


Illustration 47: Data header options

3. Please copy the template files
   - SoundPowerReport.xps
   - SoundPowerReport1.xlt
   - SoundPowerReport1.xltx

to your local DEWESoft® Scripts folder, e.g. D:\DEWESoft\System\Scripts

11.2 Creating the report

Restart DEWESoft®, open a soundpower file (**the Data Header must already have been filled during measurement!**), go to Export and select the Excel ribbon. The "Sound Power" template should be visible now in the list on the left.

Then **deselect all channels** in the list on the right. Fast channels would take too much time to export and we don't need them for the report.

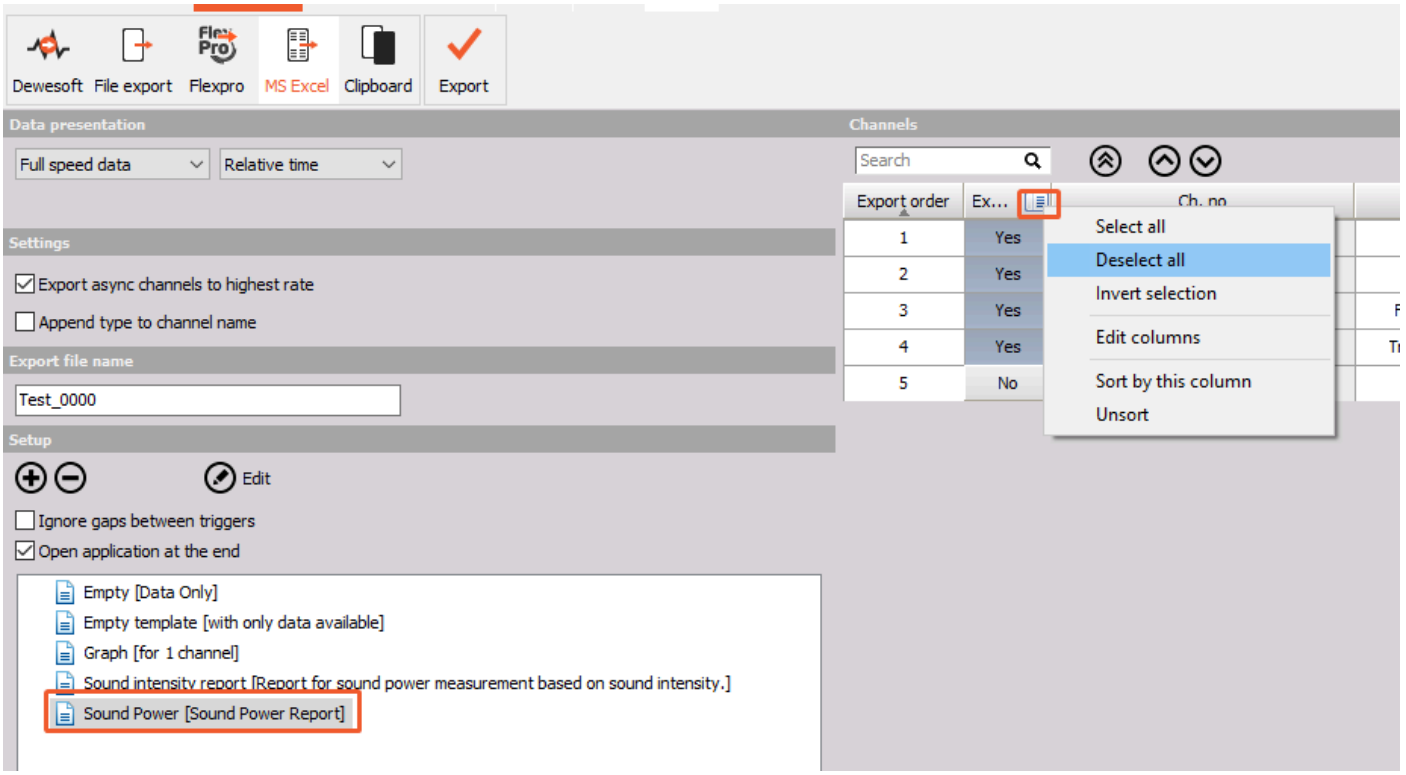
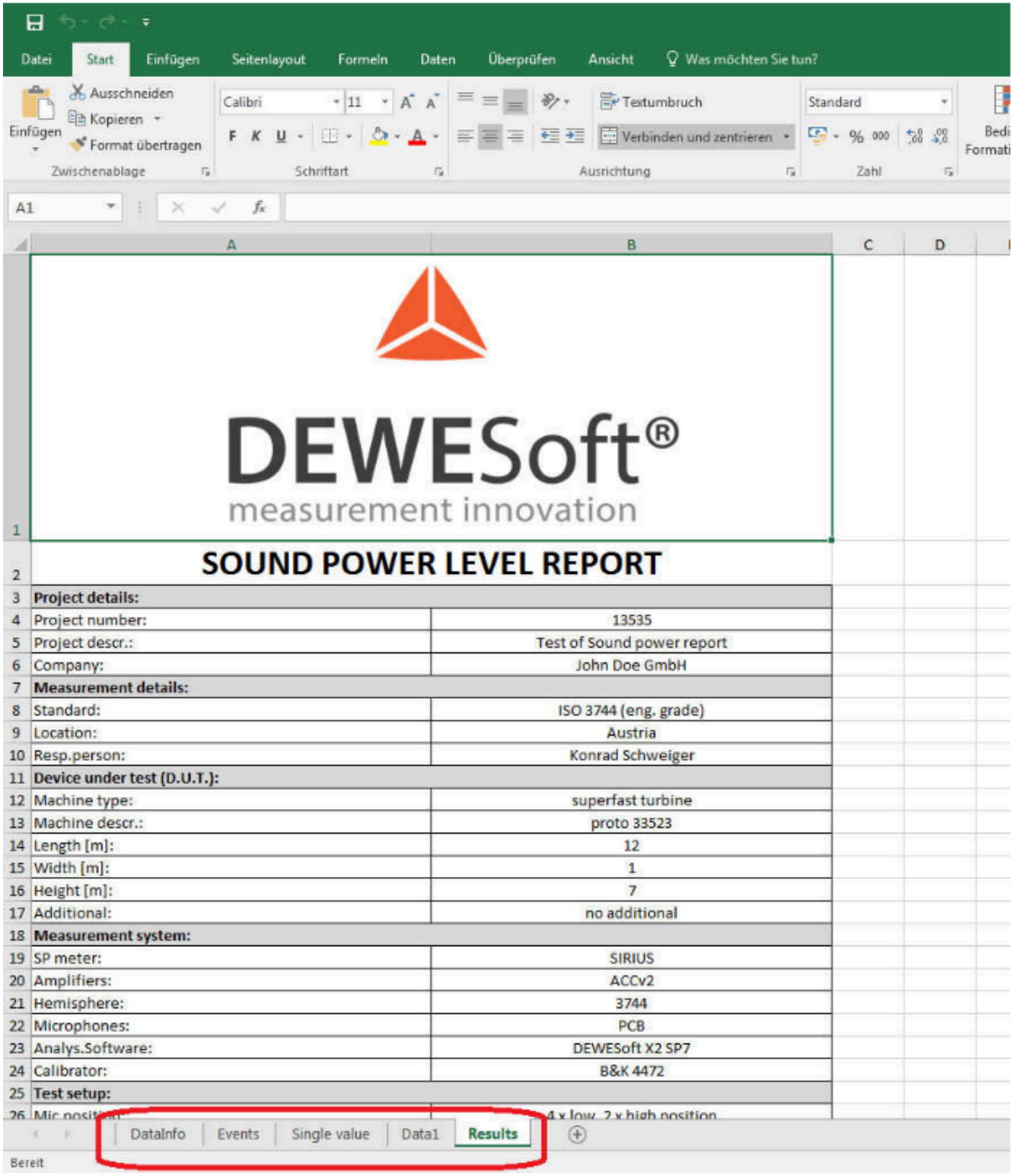


Illustration 48: Export template

From the Sampling column select only the "Single value channels' ', that will include all CPB plots and final results. Then click "Export". Excel will automatically start and fill the data into the template.



3	**Project details:**	
4	Project number:	13535
5	Project descr.:	Test of Sound power report
6	Company:	John Doe GmbH
7	**Measurement details:**	
8	Standard:	ISO 3744 (eng. grade)
9	Location:	Austria
10	Resp.person:	Konrad Schweiger
11	**Device under test (D.U.T.):**	
12	Machine type:	superfast turbine
13	Machine descr.:	proto 33523
14	Length [m]:	12
15	Width [m]:	1
16	Height [m]:	7
17	Additional:	no additional
18	**Measurement system:**	
19	SP meter:	SIRIUS
20	Amplifiers:	ACCv2
21	Hemisphere:	3744
22	Microphones:	PCB
23	Analys.Software:	DEWESoft X2 SP7
24	Calibrator:	B&K 4472
25	**Test setup:**	
26	Mic positions:	4 x low, 2 x high position

Illustration 49: Excel export template

Notice, that the Excel file contains multiple sheets:

- DataInfo … the data header details
- Events … events like start and stop storing, or notes added during measurement
- Single value … Sound power CPB's and overall levels
- Data1 … usually contains full-speed-data (e.g. with 50 kHz), but we deselected it
- al report

(the blue marked sheets are automatically filled with data, the red is just linked to them)

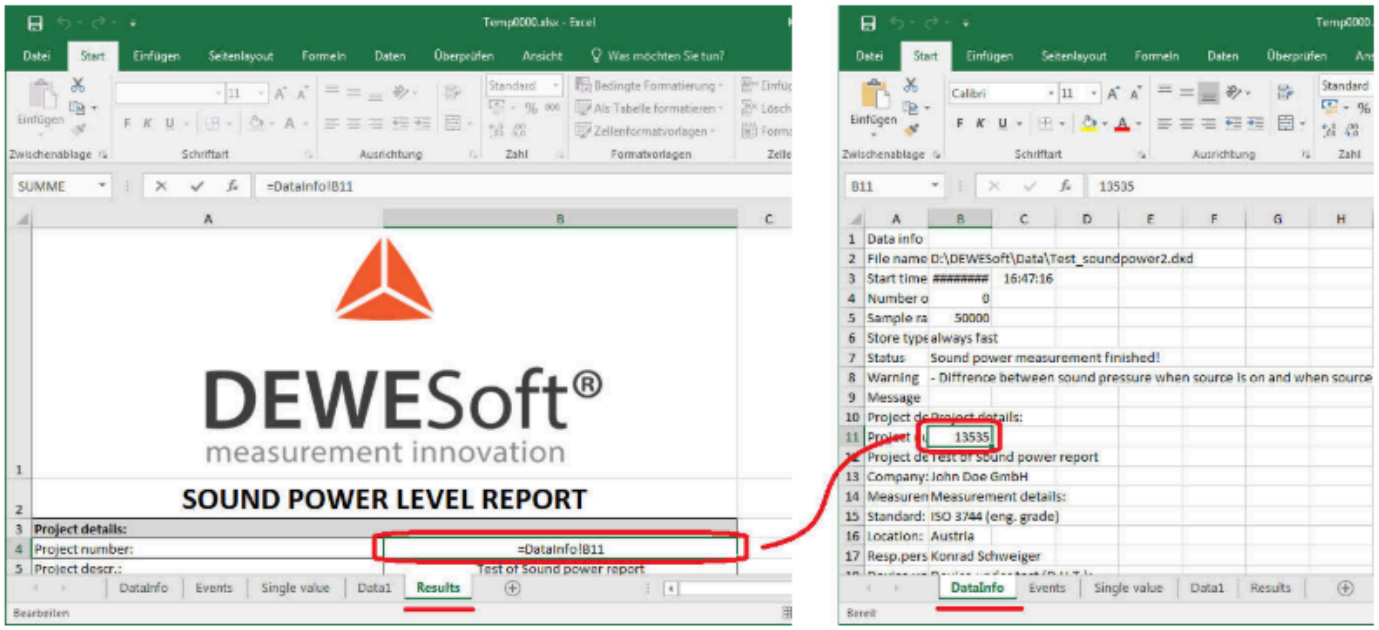


Illustration 50: Excel export template

As you can see, the Results sheet is linked to the other pages.

11.3. Modifying the template

If you want to change the example template, e.g. the company logo, click "Edit template".

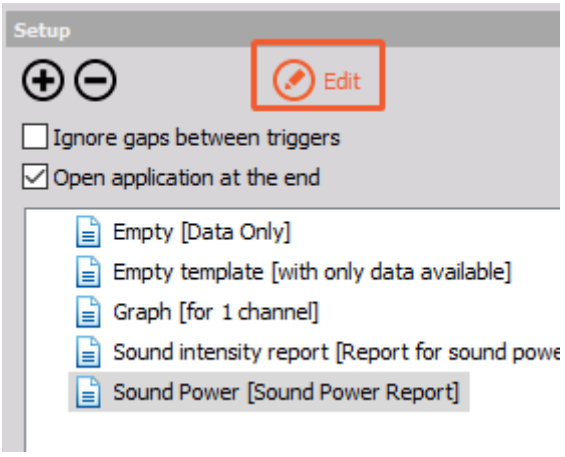


Illustration 51: Edit template

Excel will open the template file (notice the ending .xltx).

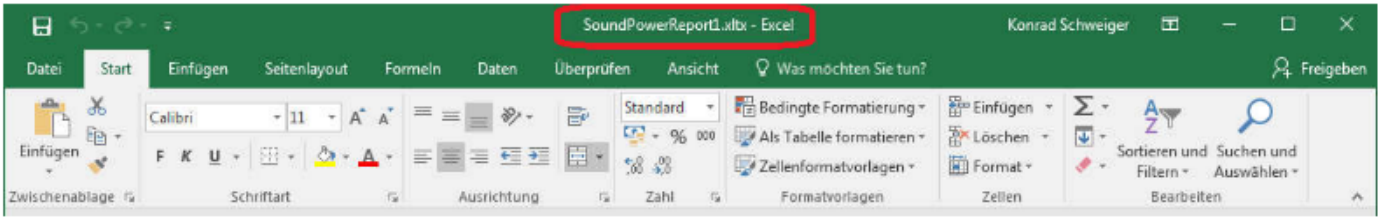


Illustration 52: Sound Power Report

The template is already filled with the current data.

To modify a cell, just press the equal sign (=), then you can move to one of the automatically filled sheets...

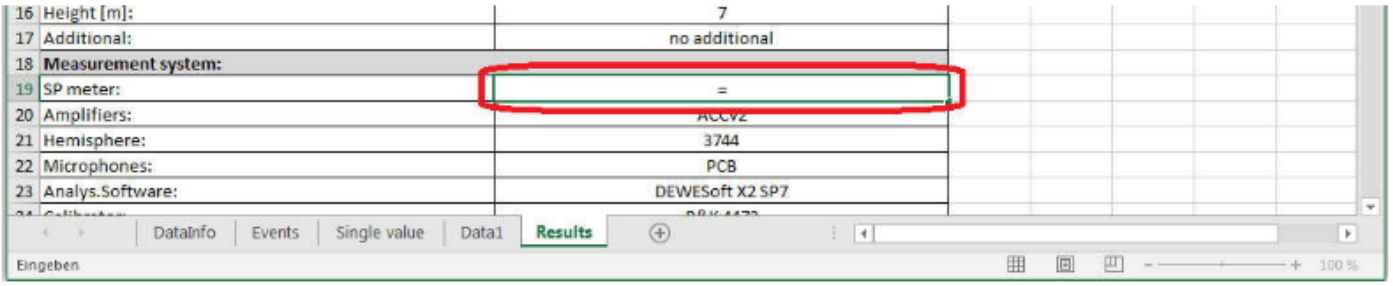


Illustration 53: Modify cell in Excel

... select the wanted cell and press Enter:

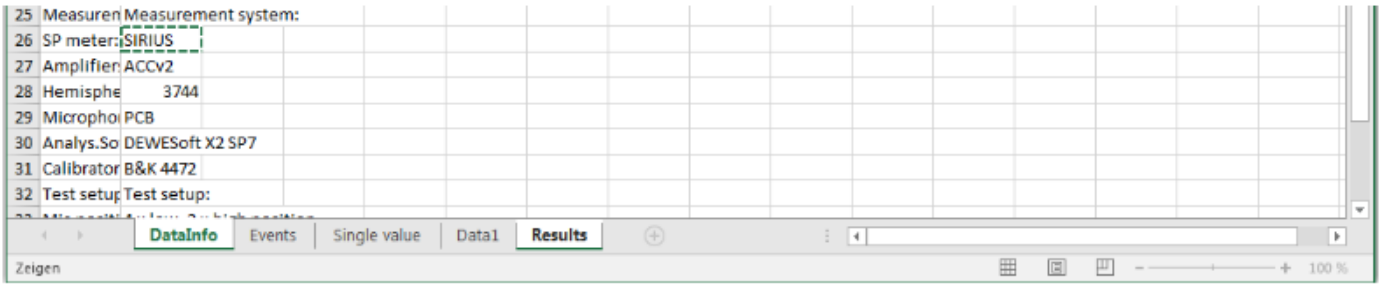


Illustration 54: Select the wanted cell

The cell will be linked now.

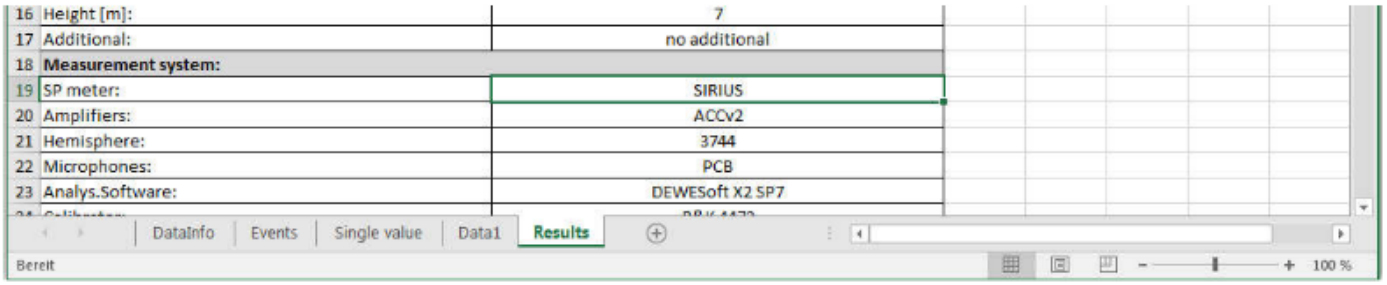


Illustration 55: Excel report

After you have done all your changes, it is important that you delete all the contents from all other pages except “Results”!!

Then press Save in Excel. Done.

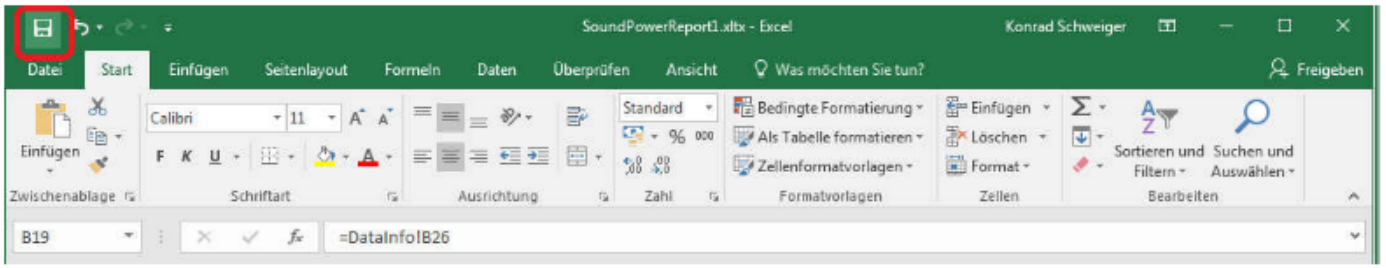


Illustration 56: Save the report

11. Warranty information

Notice
The information contained in this document is subject to change without notice.

Note:
Dewesoft d.o.o. shall not be liable for any errors contained in this document. Dewesoft MAKES NO WARRANTIES OF ANY KIND WITH REGARD TO THIS DOCUMENT, WHETHER EXPRESS OR IMPLIED. DEWESOFT SPECIFICALLY DISCLAIMS THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Dewesoft shall not be liable for any direct, indirect, special, incidental, or consequential damages, whether based on contract, tort, or any other legal theory, in connection with the furnishing of this document or the use of the information in this document.

The copy of the specific warranty terms applicable to your Dewesoft product and replacement parts can be obtained from your local sales and service office. To find a local dealer for your country, please visit https://dewesoft.com/support/distributors.

11.1. Calibration

Every instrument needs to be calibrated at regular intervals. The standard norm across nearly every industry is annual calibration. Before your Dewesoft data acquisition system is delivered, it is calibrated. Detailed calibration reports for your Dewesoft system can be requested. We retain them for at least one year, after system delivery.

11.2. Support

Dewesoft has a team of people ready to assist you if you have any questions or any technical difficulties regarding the system. For any support please contact your local distributor first or Dewesoft directly.

Dewesoft d.o.o.
Gabrsko 11a
1420 Trbovlje Slovenia

Europe Tel.: +386 356 25 300
Web: http://www.dewesoft.com
Email: Support@dewesoft.com
The telephone hotline is available Monday to Friday from 07:00 to 16:00 CET (GMT +1:00)

11.3. Service/repair

The team of Dewesoft also performs any kinds of repairs to your system to assure a safe and proper operation in the future. For information regarding service and repairs please contact your local distributor first or Dewesoft directly on https://dewesoft.com/support/rma-service.

11.4. Restricted Rights

Use Slovenian law for duplication or disclosure. Dewesoft d.o.o. Gabrsko 11a, 1420 Trbovlje, Slovenia / Europe.

11.5. Printing History

Version 2.0.0, Revision 217 Released 2015 Last changed: 23. July 2018 at 16:54.

11.6. Copyright

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12. Safety instructions

Your safety is our primary concern! Please be safe!

12.1. Safety symbols in the manual

Warning
Calls attention to a procedure, practice, or condition that could cause the body injury or death

Caution
Calls attention to a procedure, practice, or condition that could possibly cause damage to equipment or permanent loss of data.

12.2. General Safety Instructions

Warning

The following general safety precautions must be observed during all phases of operation, service, and repair of this product. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the product. Dewesoft d.o.o. assumes no liability for the customer's failure to comply with these requirements.

All accessories shown in this document are available as an option and will not be shipped as standard parts.

12.2.1. Environmental Considerations

Information about the environmental impact of the product.

12.2.2. Product End-of-Life Handling

Observe the following guidelines when recycling a Dewesoft system:

12.2.3. System and Components Recycling

Production of these components required the extraction and use of natural resources. The substances contained in the system could be harmful to your health and to the environment if the system is improperly handled at its end of life! Please recycle this product in an appropriate way to avoid unnecessary pollution of the environment and to keep natural resources.

This symbol indicates that this system complies with the European Union's requirements according to Directive 2002/96/EC on waste electrical and electronic equipment (WEEE). Please find further information about recycling on the Dewesoft web site www.dewesoft.com

Restriction of Hazardous Substances

This product has been classified as Monitoring and Control equipment and is outside the scope of the 2002/95/EC RoHS Directive. However, we take care of our environment and the product is lead-free.

12.2.4. General safety and hazard warnings for all Dewesoft systems

Safety of the operator and the unit depend on following these rules.

- Use this system under the terms of the specifications only to avoid any possible danger.
- Read your manual before operating the system.
- Observe local laws when using the instrument.
- DO NOT touch internal wiring!
- DO NOT use higher supply voltage than specified!
- Use only original plugs and cables for harnessing.
- You may not connect higher voltages than rated to any connectors.
- The power cable and connector serve as Power-Breaker. The cable must not exceed 3 meters, the disconnect function must be possible without tools.
- Maintenance must be executed by qualified staff only.
- During the use of the system, it might be possible to access other parts of a more comprehensive system. Please read and follow the safety instructions provided in the manuals of all other components regarding warning and security advice for using the system.
- With this product, only use the power cable delivered or defined for the host country.
- DO NOT connect or disconnect sensors, probes or test leads, as these parts are connected to a voltage supply unit.
- Ground the equipment: For Safety Class 1 equipment (equipment having a protective earth terminal), a non-interruptible safety earth ground must be provided from the mains power source to the product input wiring terminals.
- Please note the characteristics and indicators on the system to avoid fire or electric shocks. Before connecting the system, please read the corresponding specifications in the product manual carefully.
- The inputs must not, unless otherwise noted (CATx identification), be connected to the main circuit of category II, III and IV.
- The power cord separates the system from the power supply. Do not block the power cord, since it has to be accessible for the users.
- DO NOT use the system if equipment covers or shields are removed.
- If you assume the system is damaged, get it examined by authorized personnel only.
- Adverse environmental conditions are Moisture or high humidity Dust, flammable gases, fumes or dissolver Thunderstorm or thunderstorm conditions (except assembly PNA) Electrostatic fields, etc.
- The measurement category can be adjusted depending on module configuration.
- Any other use than described above may damage your system and is attended with dangers like short-circuiting, fire or electric shocks.
- The whole system must not be changed, rebuilt or opened.
- DO NOT operate damaged equipment: Whenever it is possible that the safety protection features built into this product have been impaired, either through physical damage, excessive moisture, or any other reason, REMOVE POWER and do not use the product until the safe operation can be verified by service-trained personnel. If necessary, return the product to Dewesoft sales and service office for service and repair to ensure that safety features are maintained.
- If you assume a more riskless use is not provided anymore, the system has to be rendered inoperative and should be protected against inadvertent operation. It is assumed that a more riskless operation is not possible anymore if the system is damaged obviously or causes strange

noises. The system does not work anymore. The system has been exposed to long storage in adverse environments. The system has been exposed to heavy shipment strain.

- Warranty void if damages caused by disregarding this manual. For consequential damages, NO liability will be assumed!
- Warranty void if damage to property or persons caused by improper use or disregarding the safety instructions.
- Unauthorized changing or rebuilding the system is prohibited due to safety and permission reasons (CE).
- Be careful with voltages >25 VAC or >35 VDC! These voltages are already high enough in order to get a perilous electric shock by touching the wiring.
- The product heats during operation. Make sure there is adequate ventilation. Ventilation slots must not be covered!
- Only fuses of the specified type and nominal current may be used. The use of patched fuses is prohibited.
- Prevent using metal bare wires! Risk of short circuit and fire hazard!
- DO NOT use the system before, during or shortly after a thunderstorm (risk of lightning and high energy over-voltage). An advanced range of application under certain conditions is allowed with therefore designed products only. For details please refer to the specifications.
- Make sure that your hands, shoes, clothes, the floor, the system or measuring leads, integrated circuits and so on, are dry.
- DO NOT use the system in rooms with flammable gases, fumes or dust or in adverse environmental conditions.
- Avoid operation in the immediate vicinity of high magnetic or electromagnetic fields, transmitting antennas or high-frequency generators, for exact values please refer to enclosed specifications.
- Use measurement leads or measurement accessories aligned with the specification of the system only. Fire hazard in case of overload!
- Do not switch on the system after transporting it from a cold into a warm room and vice versa. The thereby created condensation may damage your system. Acclimatise the system unpowered to room temperature.
- Do not disassemble the system! There is a high risk of getting a perilous electric shock. Capacitors still might be charged, even if the system has been removed from the power supply.
- The electrical installations and equipment in industrial facilities must be observed by the security regulations and insurance institutions.
- The use of the measuring system in schools and other training facilities must be observed by skilled personnel.
- The measuring systems are not designed for use in humans and animals.
- Please contact a professional if you have doubts about the method of operation, safety or the connection of the system.
- Please be careful with the product. Shocks, hits and dropping it from already- lower level may damage your system.
- Please also consider the detailed technical reference manual as well as the security advice of the connected systems.
- This product has left the factory in safety-related flawlessness and in proper condition. In order to maintain this condition and guarantee safety use, the user has to consider the security advice and warnings in this manual.

EN 61326-3-1:2008

IEC 61326-1 applies to this part of IEC 61326 but is limited to systems and equipment for industrial applications intended to perform safety functions as defined in IEC 61508 with SIL 1-3.

The electromagnetic environments encompassed by this product family standard are industrial, both indoor and outdoor, as described for industrial locations in IEC 61000-6-2 or defined in 3.7 of IEC 61326-1.

Equipment and systems intended for use in other electromagnetic environments, for example, in the process industry or in environments with potentially explosive atmospheres, are excluded from the scope of this product family standard, IEC 61326-3-1.

Devices and systems according to IEC 61508 or IEC 61511 which are considered as “operationally well-tried”, are excluded from the scope of IEC 61326-3-1.

Fire-alarm and safety-alarm systems, intended for the protection of buildings, are excluded from the scope of IEC 61326-3-1.

13. Documentation version history

Version	Date	Notes
1.0	26/09/14	initial revision for plugin version 1.1
1.1	15/01/15	Dewesoft® manual template, structural rework
1.2	15/01/15	4.1.1 ISO standards: ISO3744/ISO3745, free field/anechoic, was exchanged
1.3	15.09.15	4.1.1 ISO standards: typo: should be hemi-anechoic instead of semi-anechoic
1.4	10.03.15	Added ISO 3741 standard renewed screenshots for licensing for X2
1.5	28.3.17	Added triggers, runs description. Renewed screenshots for current GUI
V20-1	1.10.2020	New Template, Sound power report
V24-1	26.01.2024	Updated Scripts folder path for Sound power report