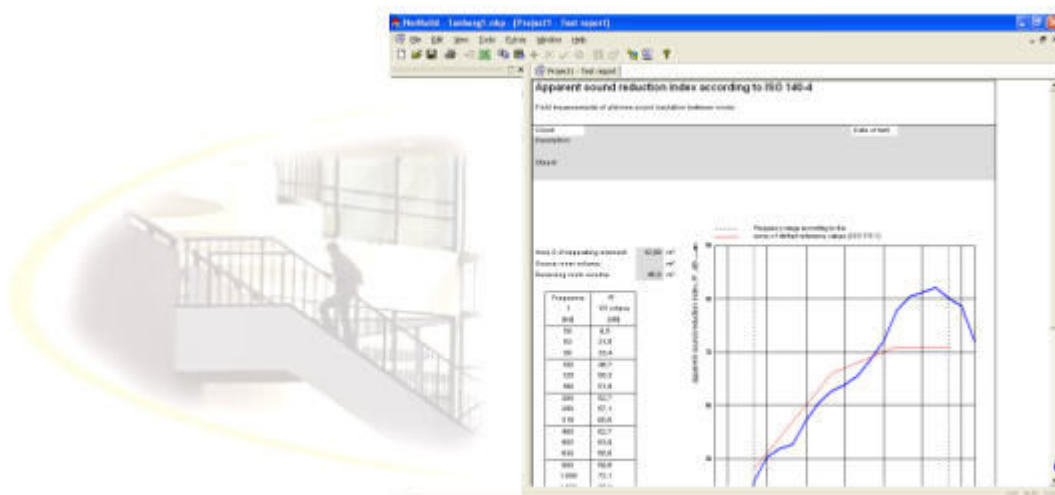


NorBuild Program for the calculation of sound insulation indices

Type Nor-1028



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Introduction

Support

Support for International Users:

Please contact either the Agent from whom you purchased NorBuild, or Norsonic AS, Norway:

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Fax.: +47 32852208

E-Mail: support@norsonic.com

Web site:
www.norsonic.com

Norsonic AS, P.O. Box 24, N-342 Lierskogen, Norway

Installation & registration

The NorBuild program is delivered on a CD and may be installed directly onto your computer following the instructions below. For the installation of the software you need administrator rights for your computer.

1. Insert the CD-ROM into the drive. If the CD-ROM does not start automatically use Windows Explorer to locate the file *Install.exe* in the root directory of the CD, double-click it and follow the instructions to complete the auto-install of NorBuild.

2. Plug the delivered dongle **after the successful installation of NorBuild** into the USB port.

This software program is protected by a software protection plug (dongle). The software driver for the dongle will be installed automatically by the installation program of NorBuild. When plugged into the USB port, the red LED inside the dongle should light up, indicating its full functionality.

3. Start the NorBuild program. NorBuild will then automatically recognize your registration data.

In the other case, the dialog box "Product Registration" will open. Key in the Company, User name and the 32 character Registration code exactly as written in your license information. You may enter DEMO to enable all available

options for a 30 day trial period.

For information about additional options and how to install / register them, see chapter *Install options*.

Possible error messages and solutions

“Software protection plug not found. Make sure it is installed correctly.”

- Check if the dongle is plugged into the USB port.
- If this is the case, the automatic installation of the dongle driver may not have been successful. This can be the case even with the red LED in the dongle lightening. That means that Windows has recognized the dongle as “new hardware” and used a Windows driver. Please start the installation of the dongle driver manually by launching the file *HASPUserSetup.exe* from the NorBuild program folder or from the CD.

Uninstalling NorBuild

Norsonic recommends that you uninstall any older versions of NorBuild prior to installing new versions. Running multiple versions of NorBuild applications on the same computer is not recommended or supported by Norsonic.

To uninstall NorBuild:

1. From the **Start** menu, select **Settings > Control Panel > Software**
2. Click on **Add/Remove Programs**.
3. Click the **Install/Uninstall** tab, if your version of Windows has it.
4. From the list of programs that you can remove, select **NorBuild**.
5. Click **Add/Remove**.
6. At the prompt, click **Yes** to confirm that you want to remove the NorBuild program. The uninstall program removes program files, folders, and registry entries.
7. When the files are removed, the uninstall program indicates that the process is complete. Click **Finish**.

System requirements

Processor/memory

233 MHz Pentium-class processor with 128Mb RAM (minimum).
600 MHz Pentium III-class processor with 256Mb RAM (recommended).

Display

800x600 or higher resolution display with 16-bit colours (minimum).

USB Port

One USB port has to be available for the software protection module.

Operating system

Windows XP.
Windows 2000.
Windows Vista.
Windows 7/8/8.1

It is possible that NorBuild also runs on older operating systems.

In order to be able to open and edit Excel files, MS-Excel (version 2002 or better) needs to be installed. However, the NorBuild Export function (sole export without opening the Excel file) does not require MS-Excel to be installed.

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Getting started

Overview

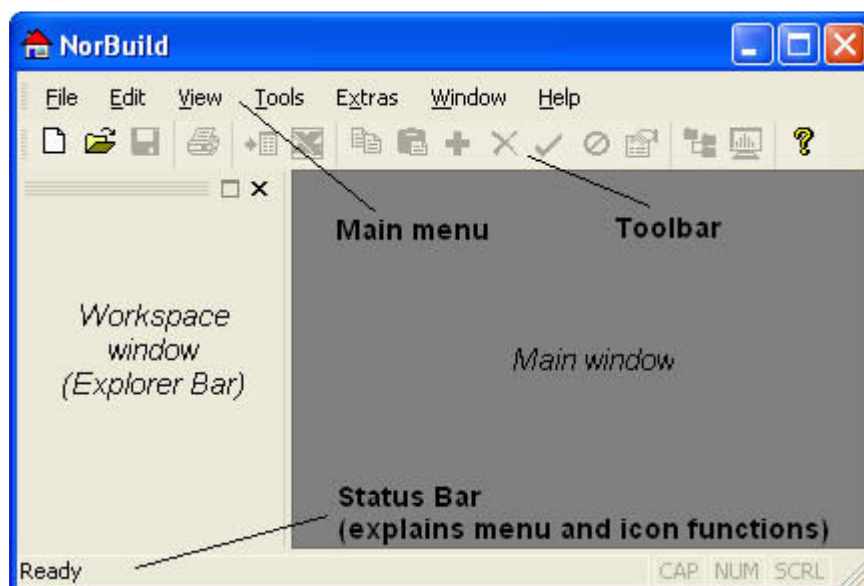
NorBuild is a program for the calculation of building acoustic indices as set out in various National and International Standards.

The optional software module CtrlBuild will guide the operator through the various measurement functions for the data acquisition. Once the measurement data has been acquired NorBuild is used to perform the complex calculations needed following the exact requirements of the selected standards.

Hard copy reports are provided in the format specified by the selected standard. The 'report' option allows exporting projects to MS-Excel for user-specific formatting.

Starting NorBuild

Launch NorBuild like any other MS-Windows program: *Start > Programs > Norsonic > NorBuild*. The program window of NorBuild appears:



In the *View* menu you can define whether the Toolbar, Explorer Bar and /or the Status Bar should be visible or hidden. In order to view or hide the Toolbar, click *View > Toolbar*.

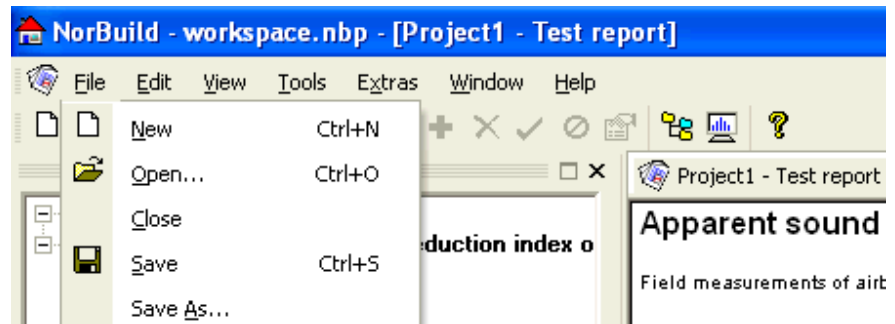
Using NorBuild

The operation of NorBuild is either by keyboard or mouse. These may be used to access the main menu, dialog boxes and control buttons.

When the mouse pointer is located over a button, a description of its function will appear in the status bar at the bottom of the program window.

The operational procedures of NorBuild follow the general principles of MS-Windows programs.

By means of hot keys (underlined letters) the menu functions may be accessed via the keyboard; hold the Alt-button, and type the underlined letter of the menu (e.g. Alt+'F' to open the File menu). Within the menu the hot key letter gives direct access to the functions without the need to use the Alt-button (e.g. 'A' for Save As...).



When working with NorBuild some menu items result in a function, others open a dialog box, those followed by '...' open a dialog box.

Clicking the mouse means pushing and releasing the mouse button in a single move. A double click means two successive clicks on the same screen item. Unless stated to the contrary all mouse clicks are made with the left key.

Words that are written *italic* in the handbook (like *save*) are describing menu points, and you can activate them either by mouse or keyboard. Folders in the project tree and titles of opened windows are referred to using "quotation marks". Individual items within a project folder (measurement or protocol) are referred to using 'single quotation marks'.

Summary

The evaluation of a building acoustic measurement with NorBuild includes a few simple steps. These steps are described in more detail in the appropriate section of this manual.

The calculations in NorBuild are done automatically, the entire project is updated as soon as you change any input value.

1. Create a new project

(see chapter *Administrating Projects*)

2. Choose the correction table

(see chapter *Correcting measurement data*)

3. Import the measurement data

(see chapter *Importing measurement data*)

4. Enter room and building element data

(see chapter *Protocols*)

5. Perform the background noise level correction

(see chapter *Background noise correction*)

6. Print the protocol and report

(see chapter *Printing*)

7. Save the project

Administreating projects

General

A NorBuild project includes all measured values, calculation parameters and protocol statements.

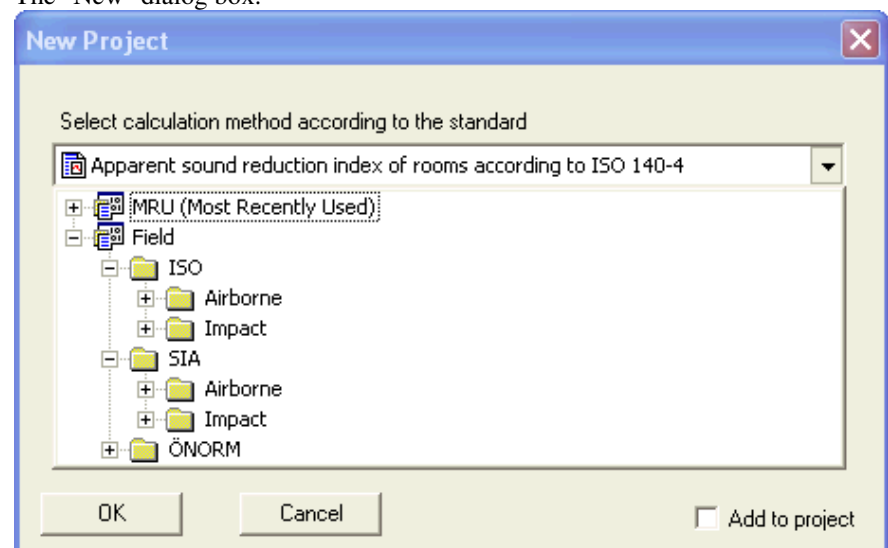
A project is organised in a tree structure, it will be updated as you work with NorBuild.

Creating a project

When creating a new project a building acoustic standard is chosen according to which the analysis shall be conducted.

A new project is created by using the *New* command (*File > New*).

The "New" dialog box:



The standards are organised in a tree, e.g. various ISO standards can be found in the folder "ISO" and its sub-folders.

National Standards (like SIA) are available as an option and are stored in the according folders.


The directory "MRU (Most Recently Used)" contains the most recently used standards allowing a quicker access to frequently used standards.

If the box "Add to project" is checked the project will appear together with other

already opened projects in the workspace window. If it is not checked the workspace window will be cleared so that only the new project will appear in the workspace window (see chapter *Working in the workspace window*). All previously opened projects are closed automatically. NorBuild prompts you to save projects with unsaved changes.

Choose the standard according to which the evaluation shall be conducted and click *OK*.

Shortcuts:

Toolbar: 

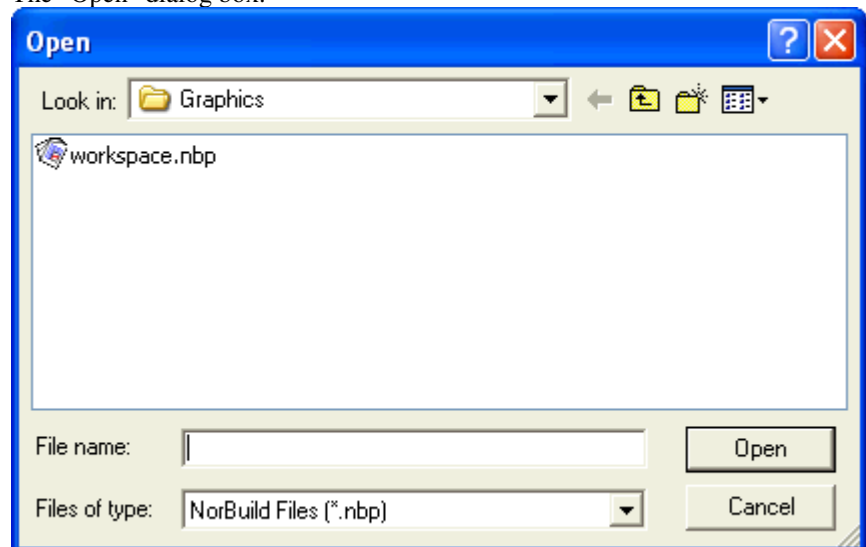
Keys: **Ctrl + N**

Opening existing projects

An existing NorBuild file can be opened in two ways:

- Double-click the project file in the Windows Explorer.
- Use the *Open* command (*File > Open*):

The "Open" dialog box:




Choose the directory and select the NorBuild file to be opened. Then click *Open*.

A NorBuild file has the extension *.nbp.

Opening a NorBuild file means to open a previously stored workspace which can either hold one or several individual projects.

Shortcuts:

Toolbar: 

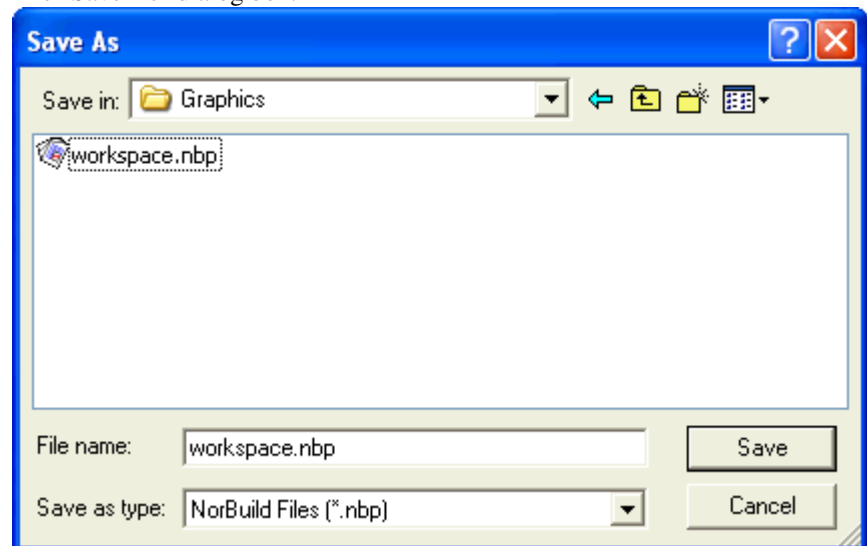
Keys: **Ctrl+O**

Saving project data

Use the command *File > Save* to save the project / workspace to its current name and directory. The workspace can hold one or several individual projects.


When you save a project / workspace for the first time, NorBuild displays the "Save As" dialog box so that you can name it. If you want to change the name and directory of an existing file before you save it, choose the *Save As* command.

The "Save As" dialog box:



A NorBuild file has the extension *.nbp.

Shortcuts:

Toolbar: 

Keys: **Ctrl+S**

Closing the workspace

Use the command *File > Close* to close an open workspace / project. NorBuild prompts you to save projects with unsaved changes.

Working in the workspace window

The workspace window is the place to do project administration. You can create several projects in one workspace and save it as one NorBuild file.

A project tree will be updated as you work with NorBuild. A project includes all measured values, calculation parameters and protocol statements. A NorBuild project holds the two folders "Results" and "Measurement data".

The exact layout of the project tree depends on the selected standard.

"Results":

This folder contains the results of the analysis summarized in protocol statements (see chapter *Protocols*):

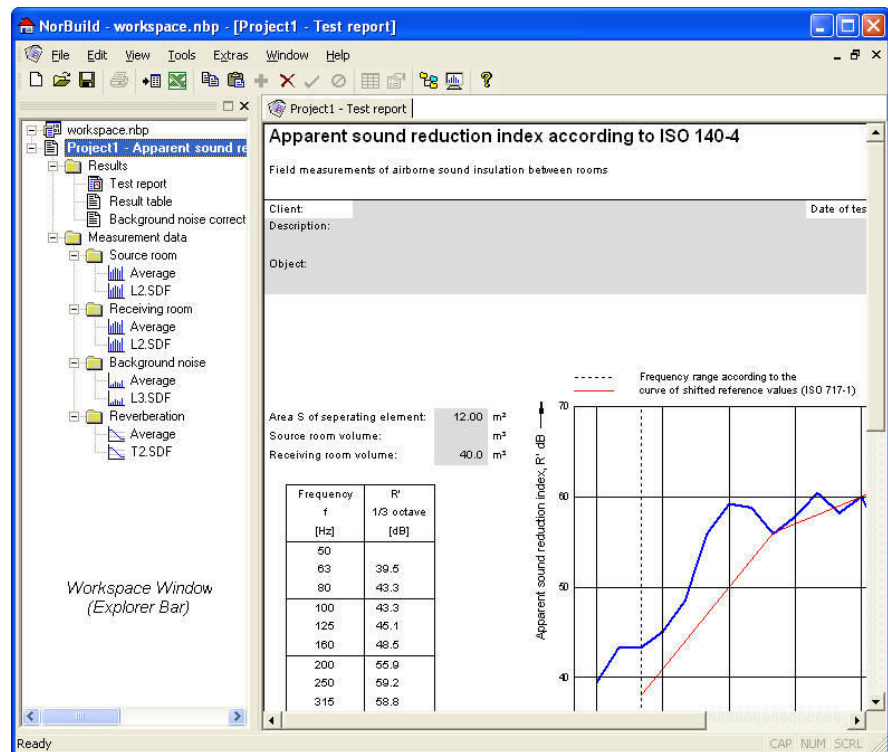
- *'Test report'*: the formal report sheet as specified in the selected standard.
- *'Result table'*: a summary of all numerical results of the analysis.
- *'Background noise correction table'*: a summary of the background noise correction data.

"Measurement data":

For example for the calculation of the 'apparent sound reduction index according to ISO 140-4' the folder "Measurement data" contains four sub-folders:

- "Source room": contains the source room measurements
- "Receiving room": contains the receiving room measurements
- "Background noise": contains the background noise measurements
- "Reverberation": contains the reverberation time measurements

Any item within these folders can be opened by double-clicking it or by using *View > Open*. There is also a context menu (right mouse click) holding the menu commands that are available for the currently selected item. It is then opened in the *Main window*, as the 'Test report' below.



In the workspace window you can:

- Open measurement tables and/or protocol statements
- Import new measurements
(see chapter *Importing measurement data*)
- Delete measurements
- Rename a project or measurement
- Copy and Paste measurements or use drag & drop
- Swap source and receiving room measurements
- View properties of a measurement
- Define the Page and Print Setup
(see chapter *Printing*)

The topics *Importing measurement data* and *Printing* are dealt with in extra chapters; the other functions are explained in more detail in the following sections of this chapter.

Opening tables or protocols

Use the command *View > Open* to open measurement tables or protocol statements.

Select the desired measurement or protocol statement by clicking on its title in the project tree. Then choose the *Open* command either from the *View* menu or from the *Context* menu (right mouse click). Alternatively you can double-click on the desired item in the project tree.

The table will be opened as a new window within the main window.

Deleting a measurement

Use the command *Edit > Delete* to delete the selected measurement. To select a measurement to delete, click on it to activate it and then use this command.

Select the desired measurement by clicking on the measurement title in the project tree. Then choose the *Delete* command either from the *Edit* menu or from the *Context* menu (right mouse click).

Shortcuts:

Toolbar: 

Keys: **DEL**

Renaming a project or measurement

Use the command *Edit > Rename* to rename a selected item in the project tree.

Click on the desired item in the project tree to activate it for the *Rename* function. Then you can use the command *Rename* from the *Edit* menu or from the *context* menu (right mouse click). Alternatively you can just click on the item twice to make it editable (like in Windows Explorer).

The availability of this command depends on the actual item selected. Only the project and individual measurements can be renamed. The title of protocol statements (in the "Results" folder) or the folder names cannot be renamed.

A measurement name can also be changed within the measurement table (see chapter *Tables of measurement series*). Just click on the title cell of the measurement and enter the new name (as in Excel).

Laboratory measurements

NorBuild offers the possibility to calculate and display laboratory measurements according the following standards:

- Sound reduction index according to ISO 140-3
- Apparent sound reduction index according to ISO 140-3
- Suspended ceiling normalized level difference to ISO 140-9
- Element-normalized level difference according to ISO 140-10
- Normalized impact sound pressure levels according to ISO 140-6
- Reduction of impact sound pressure level according to ISO 140-8

Please proceed as follows:

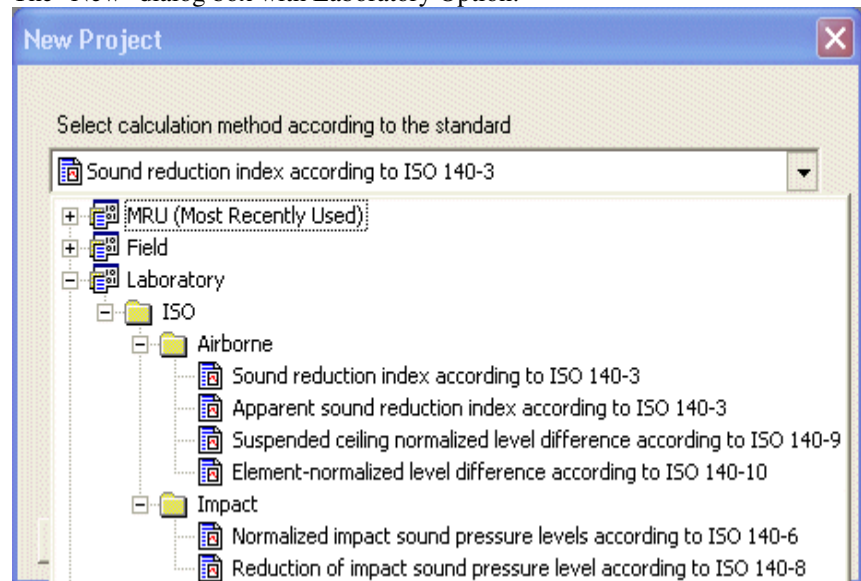
- [Creating a new laboratory project](#)
- [Working in the workspace window in laboratory projects](#)

- [Data import into laboratory projects](#)
- [Flanking transmission correction](#)

Creating a new laboratory project

A new project is created as explained in the chapter [Creating a project](#). Within the tree structure please select the directory "Laboratory", then the folder "ISO" and in the sub folder "Airborne" or "Impact" one of the laboratory templates.

The "New" dialog box with Laboratory Option:



Working in the workspace window in laboratory projects

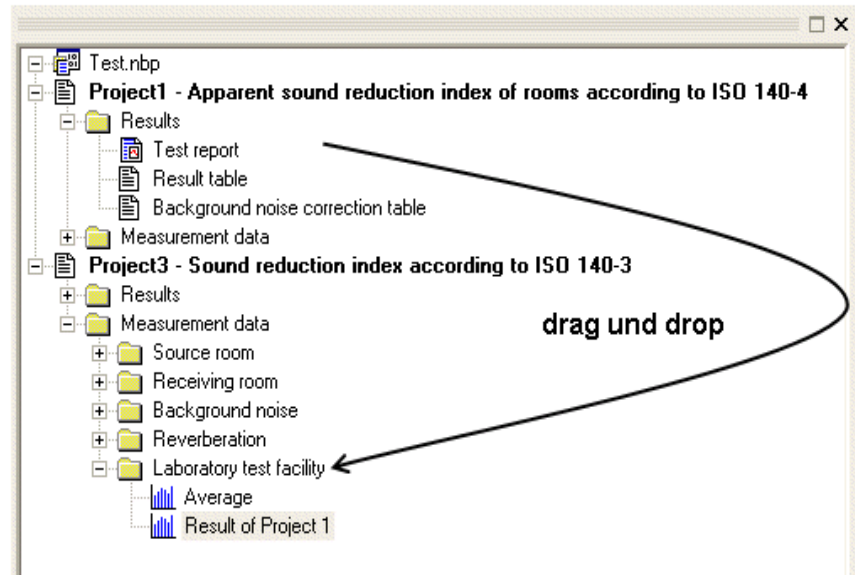
The workspace of a laboratory project contains like other projects the main folders "Results" and "Measurement data". In some standards there is an additional table, the flanking transmission correction table. This table is described in detail in chapter [Flanking transmission correction](#). The data can be manipulated as explained in the chapter [Working in the workspace window](#). In the "Measurement data" folder, you find in some standards the additional folder "Laboratory test facility" or "Bare floor". The description of this two folders you find in the chapter [Data import into laboratory projects](#).

Data import into laboratory projects

„Laboratory test facility“ folder(ISO 140-3/ ISO 140-10):

On the “Laboratory test facility“ folder the menu item *Import* is inactive. Result data can be imported from other NorBuild projects (which are opened in the same workspace) using the functions *Copy / Paste* or *drag & drop*

Workspace window ISO 140-3:

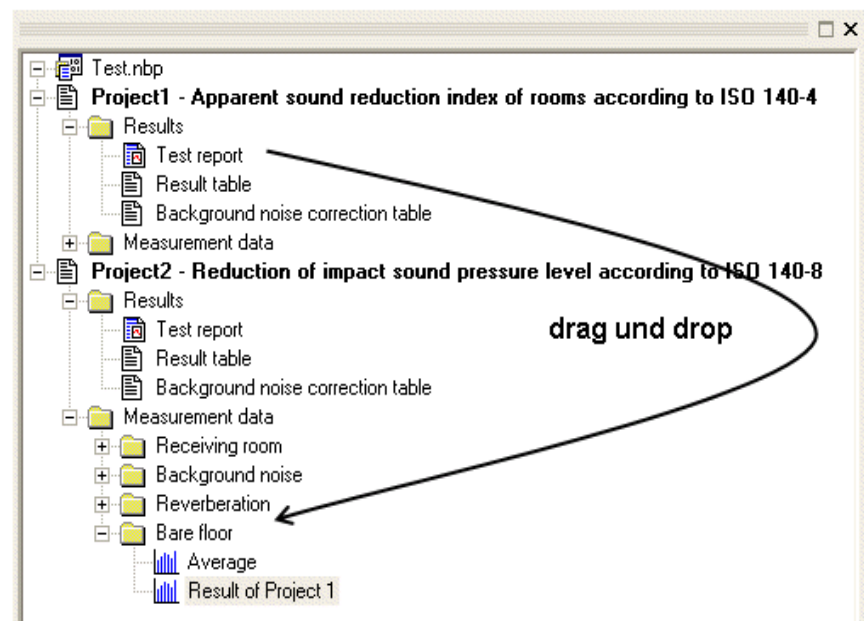


„Bare floor“ folder (ISO 140-8):

On the “Bare-floor“ folder the menu item *Import* is inactive. Result data can be imported from other NorBuild projects (which are opened in the same workspace) using the functions *Copy / Paste* or *drag & drop*

:

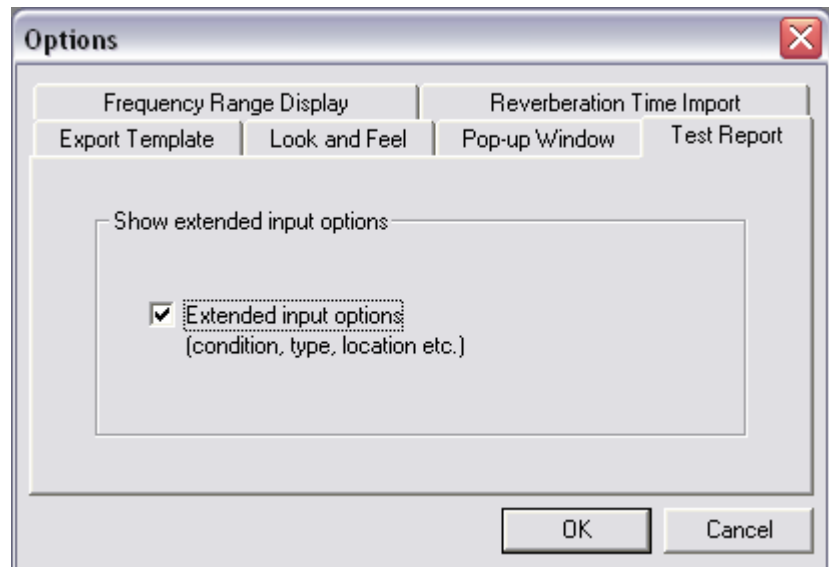
Workspace window ISO 140-8:



Extended input options

If working with important standards there's the option to specify the condition, type or location of the source – or receivingroom in the Test Report.

To enable those additional fields, use *Extras > Options > Test Report* and put a tick next to “Extended input options”



Flanking transmission correction

The standards ISO 140-3 and ISO 140-10 are using the flanking transmission correction. The flanking transmission correction is activated by the menu item *Extras>Flanking transmission correction*. If the flanking transmission is activated, the data is displayed in the “Results” folder, in the “Flanking transmission correction table”. The comments, „Minimum values“ and „Corrections“ are also shown in the “Test report” and in the “Result table”.

Flanking transmission correction table(ISO 140-3):

Frequency [Hz]	R_s [dB]	R'_s [dB]	R'_T [dB]	$R_s - R'_s$ [dB]	
50	53.4	52.1	54.2	1.3	Minimum values
63	58.2	56.9	56.0	1.3	Minimum values
80	56.5	55.2	56.3	1.3	Minimum values
100	57.3	56.0	59.8	1.3	Minimum values
125	0.7	-0.6	5.0	1.3	Minimum values
160	63.6	62.3	68.1	1.3	Minimum values
200	65.2	63.9	69.9	1.3	Correction
250	63.8	63.3	73.0	0.5	Correction
315	59.2	58.2	65.1	1.0	Correction
400	59.7	58.6	65.0	1.1	Correction
500	57.3	57.1	71.0	0.2	Correction
630	53.4	53.3	68.0	0.1	Correction
800	51.6	51.6	66.6	0.0	
1'000	35.5	35.5	50.6	0.0	
1'250	30.7	30.7	50.0	0.0	
1'600	15.5	15.5	60.0	0.0	
2'000	16.5	16.5	50.0	0.0	
2'500	45.1	45.1	67.3	0.0	
3'150	51.3	51.3	67.8	0.0	
4'000	55.1	55.1	78.9	0.0	
5'000	58.8	58.8	78.9	0.0	
6'300					
8'000					
10'000					

Legend:

R_s : The corrected sound reduction index of the test specimen

R'_s : Measured with the test specimen in the test opening

R'_T : Measured with the special construction in the test opening

Flanking transmission correction table(ISO 140-10):

Frequency [Hz]	$D_{n,e}$ [dB]	$D_{n,e,M}$ [dB]	$D_{n,e,F}$ [dB]	$D_{n,e}-D_{n,e,M}$ [dB]	
50	58.7	57.4	58.3	1.3	Minimum values
63	63.6	62.3	65.4	1.3	Minimum values
80	61.8	60.5	60.5	1.3	Minimum values
100	62.6	61.3	60.0	1.3	Minimum values
125	6.1	4.8	10.1	1.3	Minimum values
160	68.9	67.6	73.4	1.3	Minimum values
200	70.5	69.2	75.1	1.3	Minimum values
250	70.0	68.7	74.7	1.3	Correction
315	64.7	63.6	70.0	1.1	Correction
400	64.5	64.0	73.4	0.5	Correction
500	62.9	62.4	72.0	0.5	Correction
630	59.6	58.7	65.9	0.9	Correction
800	57.8	56.9	64.0	0.9	Correction
1'000	41.6	40.9	49.2	0.7	Correction
1'250	36.0	36.0	46.0	0.0	
1'600	20.8	20.8	30.9	0.0	
2'000	21.8	21.8	32.9	0.0	
2'500	50.4	50.4	66.4	0.0	
3'150	56.6	56.6	74.2	0.0	
4'000	60.5	60.5	81.3	0.0	
5'000	64.2	64.2	77.7	0.0	
6'300					
8'000					
10'000					

Legend:

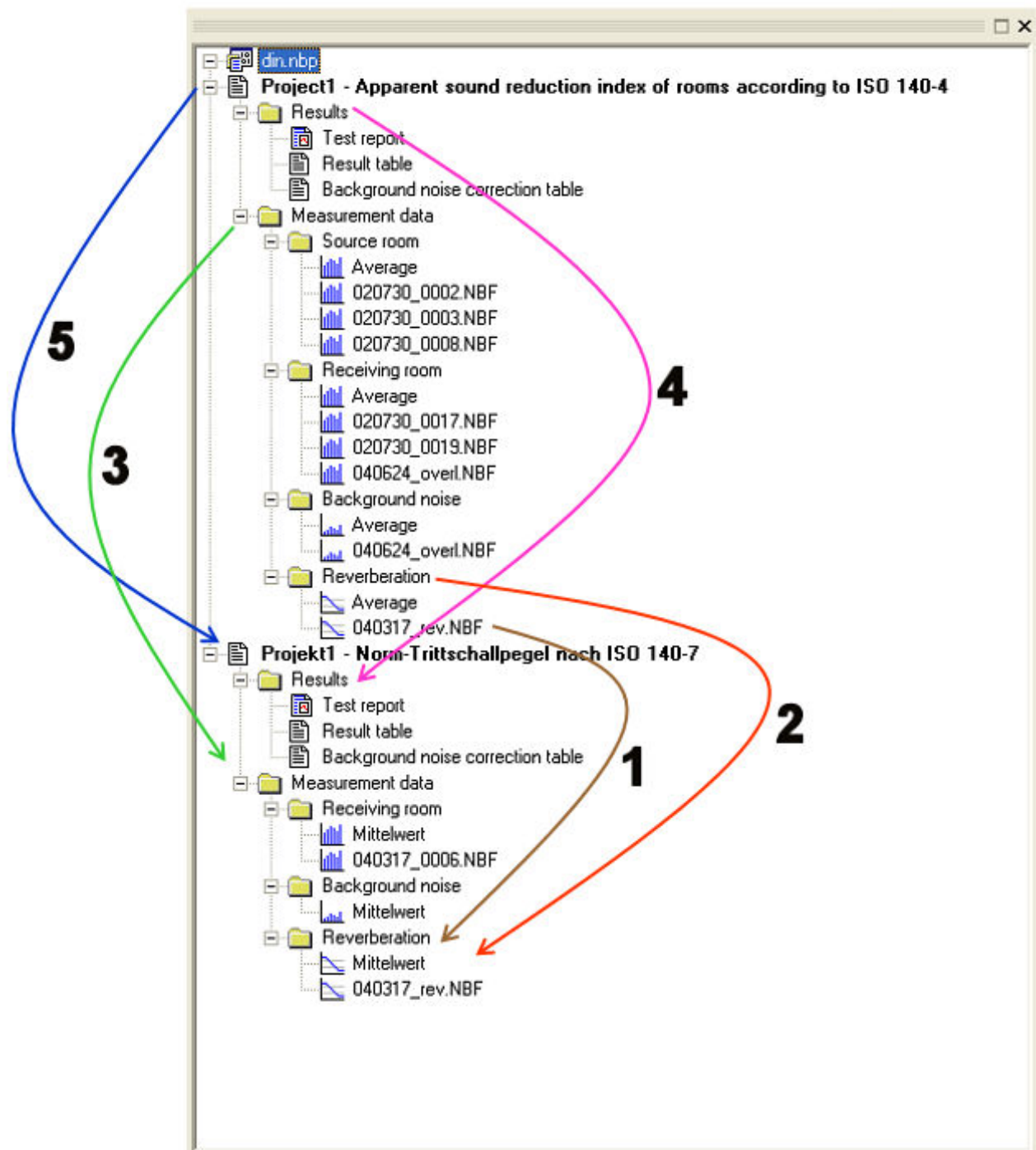
$D_{n,e}$: The corrected element-normalized level difference of the test specimen

$D_{n,e,M}$: The uncorrected element-normalized level difference including flanking transmission through the test specimen

$D_{n,e,F}$: Measured with or without sealed openings for the test specimen

Re-use of Project data

In order to copy individual measurements, entire tables, all tables, all user input or the entire project data from one folder to another, use either *Copy & Paste* or drag and drop the object within the project tree using the mouse.



1. individual measurement
2. Entire table (for example the reberberation folder)
3. All tables (Measurement data folder)
4. All user inputs (Results folder)
5. Entire project data (All user inputs and all tables)

Copy & paste of measurements


In the project tree measurements can be copied from one measurement folder to another.

Use the command *Edit > Copy* to copy the selected measurement into the

clipboard. To select a measurement to copy, click on it to activate it and then use this command.

Copying data to the clipboard replaces the contents previously stored there.


Shortcuts:

Toolbar: 

Keys: **Ctrl+C**

Use the command *Edit > Paste* to paste the measurement you have cut or copied. Place the cursor where you want to paste the data, and then on the *Edit* menu click *Paste*.

Shortcuts:

Toolbar: 

Keys: **Ctrl+V**

Swap of source and receiving room measurements

Use the command *Extras > Swap Table (L1<=>L2)* in order to swap the content of the folders of "Source room" and "Receiving room".

If the level measurements of source and receiving room were allocated to the wrong folders by mistake, this can be corrected easily.

To swap the content of the folders of source and receiving room, use:

Extras > Swap Table (L1<=>L2).

The contents of the two folders will be exchanged.

If you want to swap a single measurement from one folder to another, use *Copy & Paste* (see above) or drag and drop the measurement with the mouse.

Viewing properties of a measurement

Use the command *View > Properties* to view the properties of a measurement.

Select the desired measurement by clicking on the measurement title in the project tree. Then choose the *Properties* command either from the *View* menu or from the *Context* menu (right mouse click).

The graphical display and the setup details of the particular measurement will be

shown. This command is also available within the measurement table, therefore it is explained in more detail in chapter *Tables of measurement series*.

Rounding Rules

The rounding of partial results in NorBuild calculations is magisterial. In this chapter, the rounding rules are specified, because they are not always defined in details, in ISO140/717.

General rule:

- Positive values: $+xy.5$ is rounded to $xy + 1$
- Negative values: $-xy.5$ is rounded to $-xy - 1$

Level measurements:

- The results of the partial measurements are rounded to 0.1 dB.
- Afterwards, the average of the partial measurement is calculated.
- This average is rounded again, to 0.1 dB (except for BS EN ISO 140-4 (Reg 20A/12A and BB93)).

Reverberation time measurements

- The results of the partial measurements are rounded to 0.01 seconds.
- Afterwards, the average of the partial measurement is calculated.
- This average is rounded again, to 0.01 seconds (except for BS EN ISO 140-4 (Reg 20A/12A and BB93)).

*$10 * \log(u/v)$*

- A term such as $10 * \log(u/v)$ is calculated by dividing (u/v) first, before ten times the logarithm to the base 10 is calculated. (Not $\log u - \log v$)
- The result is rounded to 0.1 dB (except for BS EN ISO 140-4 (Reg 20A/12A and BB93)).

Summation of the terms

- All the terms are rounded to 0.1 dB, so the result of the summation (R, D_n, T, L_n, T) is also rounded to 0.1 dB.

Single-number quantity

- According ISO 717, the reference curve is shifted in 1 dB steps. Therefore the result is an integer value.

Calculation of spectrum adaption terms acc. to ISO 717

- ISO 717-1:1996/Amd 1:2006
- ISO 717-2:1996/Amd 1:2006

Correcting measurement values

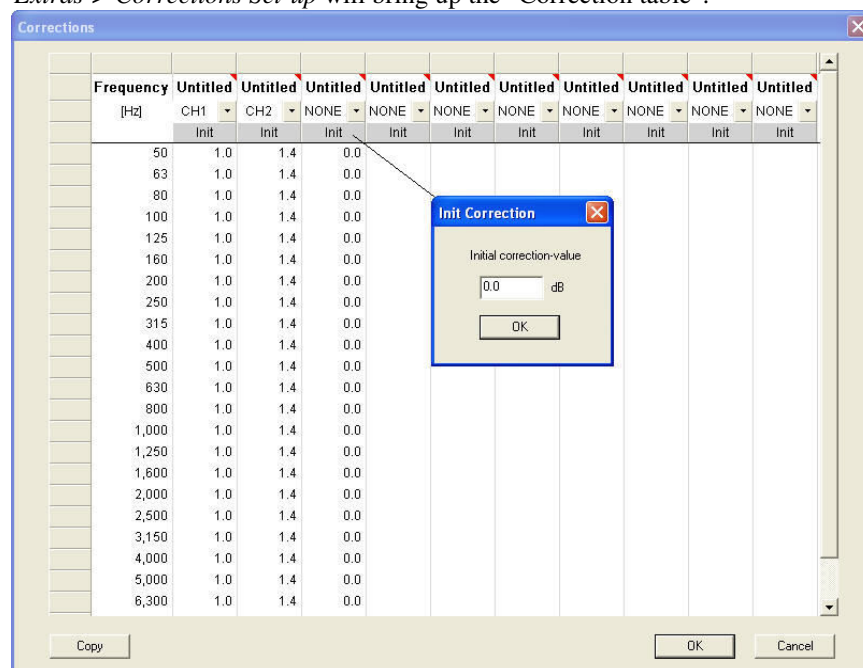
Overview

With NorBuild it is possible to automatically correct measured levels with pre-defined k factors. The values used for these are usually filter or microphone correction factors for each individual 1/3 octave band. The necessary data may be determined from the corresponding calibration certificates and can be as small as one tenth dB. The correction values can be applied to both channel 1 and channel 2. They are added to the corresponding measurement values during the data import.

Using the corrections

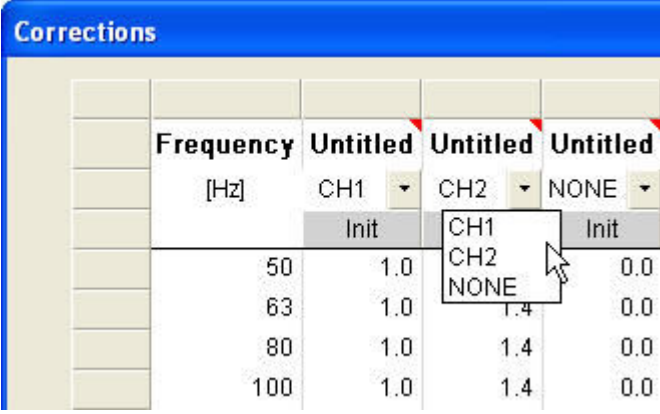
Use *Extras > Corrections Set-up* in order to pre-define level corrections for the data import. The corrections activated here will be applied to each measurement that is imported. The pre-defined corrections are only applied during the import of a measurement but not when opening an existing project.

Extras > Corrections Set-up will bring up the "Correction table":



Click on "Init" to initialise an entire spectrum with a preset value.

In the "Correction table" you can pre-define up to ten spectrum correction tables. You can deactivate a correction table by choosing NONE or activate it by assigning it either to CH1 or CH2:



Frequency [Hz]	CH1	CH2	NONE
	Init		Init
50	1.0		0.0
63	1.0	1.4	0.0
80	1.0	1.4	0.0
100	1.0	1.4	0.0

The activated corrections are applied when a measurement is read in. You can always change the level corrections of an already imported measurement:

1. Open the measurement table by double-clicking on the measurement title in the project tree.
2. Enter the new correction values manually into the "Corr." column (see chapter *Tables of measurement series*).

Corrections with the Nor121

The Norsonic analyser Nor121 has internal correction facilities. Please use these to apply any corrections to the measurement. In order to avoid duplicate correction the correction settings in NorBuild are not applied when importing a Nor121 measurement (*.npf), even with the correction table being activated. If you still need to apply corrections to a Nor121 measurement in NorBuild, please enter the correction values in the measurement table as described above.

Note: the presentation of numerical values in any NorBuild table (i.e. '.' or ',' as decimal delimiter) depends on the language settings of your computer. These can be changed under *Start > Control Panel > Regional and Language Options*.

Acceleration

Use *Extras > Corrections Set-up* to set up the specific correction values to convert dB-Values that were measured with accelerometers into velocitylevel values referenced to $5 \cdot 10^{-8}$

Correction values in dB, measurements with accelerometers (reference: $2 \cdot 10^{-5}$) have to be converted into velocitylevel values (reference: $5 \cdot 10^{-8}$) according to the table on the next page:

Frequenz [Hz]	Korrekturen in dB für Umrechnung von Beschleunigung auf Schnelle mit Bezug $5 \cdot 10^{-8}$
6.3 Hz	20,1
8.0 Hz	18,0
10 Hz	16,1
12.5 Hz	14,1
16 Hz	12,0
20 Hz	10,0
25 Hz	8,1
31.5 Hz	6,1
40 Hz	4,0
50 Hz	2,1
63 Hz	0,1
80 Hz	-2,0
100 Hz	-3,9
125 Hz	-5,9
160 Hz	-8,0
200 Hz	-10,0
250 Hz	-11,9
315 Hz	-13,9
400 Hz	-16,0
500 Hz	-17,9
630 Hz	-19,9
800 Hz	-22,0
1.0 k	-23,9
1.25 k	-25,9
1.6 k	-28,0
2.0 k	-30,0
2.5 k	-31,9
3.15 k	-33,9
4.0 k	-36,0
5.0 k	-37,9
6.3 k	-39,9
8.0 k	-42,0
10.0 k	-43,9
12.5 k	-45,9
16.0 k	-48,0
20.0 k	-50,0

Importing measurement data

Overview

Data to be used in the project can either be read from files stored on the hard disk or directly from measurement instruments.

Note: Before importing a reverberation time measurement, the reverberation time import settings (T15/T20, T30 or Auto) need to be made under *Extras > Options*, see section *Importing reverberation time* data later in this chapter. If you want to apply initial corrections to a level measurement, these settings need to be made under *Extras > Corrections-Setup* before the actual import, see the previous chapter *Correcting measurement values*.

Import from the hard disk:

Use the *Import* command to:

- import Norsonic measurement files (*.nbf, *.npf, *.sdf) into an open project, or
- import measurement data from an existing Nor-Sic project (*.prj) into an open NorBuild project, or
- import measurement data from an existing CtrlBuild project (*.ctb) into an open NorBuild project, or
- import an existing NorBuild project (*.nbp) into the workspace.

Alternatively you can drag and drop the desired file from the Windows Explorer (or use *NorXfer* as file Explorer) into the NorBuild project tree.

Import from the analyser:

- In order to import a measurement file directly from the analyser you can launch *NorXfer* from the *Tools* menu to start the data transfer from the instrument (see *Import via NorXfer* later in this chapter).
- If the measurement was controlled by the software module CtrlBuild you can directly drag and drop the measurement to the NorBuild project tree (see *Import from CtrlBuild* later in this chapter).

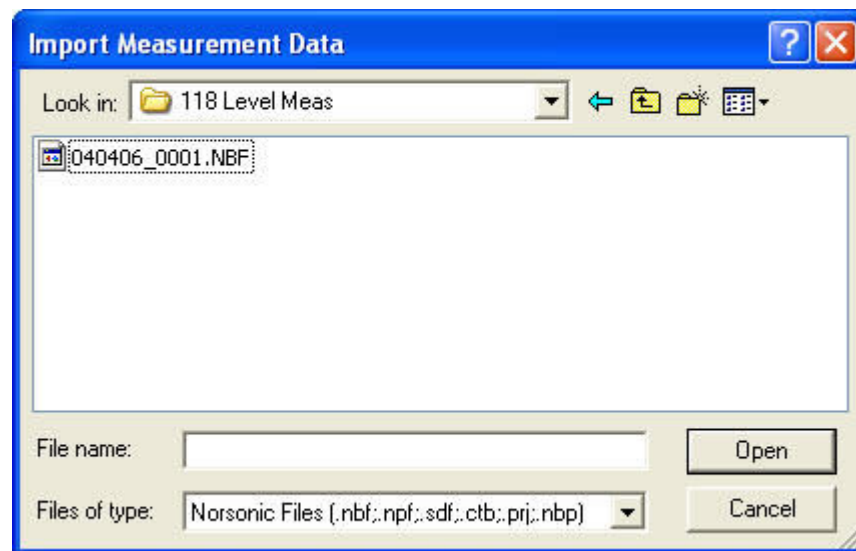
Import from the clipboard:

Measurement data can also be imported from the clipboard, see the according section *Import from the clipboard* in this chapter.

Import command

Use the command *File > Import* to import files that are stored on the hard disk. These can be either Norsonic measurement files (*.nbf, *.npf, *.sdf) or existing projects of the software modules Nor-Sic (*.prj), NorBuild (*.nbp) or CtrlBuild (*.ctb).

The "Import" dialog box:



Shortcuts:

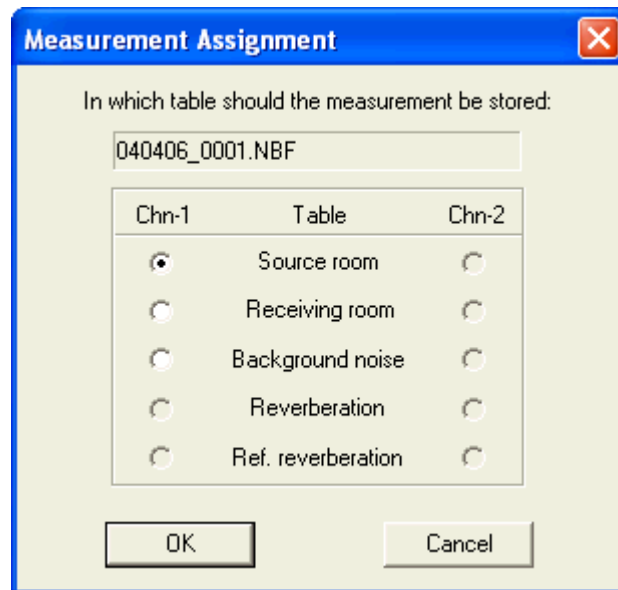
Toolbar: 

Importing Norsonic measurement files:

Note: In general, the import of measurement files into NorBuild as described above is supported for the Norsonic analysers Nor840, Nor118/843, Nor110 and Nor121. The procedure is the same for all instruments. In order to read in measurement files from instruments for which the direct import is not supported (Nor823 and Nor830) an existing Nor-Sic project can be imported.

Measurement files can be imported into an open project in NorBuild. The *File > Import* command is available in the workspace window. Click into the workspace window or on a specific measurement folder to make it active for the *Import* function. You can use this command when a specific measurement data folder of a project (e.g. "Source room") is selected in order to import the data directly into that specified folder.

When using the import command on the project title or the general folder "Measurement data", the "Measurement Assignment" dialog box appears:



Depending on whether the measurement file contains a one- or two- channel measurement, one or two columns will be available in this dialog box. The fields for the unavailable choices are greyed out.

Level measurements can then be assigned to the folder "*Source room*", "*Receiving room*" or "*Background noise*". Reverberation time measurements can be assigned to the folder "*Reverberation*" or "*Ref. Reverberation*".

Importing Nor-Sic or CtrlBuild projects:

Measurement data from an existing Nor-Sic project (*.prj) or CtrlBuild project (*.ctb) can be imported into an open NorBuild project. When importing an existing Nor-Sic or CtrlBuild project the measurement files of the entire project will automatically be assigned to the correct measurement folders in NorBuild ("Source room", "Receiving room", "Background noise" and "Reverberation").

Importing NorBuild projects:


When importing an existing NorBuild project, it will be opened as a separate project in the NorBuild workspace. The workspace in NorBuild can hold several individual projects (see chapter *Working in the workspace window*).

In order to copy individual measurements from one folder to another, use either *Copy & Paste* or drag and drop the measurement within the project tree using the mouse.

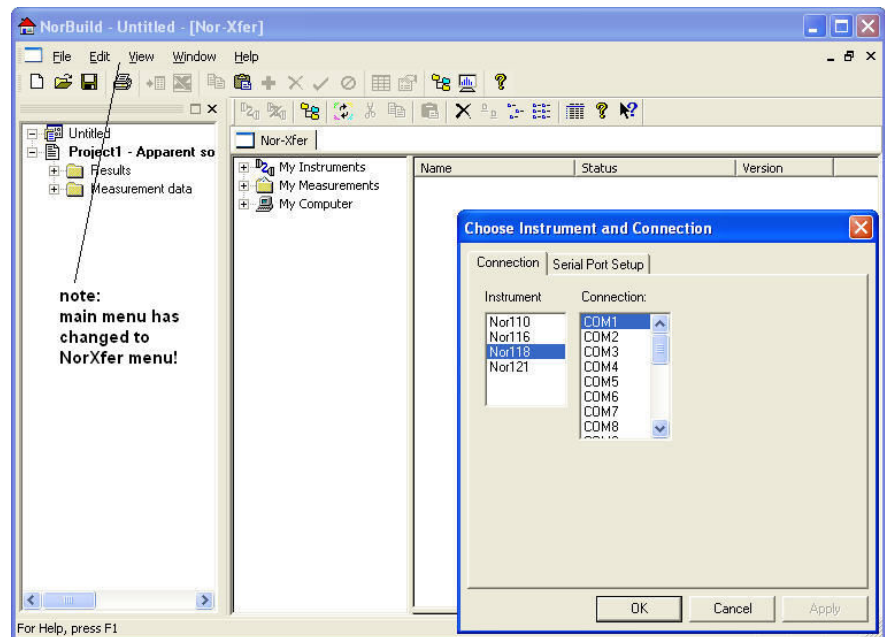
Import via NorXfer

In order to import a measurement file directly from the analyser you can launch *NorXfer* from the *Tools* menu to start the data transfer from the instrument.

NorXfer starts as an integrated software module and appears in the main window of NorBuild. It can either be used as a file Explorer to import files from the hard disk or to connect directly to a Norsonic instrument.

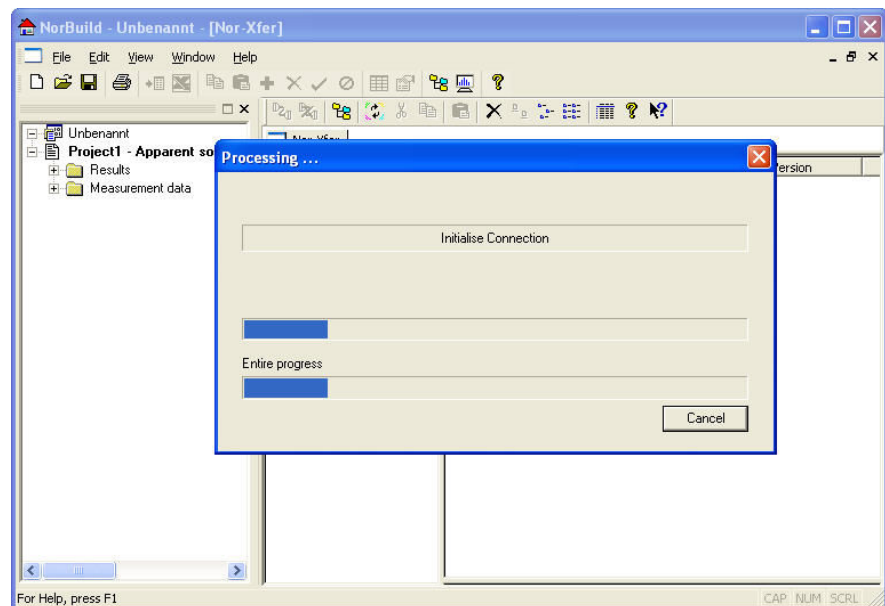
1. Start *NorXfer* from the *Tools* menu or use .
2. NorXfer starts as an integrated software module and appears in the main window of NorBuild. As long as NorXfer is running, the main menu of NorBuild

is replaced by the main menu of NorXfer:

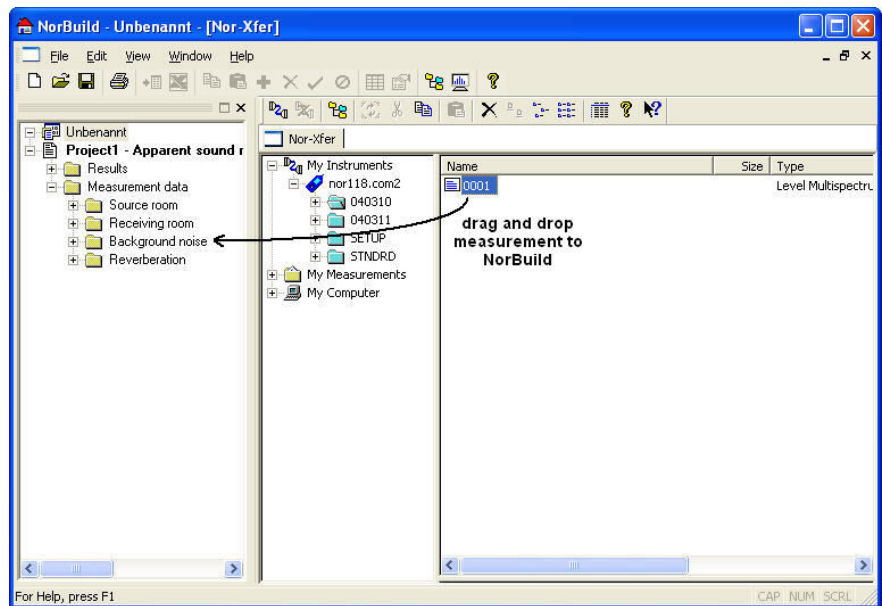


Press the NorXfer button *Connect*. A dialog box will then pop-up asking you to choose the instrument and the COM port it is connected to.

3. NorXfer connects to the measurement instrument:



4. You can see the measurement folders and files on the internal hard disk of the analyser. Drag and drop the desired measurement file(s) from the analyser into the NorBuild project tree:




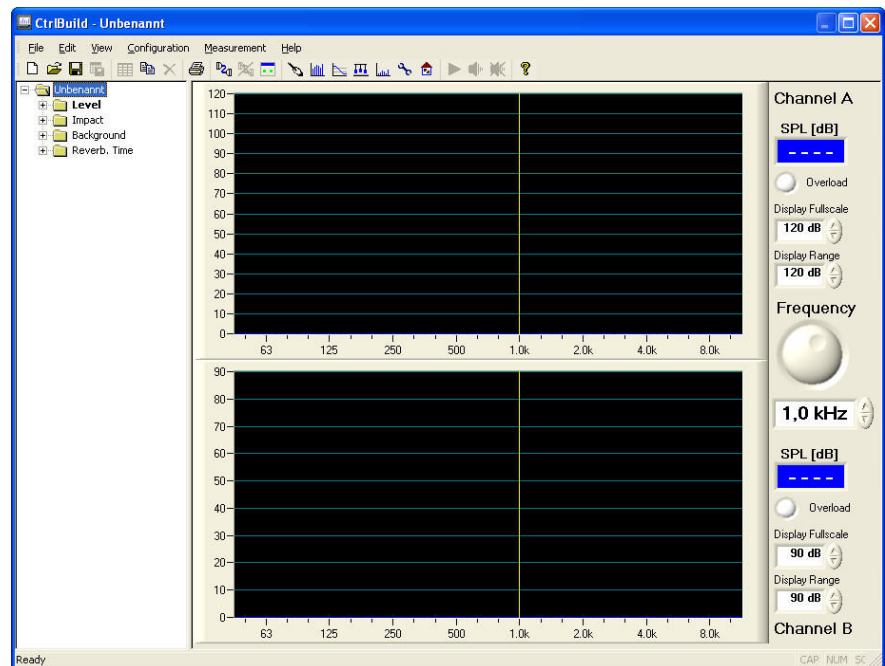
When the data import is completed you can close NorXfer by simply closing its window (click on the cross).

Import from CtrlBuild

If a building acoustic measurement was controlled by the software module CtrlBuild you can directly drag and drop the measurement to the NorBuild project tree.

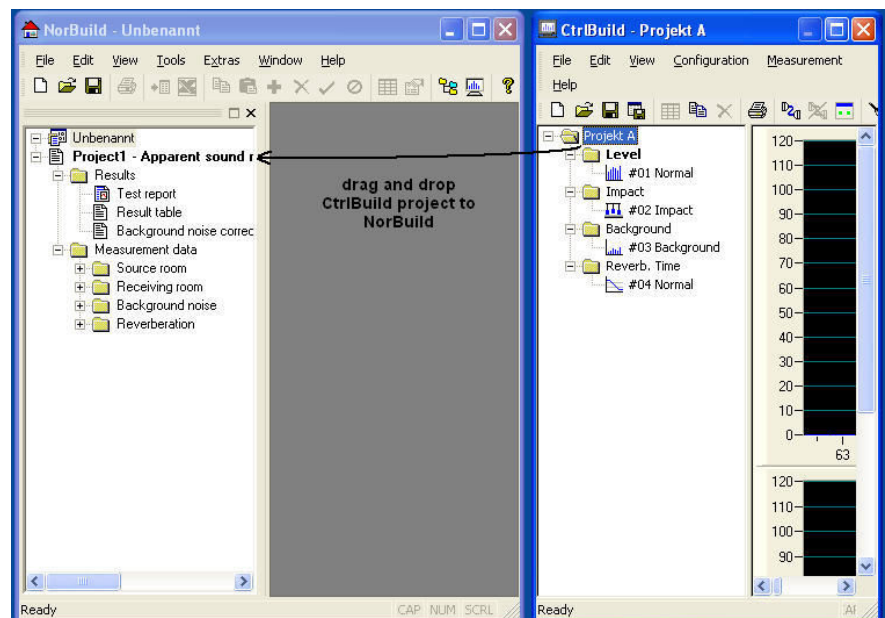
CtrlBuild is a module of the NorBuild series. Acoustic measurements in buildings can be made with CtrlBuild and the Norsonic real-time analyser types Nor843 or Nor118. CtrlBuild enables the user to control the measurement in an interactive way and to get the results per drag and drop into the evaluation program NorBuild.

1. Start *CtrlBuild* from the *Tools* menu or use .
2. CtrlBuild starts as an independent program:

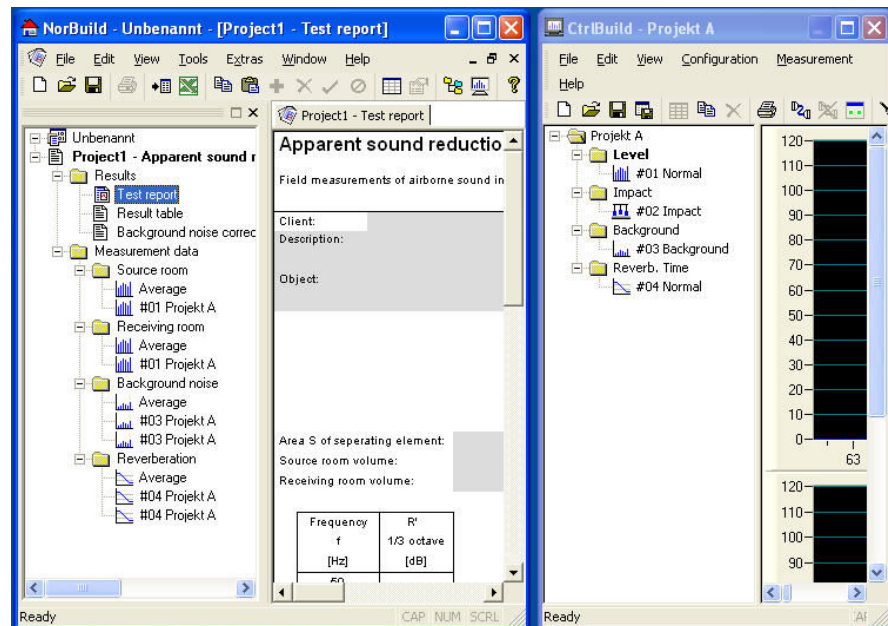


3. Use CtrlBuild to control your building acoustic measurements.

4. Drag and drop the desired measurement from the CtrlBuild project tree into the NorBuild project tree. You can also drag and drop the entire CtrlBuild project to the evaluation program NorBuild:



The individual measurements of the CtrlBuild project will then automatically be allocated to the correct folders of the NorBuild project:



Import from the clipboard

Numerical values can be imported from the clipboard into a measurement series. The data on the clipboard have to contain text (no graphics), and just one column is possible (no Tab delimited text).

To copy the measurement values from the clipboard into a NorBuild measurement table:

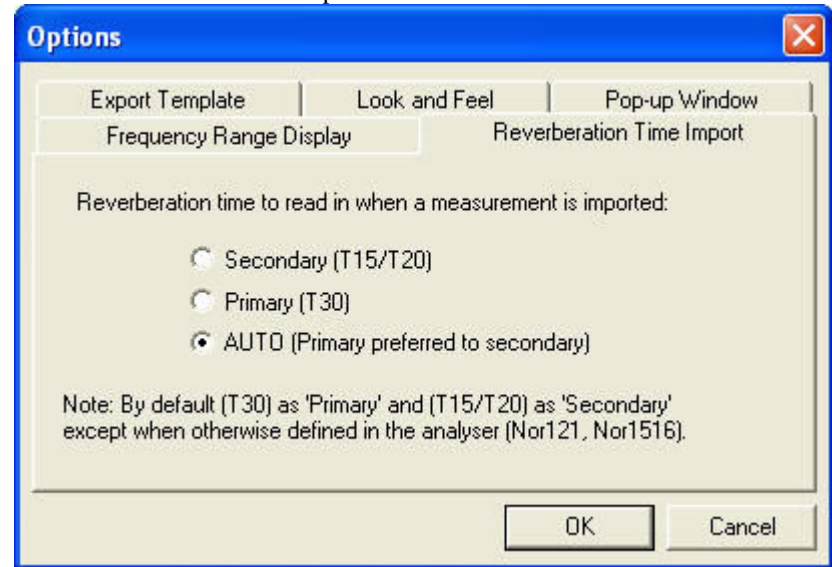
1. Copy the measurement data from your source (e.g. Excel) into the clipboard.
2. Open the desired measurement table in NorBuild (e.g. the 'Average' table in the "Source room") by double-clicking it in the project tree (see chapter *Tables of measurement series*).
3. Use *Edit > Add measurement* to add a new measurement into the desired average table in NorBuild.
4. In the column into which the data shall be pasted, click in the field matching the desired frequency.
5. Choose *Edit > Paste* (Ctrl + V).

The average table is refreshed automatically.

Importing reverberation time data

The reverberation setting affects the import of reverberation time measurements. It defines which of the RT values in a file are read into the project. The setting selected applies to both direct reading from an instrument and reading from files.

The "Reverberation Time Import" tab:



By selecting "Secondary (T15/T20)" or "Primary (T30)" just these values are read, even if some values are marked as incorrect or missing for certain frequency bands. "Auto" uses Primary in the first place and replaces only invalid values with Secondary values.

Note: in some instruments (Nor121, Nor1516) the "Primary" and "Secondary" reverberation time can be defined by the user. For all other cases NorBuild uses by default T30 as primary and T15/T20 as secondary reverberation time.

Tables of measurement series

Structure

NorBuild displays the measurements in tables. You can open a measurement table by double-clicking on the respective measurement file in the project tree ("Measurement data" folder). Alternatively you can use the *Open* command from the *View* menu or from the *Context* menu (right mouse click).

Measurement table for the source room:

Frequency [Hz]	Average			L2.SDF				L1.SDF				040406_0001.NBF			
	L avg	SD	N	L	S	N	Corr.	L	S	N	Corr.	L	S	N	Corr.
50	41.3	5.84	3	36.0		1	0.0	34.6		1	0.0	45.3		1	0.0
63	40.6	0.75	3	39.8		1	0.0	41.3		1	0.0	40.5		1	0.0
80	44.7	2.01	3	45.6		1	0.0	45.6		1	0.0	42.1		1	0.0
100	45.0	4.53	3	46.8		1	0.0	46.1		1	0.0	38.6		1	0.0
125	51.1	9.35	3	53.0		1	0.0	52.6		1	0.0	36.6		1	0.0
160	57.8	15.90	3	59.6		1	0.0	59.6		1	0.0	32.1		1	0.0
200	65.4	21.24	3	66.7		1	0.0	67.5		1	0.0	30.3		1	0.0
250	70.0	23.46	3	71.3		1	0.0	72.1		1	0.0	31.1		1	0.0
315	67.7	19.82	3	68.2		1	0.0	70.5		1	0.0	35.1		1	0.0
400	68.2	20.31	3	67.5		1	0.0	71.5		1	0.0	34.5		1	0.0
500	66.0	19.09	3	66.4		1	0.0	68.8		1	0.0	34.6		1	0.0
630	65.5	18.31	3	62.8		1	0.0	69.4		1	0.0	34.9		1	0.0
800	61.3	16.22	3	59.7		1	0.0	64.9		1	0.0	34.6		1	0.0
1,000	59.4	6.19	3	59.5		1	0.0	62.1		1	0.0	50.3		1	0.0
1,250	57.2	2.85	3	55.0		1	0.0	59.8		1	0.0	54.8		1	0.0
1,600	64.5	6.47	3	55.9		1	0.0	59.6		1	0.0	68.5		1	0.0
2,000	62.2	4.78	3	57.1		1	0.0	58.1		1	0.0	65.8		1	0.0
2,500	54.1	9.78	3	54.7		1	0.0	56.7		1	0.0	38.9		1	0.0
3,150	53.0	12.03	3	53.4		1	0.0	55.7		1	0.0	33.8		1	0.0
4,000	50.0	12.63	3	50.3		1	0.0	52.9		1	0.0	29.8		1	0.0
5,000	46.4	13.00	3	47.5		1	0.0	48.8		1	0.0	25.7		1	0.0
Sum A	72.7			71.1				74.5				71.6			

Frequency column:

The first column contains the centre frequencies of the individual 1/3 octave bands. The frequency range to be displayed can be changed under *Extras > Options*, see section *Frequency range display* in this chapter.

Average column:

The column titled "Average" contains three sub-columns of which the first "Lavg" contains the average of all measurements at that frequency with any specified corrections already added (see chapter *Correcting measurement values*). The standard deviation is stated in column "SD". Column "N" holds the number of averages.

Measurement data column:

The next major column represents the first measurement series with the column header showing the file name of the original data. Each measurement is represented by four sub-columns. Column "L" shows the level values, column "S" shows the status ('*' for overload, 'H' for manual input, '?' for suspicious value), column "N" the number of averages for that particular measurement (see section *Number of Averages column* in this chapter) and column "Corr." shows the applied correction values. Use the *View* menu to show or hide the columns "S", "N" or "Korr."

Note: Following to the upper frequency limit, the A-weighted sum level "Sum A" is shown in the table. The sum level is calculated according to the 1/3 octave band spectrum and the frequency limitations. It is a post-processed value and not a measured value.

Within a measurement table you can:

- **Change values in measurement table**
- **Add a measurement**
- **Import data from the clipboard**
- **Delete a measurement**
- **Exclude (and Include) a measurement**
- **View properties of a measurement**

These functions are explained in the following sections of this chapter.

Note: the presentation of numerical values in any NorBuild table (i.e. '.' or ',' as decimal delimiter) depends on the language settings of your computer. These can be changed under *Start > Control Panel > Regional and Language Options*.

Opening a table or protocol

Use the command *View > Open* to open a measurement table or protocol statement.

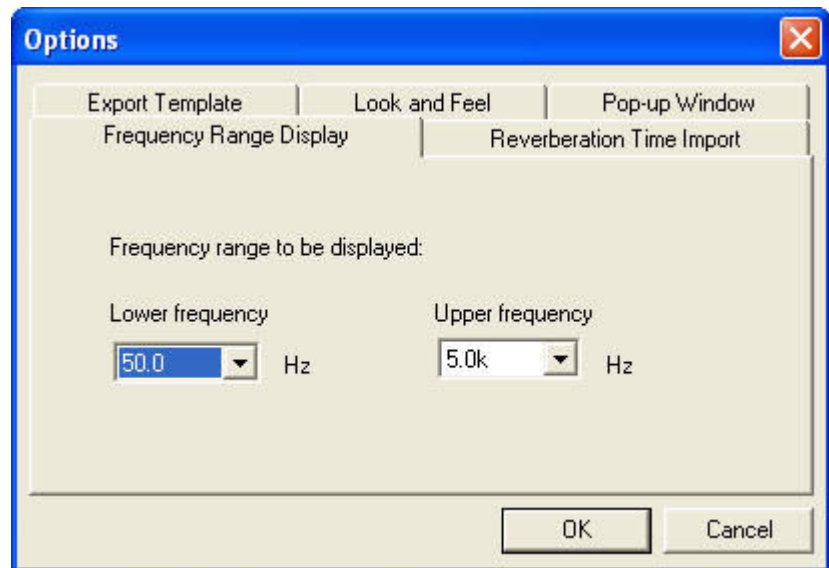
Select the desired item in the project tree. Measurements are stored in the folder "Measurement data" and protocol statements are stored in the folder "Results" in the project tree. Click on the item to make it active for the *Open* command. Then choose *Open* from the *View* menu or from the *Context* menu (right mouse-click).

Alternatively you can just double-click on the desired item in the project tree. It will be opened in the main window.

Frequency range display

Use the command *Extras > Options* to define the settings for the frequency range to be displayed in the measurement table.

The "Frequency Range Display" tab:



The "Frequency Range Display" dialog box is for display settings of the measurement table only. Lower and upper frequency can be set within the maximum range of 50 Hz to 10 kHz.

Note: Already opened measurement table windows must be closed and re-opened to make the change effective.

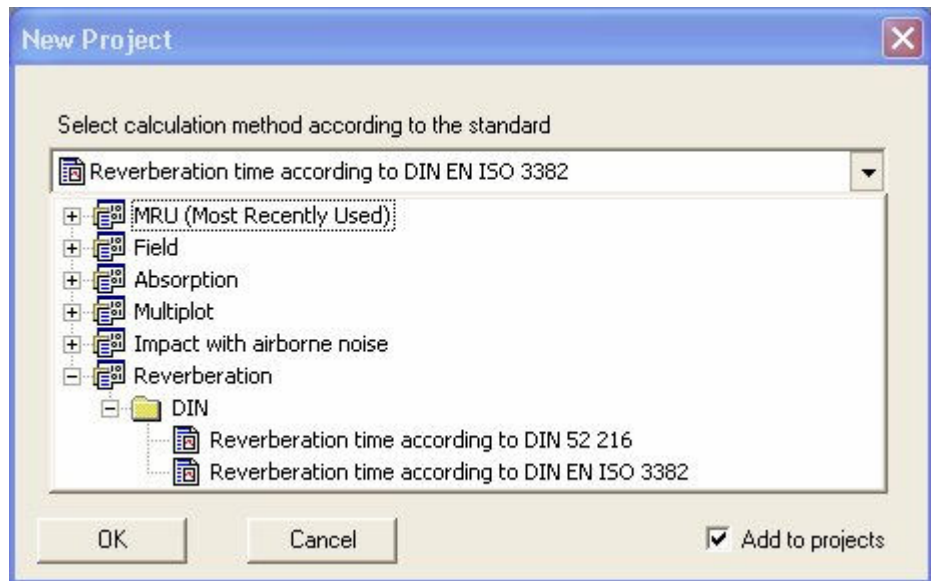
Reverberation time

NorBuild offers the option to display reverberation data according to DIN EN ISO 3382 and DIN 52 216. Please proceed as follows:

Creating a reverberation time project

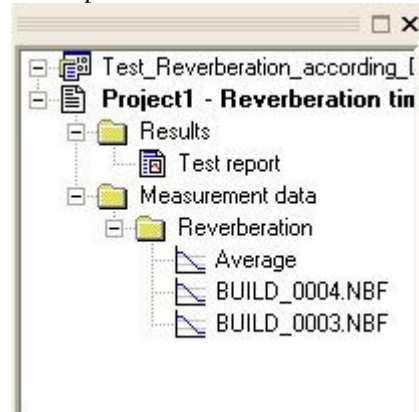
A new project is created as explained in the chapter *Creating a project*. Within the tree structure please select the directory "Reverberation", then the folder "DIN" and then the template 'Reverberation time according to DIN EN ISO 3382' or 'Reverberation time according to DIN 52 216'.

The "New" dialog box with the reverberation time option:



Working in the workspace window

Workspace window of a reverberation time project:



The workspace of a reverberation time project contains the main folders "Results" and "Measurement data". The folder "Results" contains the 'Test report'. The imported reverberation measurements can be found in the folder "Measurement data", in sub-folder "Reverberation". The reverberation data can be manipulated as explained in the chapter *Working in the workspace window*. The reverberation project can be also saved as an Excel file, as explained in the chapter *Export*.

Test report

The average of the reverberation time table is shown graphical in the 'Test report'.

The table of the DIN EN ISO 3382 'Test report' contains the reverberation time values numerical (63 ... 8000 Hz) as well as a single figure value T_{mid} calculated by averaging the 1/3 octave band values from 400 Hz to 1250 Hz.

The table of the DIN 52 216 'Test report' contains the reverberation time values of the 1/1

octave bands (125, 250, ... 4000 Hz).

The grey fields on the 'Test report' can be edited, like in all other projects.

The 'Test report' can be printed, as described in the chapter *Printing*.

'Test report' DIN EN ISO 3382:

Reverberation time according to DIN EN ISO 3382

Client:

Date of test:

Room identification:

Remarks regarding the room situation:

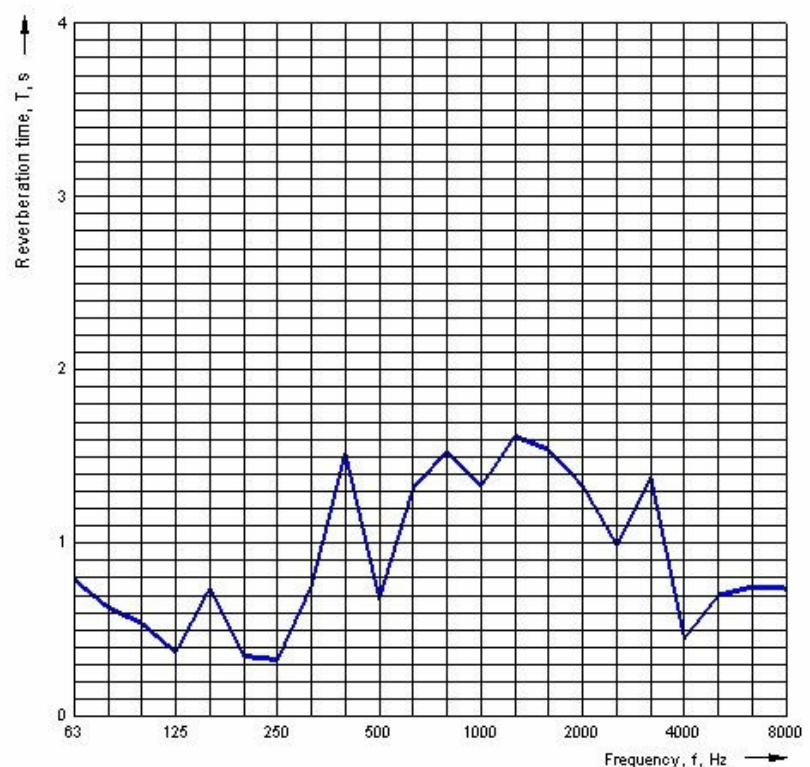
Temperature: 22.5 °C

Relative humidity: 55 %

Reverberation room volume: 92 m³

Noise type:

Frequency f [Hz]	T 1/3 octave [s]
63	0.79
80	0.63
100	0.54
125	0.37
160	0.74
200	0.35
250	0.33
315	0.75
400	1.52
500	0.68
630	1.32
800	1.53
1'000	1.33
1'250	1.62
1'600	1.54
2'000	1.33
2'500	0.99
3'150	1.38
4'000	0.45
5'000	0.70
6'300	0.75
8'000	0.74



Single figure calculated by averaging T(400 Hz to 1250 Hz) according to DIN EN ISO 3382

$T_{mid} = 1.33$ s

Company: Norsonic Brechbühl AG, CH-3452 Grünenmatt

No. of test report:

Date: 13.01.2005

Signature:

Test report' DIN 52 216:

Reverberation time according to DIN 52 216									
Client: 	Date of test: 24.05.04								
Room identification: ZXC-345									
Reverberation room volume: 56.7 m ³ Remarks regarding the room situation: No remarks									
Noise type: Pink noise	<table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse; text-align: center;"> <tr> <td style="padding: 5px;">T in s</td> <td style="padding: 5px;">0.40</td> <td style="padding: 5px;">0.39</td> <td style="padding: 5px;">0.39</td> <td style="padding: 5px;">0.36</td> <td style="padding: 5px;">0.41</td> <td style="padding: 5px;">0.39</td> </tr> </table>		T in s	0.40	0.39	0.39	0.36	0.41	0.39
T in s	0.40	0.39	0.39	0.36	0.41	0.39			
Company: Norsonic Brechbühl AG, CH-3452 Grünenmatt No. of test report:									

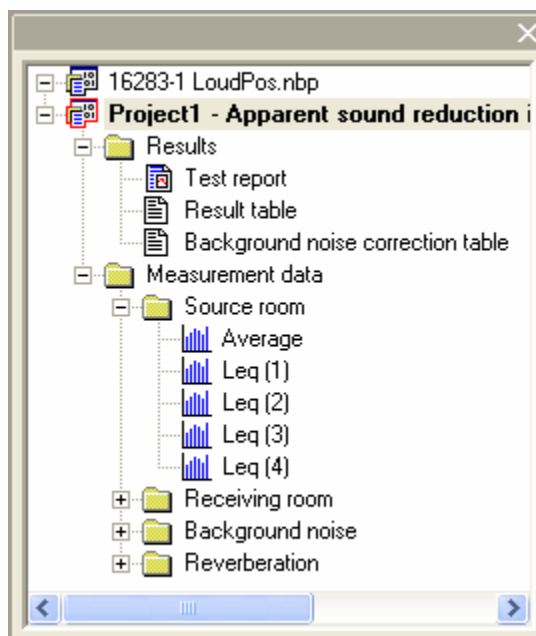
Averaging of calculated results of loudspeaker positions

Some standards (e.g. ISO 16283, ISO 10140) require to calculate the results for each single loudspeaker position and to average them at the end. To do so in NorBuild you have the possibility to assign each measurement an index in order to mark its loudspeaker position.

Creating a Project

A new project is created as explained in the chapter *Creating a project*. Within the tree structure please select the directory "Field", then the folder "ISO" and in the sub folder "Airborne" the template.

Working in the workspace window



The workspace window looks like the workspace window in a standard ISO-Project. The data can be manipulated as explained in the chapter *Working in the workspace window*.

The project can also be saved as an Excel file, as explained in the chapter *Export*.

Measurement table

In the level measurement tables, you have the possibility to assign each measurement an index from #A to #I. Results will be calculated for single loudspeaker operated at the same position. All measurements with the same index are averaged on an energy basis. To mark the 1st loudspeaker position label the corresponding measurements with L#A. For the next loudspeaker position mark the measurements with L#B, and so on.

Note: The mean value in the table is based on all available measurements

no matter what position index they have. However, this average value is of no use for the calculation unless only one position index for all measurements has been used.

Background noise correction is available. In the background noise measurement table, you have the possibility to assign each measurement an index from #A to #I or #ALL. All measurements with the same index are averaged on an energy basis. For each corresponding receiving room average the background noise correction is calculated according to the standard. If an index (#A..#I) does not match, no correction is calculated. If #ALL is chosen, the background noise correction is calculated for every receiving room average where there is no matching #A...#I spectrum.

Note: The Background noise correction table cannot show the detailed corrections for each loudspeaker positions but it will show the correction status of all positions (cumulated)

Measurement table with loudspeaker position selection box

Frequency [Hz]	Average			Leq (1)		Leq (2)		Leq (3)		Leq (4)	
	L avg	SD	N	L#A	S	L#A	S	L#B	S	L#B	S
50	73.7	4.70	4	L#A		77.9		66.5		70.8	
63	73.9	4.63	4	L#B		76.9		66.1		72.3	
80	69.5	1.37	4	L#C		69.1		69.2		71.2	
100	80.4	1.01	4	L#D		81.3		79.8		79.2	
125	85.0	1.98	4	L#E		83.6		87.1		85.3	
160	89.7	3.65	4	L#F		87.1		92.6		90.4	
200	86.6	3.60	4	L#H		89.0		88.2		81.4	
250	83.5	0.61	4	L#I		83.2		84.3		82.9	
315	87.4	1.14	4		88.9	87.2		86.2		87.0	
400	88.6	2.27	4		86.0	86.4		90.6		89.5	
500	88.4	0.97	4		88.7	87.0		88.3		89.3	
630	88.4	1.61	4		90.0	86.5		87.3		89.1	
800	85.3	1.50	4		84.8	86.1		86.4		83.1	
1'000	85.0	2.17	4		82.8	84.5		87.6		83.2	
1'250	85.4	1.39	4		84.1	87.1		84.2		85.3	
1'600	81.7	0.46	4		81.5	82.0		82.1		81.1	
2'000	86.9	3.55	4		82.7	88.9		89.1		83.0	
2'500	85.0	2.19	4		82.2	84.1		87.5		84.6	
3'150	79.9	2.30	4		77.5	81.0		81.8		77.4	
4'000	75.8	1.56	4		74.7	76.9		77.0		73.9	
5'000	67.7	0.53	4		67.6	68.0		68.2		67.0	
Sum A	95.7				94.6	95.9		96.9		94.9	

Click the L header to get the loudspeaker position selection box.

Test report

The test report looks like test reports in the standard ISO-projects. The status for corrections contains the corrections of all positions (cumulated).

Result table

The main result table shows only the final results together with some details of the single number calculation and the correction status. No average values will be shown. The results and average values for each loudspeaker position will be displayed on page 3 and continued.

Background noise correction table

The table cannot show the detailed corrections of each loudspeaker position. Only a combined status for all corrections will be displayed.

Result table without average values

Project1 - Apparent sound reduction index according to ISO 16283-1 - Result table							
Apparent sound reduction index according to ISO 16283-1							
Field measurements of airborne sound insulation between rooms							
Rating according to ISO 717-1 $R'_{w}(C;C_{tr}) = 35.1$ (2; -5) dB Evaluation based on field measurement results obtained in one-third-octave bands by an engineering method.							
				$C_{50-3150} = -2$ dB	$C_{50-5000} = -1$ dB	$C_{100-5000} = -1$ dB	
				$C_{tr,50-3150} = -6$ dB	$C_{tr,50-5000} = -6$ dB	$C_{tr,100-5000} = -5$ dB	
Sum of unfavourable deviations: 31.7 dB							
Max. unfavourable deviation: 9.0 dB at 315 Hz							
Frequency [Hz]	R' [dB]	L1 [dB]	L2 [dB]	T [s]	Corr. [dB]	u. Dev. [dB]	
50	16.8						Background noise limit
63	24.4						Background noise limit
80	24.7						Background noise limit
100	26.7						
125	28.6						
160	23.8						
200	18.7					6.4	
250	24.6					3.5	
315	22.1					9.0	
400	30.3					3.8	
500	31.1					4.0	
630	32.0					4.1	
800	36.4					0.7	
1'000	39.0						
1'250	40.3						
1'600	38.9					0.2	
2'000	39.1						
2'500	41.1						
3'150	45.5						Background noise limit
4'000	43.4						Background noise limit
5'000	39.5						Background noise limit

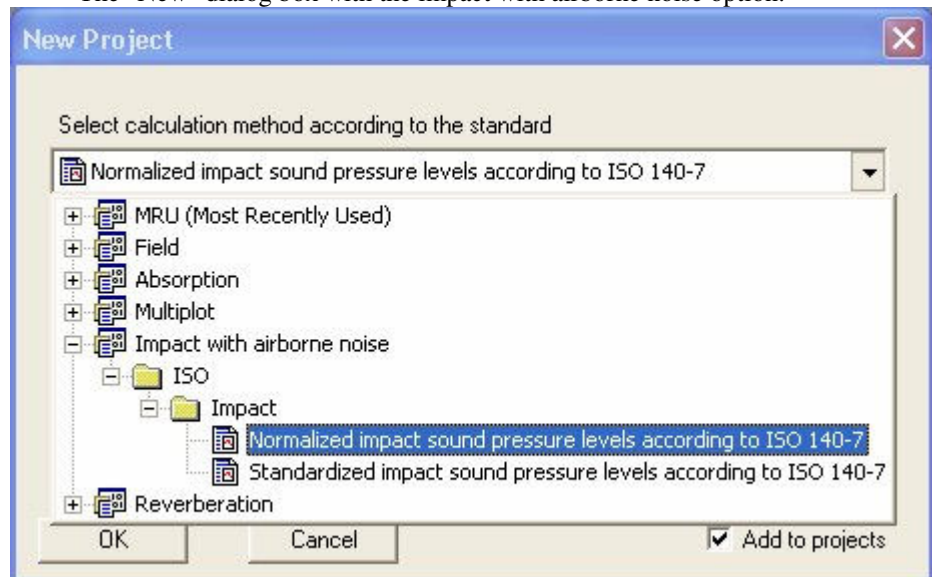
Impact with airborne noise

DIN 52210, Part 1, chapter 5.4.4 describes a procedure for measurements of impact sound at high airborne sound levels. NorBuild offers the option, to calculate and display impact data with airborne noise. Please proceed as follows:

Creating a new project: Impact with airborne noise

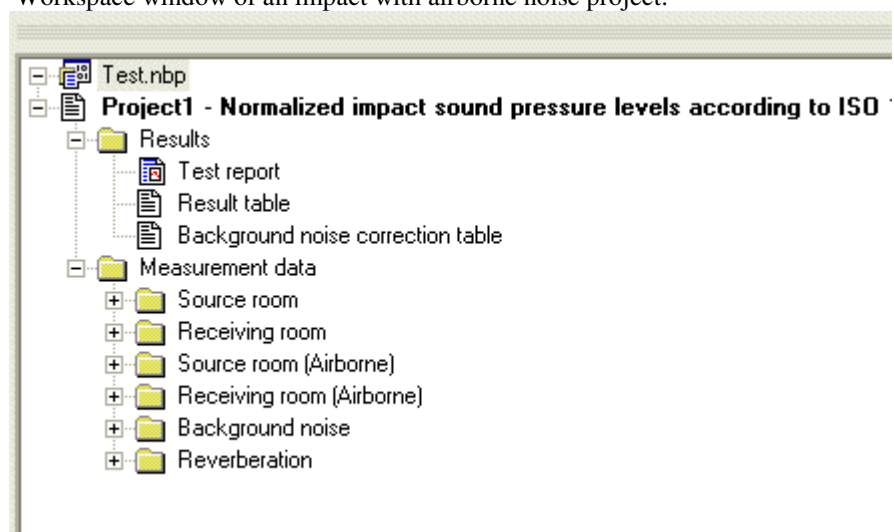
A new project is created as explained in the chapter *Creating a project*. Within the tree structure please select the directory "Impact with airborne noise", then the folder "ISO" and in the sub folder "Impact" the template 'Normalized impact sound pressure levels according to ISO 140-7' or 'Standardized impact sound pressure levels according to ISO 140-7'.

The "New" dialog box with the impact with airborne noise option:



Working in the workspace window

Workspace window of an impact with airborne noise project:



The workspace of an impact with airborne noise project contains the main folders "Results" and "Measurement data". The folder "Results" contains the same files, like in other impact projects.

In the folder "Measurement data", you find additional folders, "Source room (Airborne)" and "Receiving room (Airborne)", where the airborne noise data of the loudspeaker measurement is saved. In the "Source room" folder the airborne noise data of the tapping machine is saved.

The data can be manipulated, as explained in the chapter *Working in the workspace window*.

The impact with airborne noise project can be also saved as an Excel file, as explained in the chapter *Export*.

Test report

The test report looks like the test reports in other impact projects.

Procedure

To calculate the impact sound at high airborne sound levels, do as follows:

1. Read the results of the airborne noise of the tapping machine from the analyser or from the measurement file into the "Source room" folder (see chapter *importing measurement data*).
2. Read the results of the impact data from the analyser or from the measurement file into the "Receiving room" folder (see chapter *Importing measurement data*).
3. Read the airborne noise results of the loudspeaker measurement from the analyser or from the measurement file into the "Source room (Airborne)" folder (see chapter *Importing measurement data*).
4. Read the airborne noise results of the loudspeaker measurement from the analyser or from the measurement file into the "Receiving room (Airborne)" folder (see chapter *Importing measurement data*).
5. Read the results of the reverberation time from the analyser or from the measurement file into the "Reverberation" folder (see chapter *Importing measurement data*).
6. The correction results can be seen in the 'Background noise correction table'. (The menu item *Extras > Background noise correction* is disabled). The table contains the following columns:
 - D: Sound level difference produced in two rooms.
 - LHW: Source room airborne noise of the tapping machine.
 - LE: Signal and airborne noise in the receiving room.
 - L2: Adjusted signal level.
 - L2-LE: Difference between L2 and LE.

'Background noise correction table':

Frequency [Hz]	L2 [dB]	LE [dB]	LHW [dB]	D [dB]	L2 - LE [dB]	
50	37.7	37.7	35.3	60.2	0.0	
63	36.3	36.3	39.8	61.2	0.0	
80	35.2	35.2	34.6	65.1	0.0	
100	35.7	35.7	35.8	64.3	0.0	
125	35.0	35.0	35.9	65.2	0.0	
160	30.3	30.3	34.5	70.7	0.0	
200	23.0	23.0	32.2	75.7	0.0	
250	95.2	95.2	30.2	79.0	0.0	
315	21.0	21.0	29.4	75.7	0.0	
400	16.3	17.6	27.6	-0.2	-1.3	Background noise too high
500	17.3	17.3	26.7	77.6	0.0	
630	12.6	12.6	27.1	80.6	0.0	
800	13.7	13.7	24.0	77.3	0.0	
1'000	14.7	14.7	19.0	77.1	0.0	
1'250	10.2	10.2	14.2	79.1	0.0	
1'600	7.6	7.6	11.7	81.8	0.0	
2'000	5.0	5.0	8.1	83.8	0.0	
2'500	4.4	4.4	6.6	82.8	0.0	
3'150	4.7	4.7	5.9	82.3	0.0	
4'000	5.4	5.4	6.6	80.5	0.0	
5'000	7.3	7.3	7.3	76.5	0.0	
Legend:						
D: Sound level difference produced in two rooms.						
LHW: Source room airborne noise of the tapping machine.						
LE: Signal and airborne noise in the receiving room.						
L2: Adjusted signal level.						

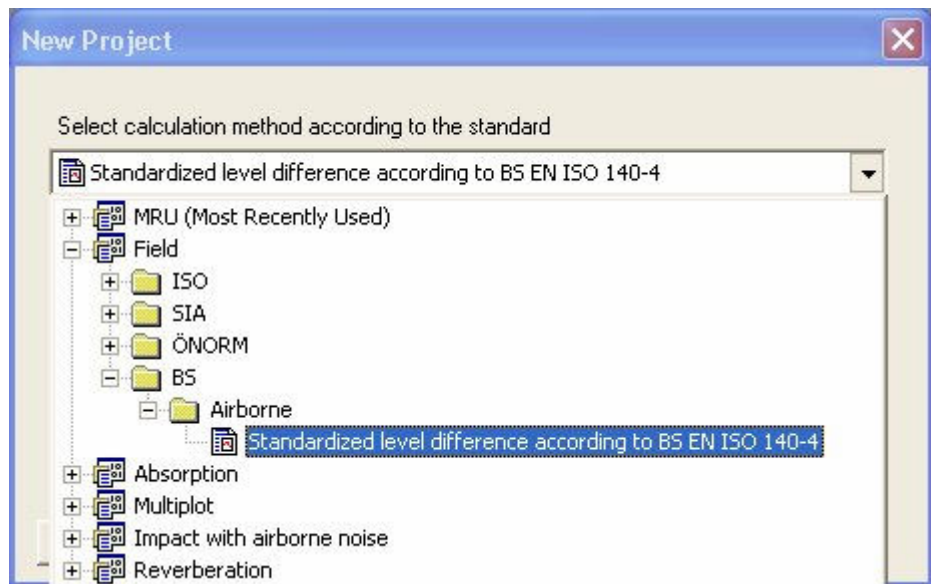
National Standards, British Standard

With the option National Standards, NorBuild offers the possibility to calculate the averages of the sending and receiving room according to the British Standard, Regulation 20A and Regulation 12A BS EN ISO.
Please proceed as follows:

Creating a British Standard-Project

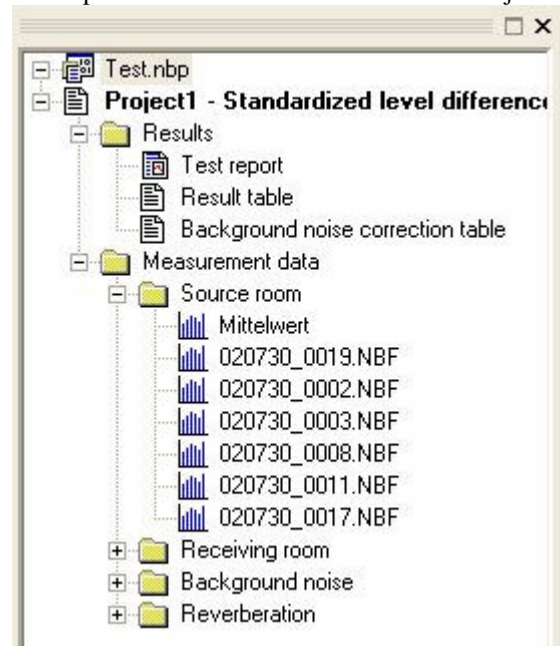
A new project is created as explained in the chapter *Creating a project*. Within the tree structure please select the directory "Field", then the folder "BS" and in the sub folder "Airborne" the template 'Standardized level difference according to BS EN ISO 140-4'.

The "New" dialog box with National Standards-Option, British Standard:



Working in the workspace window

Workspace window of a British Standard -Project:



The workspace window in a British Standard –Project, looks like the workspace window in a standard ISO-Project. The data can be manipulated as explained in the chapter *Working in the workspace window*. The project can also be saved as an Excel file, as explained in the chapter *Export*.

Test report

The test report looks like test reports in the standard ISO-projects.

Measurement table

In the source room and receiving room measurement table, you have the possibility to assign each measurement an index from #1 to #9. All measurements with the same index are averaged on an energy basis. For each corresponding average spectrum the level difference will be calculated. All the level difference spectra are arithmetically averaged to get the level difference D as defined in ISO 140-4.

Background noise correction is available. In the background noise measurement table, you have the possibility to assign each measurement an index from #1 to #9 or #ALL. All measurements with the same index are averaged on an energy basis. For each corresponding receiving room spectrum the background noise correction is calculated according to ISO 140-4. This correction value is added to the corresponding "Corr." Column in the receiving room table. If an index (#1..#9) does not match, no correction is calculated. If #ALL is chosen, the background noise correction is calculated for every receiving room spectrum.

The "Background noise correction table" does not exist in this project.

Result table

The 'Result Table' will display the level difference D instead of L1 and L2.

Measurement table with microphone position selection box

Frequency [Hz]	Average			020730_0019.NBF				020730_0002.NBF				020730_0003.NBF				020730_000	
	L avg	SD	N	L#1	S	N	Corr.	L#1	S	N	Corr.	L#1	S	N	Corr.	L#2	S
50	36.2	4.97	6	L#1		1	0.0	29.8		1	0.0	37.7		1	0.0	29.2	
63	37.4	3.73	6	L#2		1	0.0	34.5		1	0.0	42.1		1	0.0	30.9	
80	34.4	4.61	6	L#3		1	0.0	31.6		1	0.0	36.3		1	0.0	29.4	
100	36.2	5.48	6	L#4		1	0.0	33.1		1	0.0	37.5		1	0.0	38.1	
125	36.2	5.28	6	L#5		1	0.0	32.4		1	0.0	37.8		1	0.0	38.9	
160	32.4	4.58	6	L#6		1	0.0	30.6		1	0.0	36.5		1	0.0	31.8	
200	28.8	4.90	6	L#7		1	0.0	26.9		1	0.0	34.5		1	0.0	27.9	
250	26.7	5.35	6	L#8		1	0.0	24.0		1	0.0	32.6		1	0.0	26.3	
315	25.9	5.50	6	L#9		1	0.0	24.5		1	0.0	31.6		1	0.0	23.1	
400	23.7	6.41	6			1	0.0	25.1		1	0.0	29.2		1	0.0	18.9	
500	23.0	4.65	6			1	0.0	25.3		1	0.0	27.8		1	0.0	19.7	
630	22.8	7.40	6			1	0.0	24.5		1	0.0	28.7		1	0.0	18.0	
800	20.5	5.29	6			1	0.0	22.9		1	0.0	24.9		1	0.0	20.3	
1'000	18.5	3.62	6			1	0.0	16.9		1	0.0	20.4		1	0.0	22.4	
1'250	13.4	3.21	6			1	0.0	11.4		1	0.0	15.9		1	0.0	16.8	
1'600	10.7	3.15	6			1	0.0	8.8		1	0.0	13.4		1	0.0	13.9	
2'000	7.0	2.06	6			1	0.0	6.3		1	0.0	9.4		1	0.0	8.7	
2'500	5.6	1.30	6			1	0.0	5.6		1	0.0	7.4		1	0.0	6.5	
3'150	6.1	1.66	6			1	0.0	5.0		1	0.0	6.6		1	0.0	8.8	
4'000	6.1	0.95	6			1	0.0	5.5		1	0.0	7.5		1	0.0	6.9	
5'000	7.3	0.17	6			1	0.0	7.1		1	0.0	7.4		1	0.0	7.4	
Sum A	30.0			25.8				29.9				34.5				30.0	

Click the L header to get the microphone position selection box.

Changing values in measurement table

To change specific measurement or correction values just click on the cell containing the value you want to change and then enter the new value using the keyboard.

The status (column "S" in the measurement table) for that particular value will then change to 'H' indicating the manual input.

Data import from the clipboard

Numerical values can be imported from the clipboard into a measurement series. The data on the clipboard have to contain text (no graphics), and just one column is possible (no Tab delimited text).

To copy the measurement values from the clipboard into a NorBuild measurement table:

1. Copy the measurement data from your source (e.g. Excel) to the clipboard.
2. Open the desired measurement table in NorBuild (e.g. the 'Average' table in the "Source room") by double-clicking it in the project tree.
3. Use *Edit > Add measurement* to add a new measurement into the desired average table in NorBuild.
4. Click in the first field of the column into which the data shall be pasted.
5. Choose *Edit > Paste* (Ctrl + V).

The average table is refreshed automatically.

Adding a measurement

Use the command *Edit > Add Measurement* to add a new measurement to the averaging table. This command is available within the averaging table only. It will add a blank column into which the spectrum data for an additional

measurement can be either pasted from the clipboard (e.g. copied from Excel) or keyed in manually.

To add a new measurement to a measurement table, do as follows:

1. Select the desired average table within the project tree (folder "Measurement data\ Source room", "..\Receiving room", "..\Background noise" or "..\Reverberation").
2. Open the table by double-clicking on it.
3. Click into the table to activate it and then use the command *Add measurement* either from the *Edit* menu or from the *Context* menu (right mouse click).
4. A blank column for an additional measurement appears in the table.
5. The data for the new measurement can then be entered manually or be imported from the clipboard.

Shortcuts:


Toolbar: 

Deleting a measurement

Use the command *Edit > Delete* to delete the selected measurement. This command is unavailable if the currently selected item cannot be deleted.

Select the desired measurement by clicking on the corresponding column header in the measurement table with the mouse. Then choose the *Delete* command either from the *Edit* menu or from the *Context* menu (right mouse click).

Shortcuts:

Toolbar: 

Keys: **DEL**


Including a measurement in average

Use the command *Edit > Include* to include a previously excluded measurement into the average calculation. An excluded measurement is greyed out and not included into the average (see *Excluding a measurement*).

1. To select a measurement to include, mark the measurement within the averaging table by clicking on the corresponding column header.
2. Then choose the *Include* command either from the *Edit* menu or from the *Context* menu (right mouse click).

3. The measurement will then be displayed regularly and is used in the averaging.

Shortcuts:

Toolbar: 

Excluding a measurement

Use the command *Edit > Exclude* to exclude the selected measurement from the average calculation.


1. To select a measurement to exclude, mark the measurement within the averaging table by clicking on the corresponding column header.
2. Then choose the *Exclude* command either from the *Edit* menu or from the *Context* menu (right mouse click).
3. The measurement will then be greyed out and not be included into the average:

Project1 - Source room

Frequency [Hz]	Average			L2.SDF				L1.SDF				040406_0001.NBF			
	L avg	SD	N	L	S	N	Corr.	L	S	N	Corr.	L	S	N	Corr.
50	42.8	6.61	2	36.0		1	0.0	34.6		1	0.0	45.3		1	0.0
63	40.2	0.50	2	39.8		1	0.0	41.3		1	0.0	40.5		1	0.0
80	44.2	2.49	2	45.6		1	0.0	45.6		1	0.0	42.1		1	0.0
100	44.4	5.79	2	46.8		1	0.0	46.1		1	0.0	38.6		1	0.0
125	50.1	11.57	2	53.0		1	0.0	52.6		1	0.0	36.6		1	0.0
160	56.6	19.45	2	59.6		1	0.0	59.6		1	0.0	32.1		1	0.0
200	63.7	25.73	2	66.7		1	0.0	67.5		1	0.0	30.3		1	0.0
250	68.3	28.44	2	71.3		1	0.0	72.1		1	0.0	31.1		1	0.0
315	65.2	23.43	2	68.2		1	0.0	70.5		1	0.0	35.1		1	0.0
400	64.5	23.37	2	67.5		1	0.0	71.5		1	0.0	34.5		1	0.0
500	63.4	22.51	2	66.4		1	0.0	68.8		1	0.0	34.6		1	0.0
630	59.8	19.75	2	62.8		1	0.0	69.4		1	0.0	34.9		1	0.0
800	56.7	17.75	2	59.7		1	0.0	64.9		1	0.0	34.6		1	0.0
1,000	57.0	6.46	2	59.5		1	0.0	62.1		1	0.0	50.3		1	0.0
1,250	54.9	0.14	2	55.0		1	0.0	59.8		1	0.0	54.8		1	0.0
1,600	65.7	8.90	2	55.9		1	0.0	59.6		1	0.0	68.5		1	0.0
2,000	63.3	6.16	2	57.1		1	0.0	58.1		1	0.0	65.8		1	0.0
2,500	51.8	11.20	2	54.7		1	0.0	56.7		1	0.0	38.9		1	0.0
3,150	50.4	13.87	2	53.4		1	0.0	55.7		1	0.0	33.8		1	0.0
4,000	47.3	14.50	2	50.3		1	0.0	52.9		1	0.0	29.8		1	0.0
5,000	44.5	15.42	2	47.5		1	0.0	48.8		1	0.0	25.7		1	0.0
Sum A	71.4			71.1				74.5				71.6			

To undo this process: see *Include measurement*.

Shortcuts:

Toolbar: 

Correction column "Corr."

Use the command *View > Correction Column* to show or hide the correction column in a measurement table.

Column "Corr." contains the correction values that are applied to the measurement (see chapter *Correcting measurement values*).

Number of averages column "N"

Use the command *View > Number of Averages Column* to show or hide the number of averages column in a measurement table.

Column "N" contains the number of performed averages for a particular measurement file. This column is of interest only for measurements that have been averaged within the analyser already. When importing a measurement file which is a result of three averaging processes done in the analyser itself, column "N" will contain the number 3. If the table contains such a measurement, the total number of averages shown in the average column will be higher than the number of measurement files shown in the table.

Status column "S"

Use the command *View > Status Column* to show or hide the status column in a measurement table.


Column "S" shows the status of a measurement value. There are three possible status characters:

- '*' indicates an overload.
- 'H' indicates that the value was keyed in manually.
- '?' indicates doubts about the validity of that value.

Properties

Use the command *View > Properties* to view the properties of a selected measurement. This command is only available when a measurement or a measurement folder is selected. A measurement can be selected by clicking on it in the project tree or by clicking on the according column header within a measurement table.

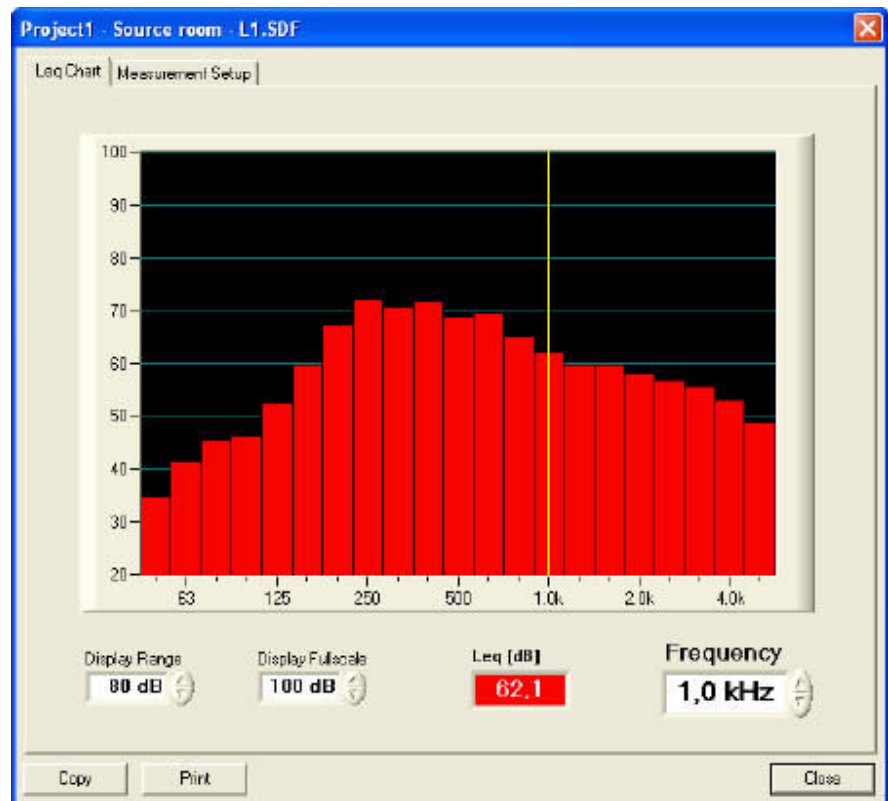
Shortcuts:

Toolbar: 

Keys: **Alt+Enter**

A window appears showing the graphical display of the measurement series (*Leq Chart* or *Reverberation Chart* depending on the type of measurement or a Multiline Graph).

Leq Chart page



The sound pressure level is shown in form of a bar graph within the selected frequency range (select frequency range under *Extras > Options*). The average Leq in every 1/3 octave band is shown as a red bar. The numeric Leq value at the cursor frequency is shown in the Leq field below the chart.

Any 1/3 octave bar can be selected by using the frequency up/down buttons or by dragging and dropping the cursor. Display Fullscale and Range can be modified by help of the corresponding control items.

Copy: Copies active chart to the Clipboard. Click into the chart to make it active for the copy function.

Print: Prints out the chart.

In case of a reverberation time measurement the command *View > Properties* will bring up a window showing the graphical display of the reverberation time spectrum.

Measurement Setup page

Project1 - Source room - L1.SDF

Leq Chart Measurement Setup

Instrument type A:	NOR640
Instrument type B:	None
Measurement mode:	Level normal
Measurement duration:	2 s
Lower frequency:	60.0 Hz
Upper frequency:	5.0k Hz
Noise type:	
Noise level:	
Activated channel:	A
Description channel A:	Sending room
Full scale channel A:	120 dB
Sensitivity microphone A:	-25,6
Software version channel A:	
Measurement datetime:	15.04.2004 10:39:22

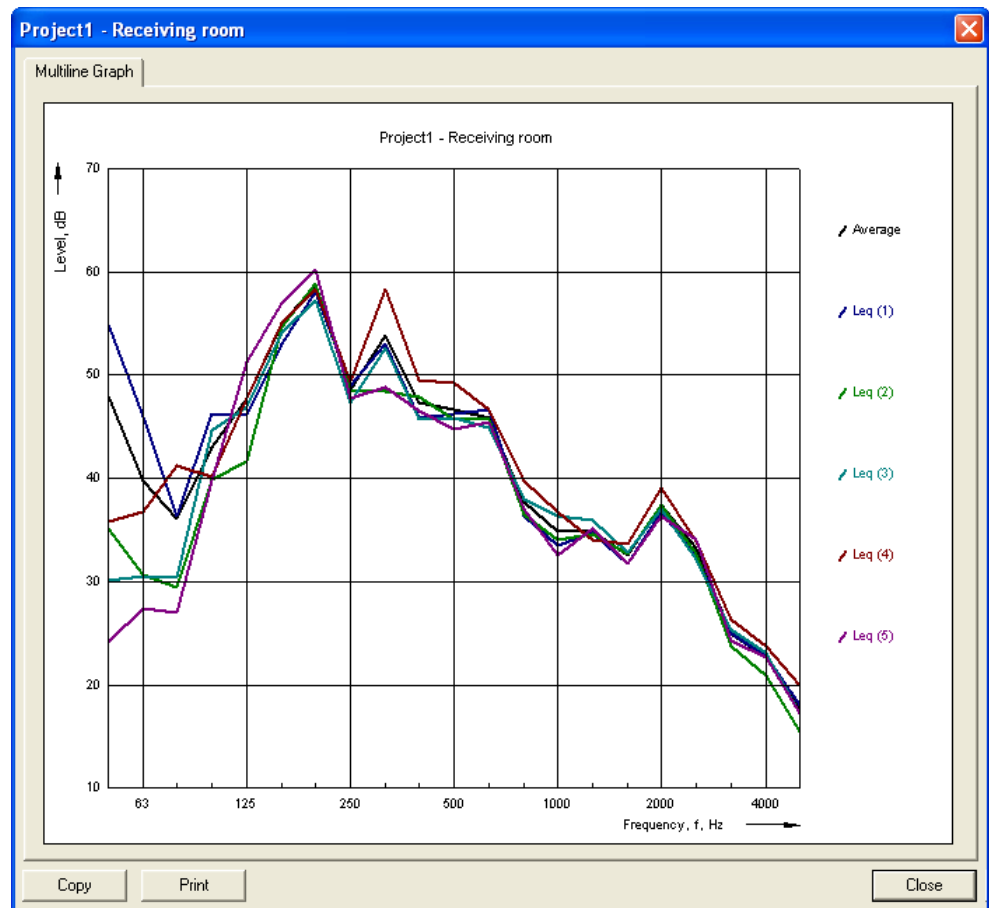
Copy Print Close

This page displays relevant information about the measurement. The amount of information available depends on the type of data acquisition. If a measurement was acquired using the software module *CtrlBuild*, there will be more detailed information available (e.g. noise type).

Copy: Copies the selection to the Clipboard.

Print: Prints out the table.

Multiline Graph




The sound pressure levels of a measurement folder is shown in form of a line graph within the selected frequency range (select frequency range under *Extras* > *Options*).

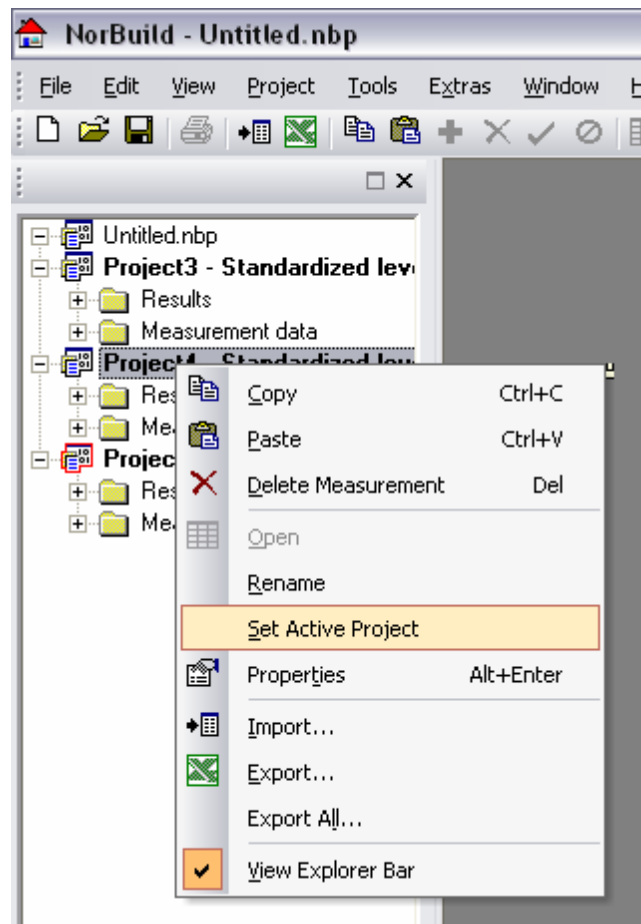
Copy: Copies the graph to the Clipboard.


Print: Prints out the graph.

Active Project

The actual project, on which is worked, is marked red (e.g. ). There are certain menus (discussed in the next section) that just apply to the active project.

To set a project active, select the project and chose *Project* > *Set Active Project* from the menu or right click onto the project and chose “Set Active Project” from the shortcut menu.



Inactive projects are indicated with the following symbol: 

Menugroup „Open Table“

The tool bar contains a group of symbols that can be used to open certain tables from the active project, just with one click.



Opens the Test Report of the active project.



Opens the Result Table of the active project.



Opens the Source Room Table of the active project.



Opens the Receiving Room Table of the active project.



Opens the Background Noise Table of the active project.



Opens the Reverberation Table of the active project.

You can also chose those commands with the *View* from the menubar.

Background noise correction

Rules

Sometimes the signal from the speakers or the tapping machine is corrupted by background noise. If the background noise is steady it can be subtracted from the measured levels afterwards.

For field measurements NorBuild makes use of the rules according to ISO 140-4/5:

If the difference of the receiving room level and the background noise level exceeds 10 dB, a correction is not necessary. If the difference of the receiving room level and the background noise level lies between 6 and 10 dB, the background noise level is subtracted energetically.

If the difference of the receiving room level and the background noise level is below 6 dB, a correction of 1.3 dB is appropriate. The measurement values do not fulfil the standards requirement. The measurement has to be repeated. In this case the resulting values are marked with the comment "Background noise too high" on the 'Test report' and on the 'Result table' (see chapter *Protocols*).

For laboratory measurements NorBuild makes use of the rules according to ISO 140-3:

If the difference of the receiving room level and the background noise level exceeds 15 dB, a correction is not necessary. If the difference of the receiving room level and the background noise level lies between 6 and 15 dB, the background noise level is subtracted energetically.

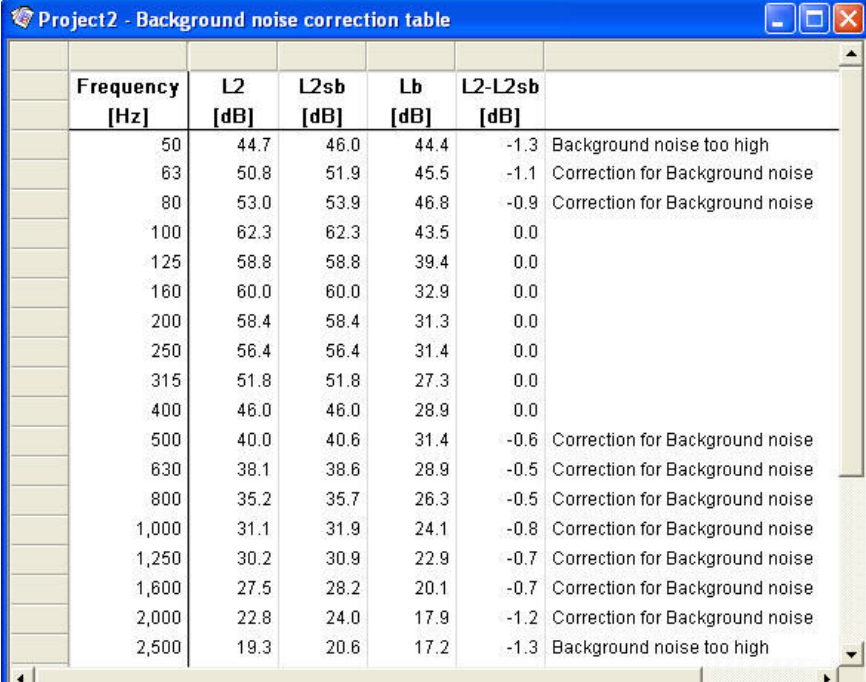
If the difference of the receiving room level and the background noise level is below 6 dB, a correction of 1.3 dB is appropriate. The measurement values do not fulfil the standards requirement. The measurement has to be repeated. In this case the resulting values are marked with the comment "Background noise too high" on the 'Test report' and on the 'Result table' (see [Protocols](#)).

Procedure

To perform the background noise level correction do as follows:

1. Read the results of the background noise measurement from the analyser or from the measurement file (see chapter *Importing measurement data*).

2. Make sure that valid receiving room levels are available.
3. Activate the correction by choosing *Extras > Background noise correction*.
4. The results can be seen in the '*Background noise correction table*', in which the measured receiving room level, the measured background noise level and the corrected receiving room level are documented. The corrected values are used for further calculations.



Frequency [Hz]	L2 [dB]	L2sb [dB]	Lb [dB]	L2-L2sb [dB]
50	44.7	46.0	44.4	-1.3
63	50.8	51.9	45.5	-1.1
80	53.0	53.9	46.8	-0.9
100	62.3	62.3	43.5	0.0
125	58.8	58.8	39.4	0.0
160	60.0	60.0	32.9	0.0
200	58.4	58.4	31.3	0.0
250	56.4	56.4	31.4	0.0
315	51.8	51.8	27.3	0.0
400	46.0	46.0	28.9	0.0
500	40.0	40.6	31.4	-0.6
630	38.1	38.6	28.9	-0.5
800	35.2	35.7	26.3	-0.5
1,000	31.1	31.9	24.1	-0.8
1,250	30.2	30.9	22.9	-0.7
1,600	27.5	28.2	20.1	-0.7
2,000	22.8	24.0	17.9	-1.2
2,500	19.3	20.6	17.2	-1.3

The '*Background noise correction table*' is stored in the "Results" folder in the project tree. You can open the table by double-clicking on its title in the project tree. Alternatively you can use the *Open* command from the *View* menu or from the *Context* menu (right mouse click).

Protocols

Overview

NorBuild eases your work. That is why measurement protocols are created automatically according to the standard.

Room or element dimensions which are required for the analysis are simply typed into the grey input fields on the test report. The calculations in NorBuild are done automatically, the entire project is updated as soon as all required input values have been entered or when individual values are changed.

Protocols are stored in the "Results" folder in the project tree. The folder contains the following three protocols:

- *Test report*
- *Result table*
- *Background noise correction table*

You can open a protocol by double-clicking on the desired item in the project tree. Alternatively you can use the *Open* command from the *View* menu or from the *Context* menu (right mouse click).

Test report

The '*Test report*' is the formal report sheet as specified in the selected standard. It presents project descriptions, the input parameters (room and element dimensions), the calculated single number ratings and both the numerical and graphical representation of the spectrum of the calculated quantity.

All grey fields on the 'Test report' can be edited. All fields are text fields. The plausibility of the fields including numeric values is checked automatically. In order to insert a line break within an input cell, use *Ctrl+Enter*.

'Test report':

Apparent sound reduction index according to ISO 140-4

Field measurements of airborne sound insulation between rooms

Client:

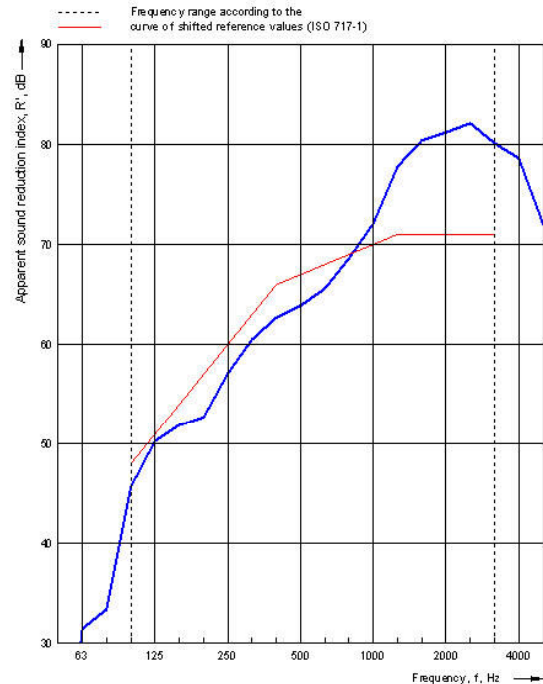
Date of test:

Description:

Object:

Area S of separating element: 12.00 m²
Source room volume: m³
Receiving room volume: 45.0 m³

Frequency f [Hz]	R' 1/3 octave [dB]
50	8.5
63	31.5
80	33.4
100	46.7
125	50.3
160	51.9
200	52.7
250	57.1
315	60.5
400	62.7
500	63.9
630	65.6
800	68.6
1,000	72.1
1,250	77.8
1,600	80.4
2,000	81.2
2,500	82.1
3,150	80.1
4,000	78.6
5,000	72.0



Rating according to ISO 717-1

$R'_{w}(C;C_{tr}) = 67 (-1; -6) \text{ dB}$

Evaluation based on field measurement results obtained in one-third-octave bands by an engineering method.

$C_{50-3150} = -19 \text{ dB}$

$C_{tr,50-3150} = -34 \text{ dB}$

$C_{50-5000} = -18 \text{ dB}$

$C_{tr,50-5000} = -34 \text{ dB}$

$C_{100-5000} = 0 \text{ dB}$

$C_{tr,100-5000} = -6 \text{ dB}$

Company:

No. of test report: 123

Date: 03/06/2004

Signature:

Descriptive Inputs:

The first grey field on the test report is supposed to show the 'Client' and the 'Date of test'. All grey fields can be edited so that the field names 'Description' and 'Object' can also be changed according to your needs. These fields can be used to protocol information describing your project: e.g. location, characteristics of test specimen, description of source and receiving room, and description of the situation (like noise type, filter, temperature, humidity etc.).

Besides the fields for 'Company' and 'No. of test report' the descriptive input area at the bottom of the test report contains fields for the date of the report and for the signature.

For identification purpose the input for 'No. of test report' (which can also be edited as you wish) is automatically copied into the last line of the 'Result table'. The entry for the field 'Company' will be stored so that it will remain unchanged even when starting a new project.

Numerical Inputs:

The required numerical input parameters depend on the analysis. For the example of calculating the apparent sound reduction index, values for the 'Area S of separating element' and 'Receiving room volume' are required. Use the keyboard to enter the values into the grey input fields.

If the function *Extras > Background noise correction* is activated, invalid results in the table will be marked with a reference to a footnote. The footnote 'Background noise too high' indicates that the calculated value is invalid due to an insufficient signal-to-noise ratio (see chapter *Background noise correction*).

Result table

The '*Result table*' contains all numerical results of the analysis plus a level overview graph. Besides the calculated single number ratings it holds a table presenting the final result of the desired quantity and all intermediate results necessary for its calculation.

The table has a column for:

- L1: average sound pressure level in the source room
- L2: average sound pressure level in the receiving room (already corrected)
- T: reverberation time in the receiving room
- Corr.: level corrections
- u. Dev.: unfavourable deviations

If the function *Extras > Background noise correction* is activated, the last column of the result table will contain descriptive information about the background noise. This can either be 'Background noise too high' indicating an invalid measurement or 'Correction for Background noise' indicating that corrections were applied according to the rules of the standard (see chapter *Background noise correction*).

The result table also shows the sum of unfavourable deviations, the maximum unfavourable deviation, the room and element dimensions and a grey input field for remarks. In order to insert a line break within an input cell, use *Ctrl+Enter*.

'Result Table':

Apparent sound reduction index according to ISO 140-4

Field measurements of airborne sound insulation between rooms

Rating according to ISO 717-1

$R'_{w,C;C_{tr}} = 67 (-1; -6)$ dB

Evaluation based on field measurement results obtained in one-third-octave bands by an engineering method.

$C_{50-3150} = -19$ dB

$C_{50-5000} = -18$ dB

$C_{100-5000} = 0$ dB

$C_{tr,50-3150} = -34$ dB

$C_{tr,50-5000} = -34$ dB

$C_{tr,100-5000} = -6$ dB

Sum of unfavourable deviations: 24.0 dB

Max. unfavourable deviation: 4.3 dB at 200 Hz

Frequency [Hz]	R' [dB]	L1 [dB]	L2 [dB]	T [s]	Corr. [dB]	u. Dev. [dB]	
50	8.5	68.0	58.4	0.46	-1.1		
63	31.5	69.9	41.3	1.16	2.9		
80	33.4	75.9	46.5	1.20	3.0		
100	46.7	89.9	48.1	1.47	3.9	2.3	
125	50.3	97.4	51.6	1.71	4.5	0.7	
160	51.9	106.2	57.5	1.25	3.2	2.1	
200	52.7	105.4	52.7	0.80	0.0	4.3	
250	57.1	98.2	42.1	0.75	1.0	2.9	
315	60.5	99.3	39.5	0.71	0.7	2.5	
400	62.7	95.0	33.6	0.81	1.3	3.3	
500	63.9	94.5	31.8	0.79	1.2	3.1	
630	65.6	92.7	27.7	0.69	0.6	2.4	
800	68.6	89.0	20.3	0.59	-0.1	0.4	
1,000	72.1	87.7	16.1	0.57	0.5		
1,250	77.8	90.2	14.5	0.97	2.1		
1,600	80.4	91.6	13.8	1.09	2.6		
2,000	81.2	89.0	11.4	1.37	3.6		
2,500	82.1	87.6	9.2	1.41	3.7		
3,150	80.1	85.2	8.1	1.19	3.0		
4,000	78.6	84.2	7.8	1.00	2.2		
5,000	72.0	78.1	7.8	0.89	1.7		

Receiving room volume: 45.0 m³

Source room volume: m³

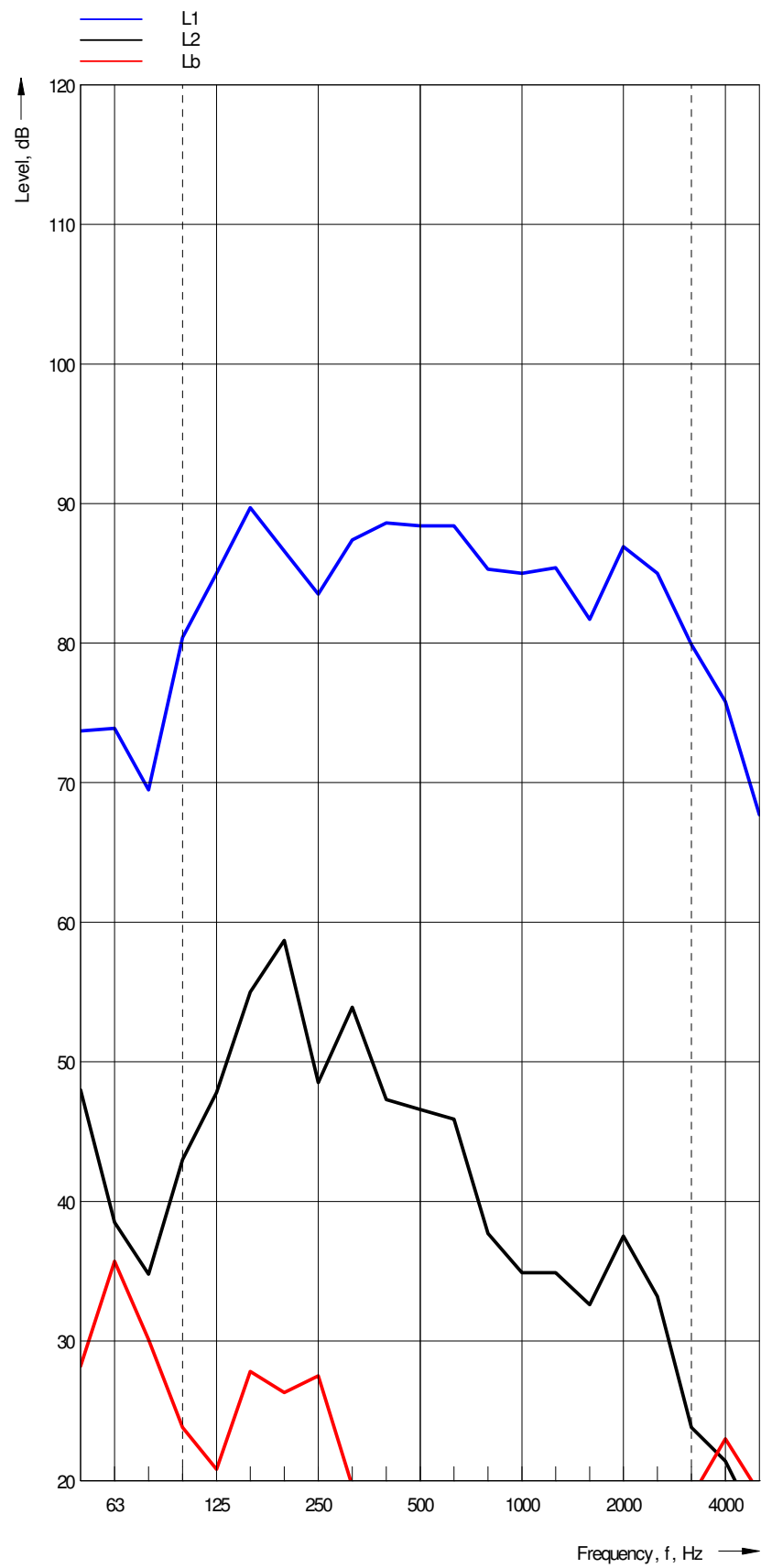
Area S of separating element: 12.00 m²

Remarks:

No. of test report: 123

For identification purpose the input for 'No. of test report' on the 'Test report' (which can also be edited as you wish) is automatically copied into the last line of the 'Result table'. It can only be changed on the 'Test report'.

Level overview



Background noise correction table

The '*Background noise correction table*' contains the spectral level data for the received signal (disrupted by background noise), for the background noise itself and for the corrected signal in the receiving room.

The background noise correction table is explained in chapter *Background noise correction*.

Export

Overview

An entire NorBuild project, including the averaged measurement data and all result sheets, can be saved as an Excel file. This eases your work when further user-specific editing and formatting in MS-Excel or Word is desired.

NorBuild uses Excel templates which are pre-formatted according to the selected standard of the project which is exported. The entire NorBuild project, including the measurement data and all result sheets, are written into the Excel template.

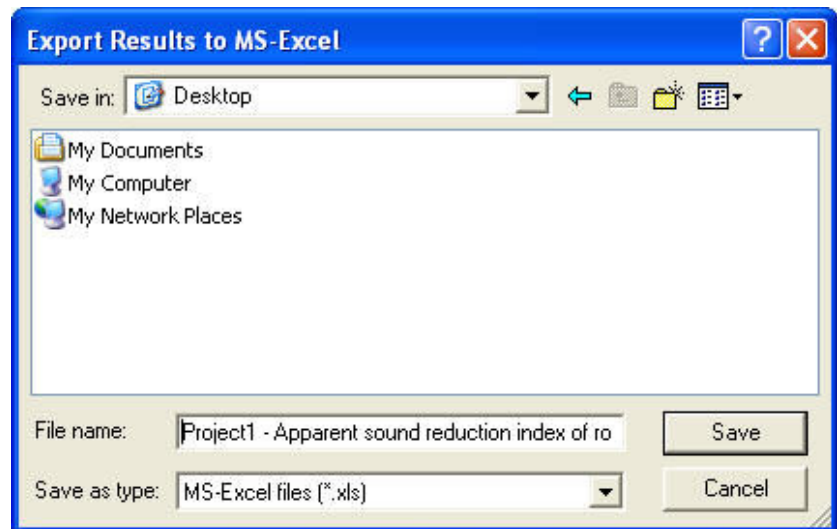
You do not need to select the template file during export, the correct file is found automatically based on the standard according to which the analysis was conducted.

Export command


Use the command *File > Export* to export the entire project to Excel.

Use the command *File > Export All* to export all projects to Excel.

1. Select the desired project in the workspace by clicking on it.
2. Choose *Export* either from the *File* menu or from the *Context* menu (right mouse click).
3. A dialog box appears to save the Excel file. Define directory and file name.
4. Press *Save*.



Shortcuts:

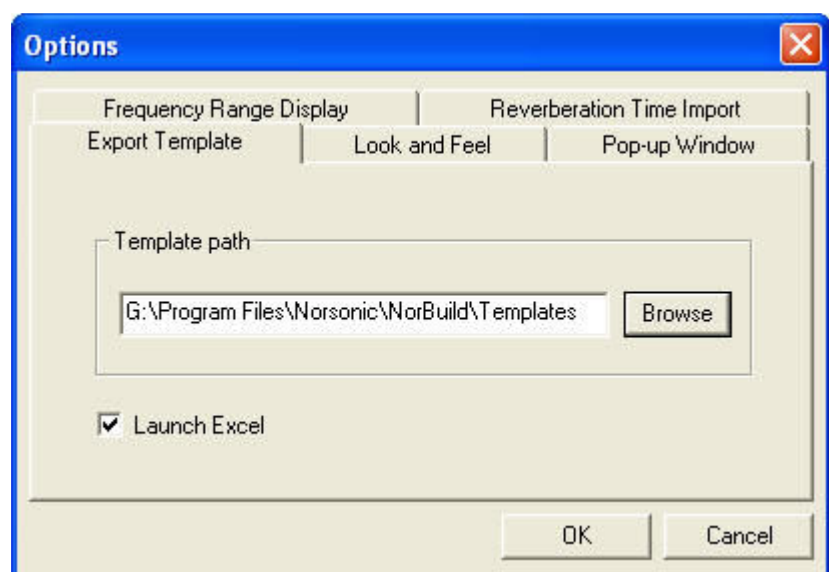
Toolbar: 

Location and name of Excel templates

By default the Excel templates are stored in the NorBuild program folder. In the 'Template' folder there is one template for each type of analysis available in NorBuild.

It is only necessary to change the template path if you want the templates to be stored in a directory other than the default directory (e.g. on the network if several people require access to the templates).

Use the 'Export Template' tab under *Extras > Options* in order to change the path of the Excel templates:



Activate the check box 'Launch Excel' if Excel shall be started after export.

If the template path set here is not correct NorBuild will not find the required template during export. In that case it will bring up the error message:



You can then decide to abort the export or to browse for the templates yourself.

Name of templates:

During export the templates can only be found by NorBuild if the original template name remains unchanged. The templates are named after the standard according to which the analysis is made. The name of the templates shall not be changed. If the name of a template has been changed by mistake NorBuild will not find the template during the export and brings up the error message as above.

After having modified the Excel sheets in the 'Template' folder, you can still find the original template files in the corresponding folder on the installation CD.

Working with Excel templates

NorBuild uses Excel templates which are pre-formatted according to the selected standard of the project which is exported.

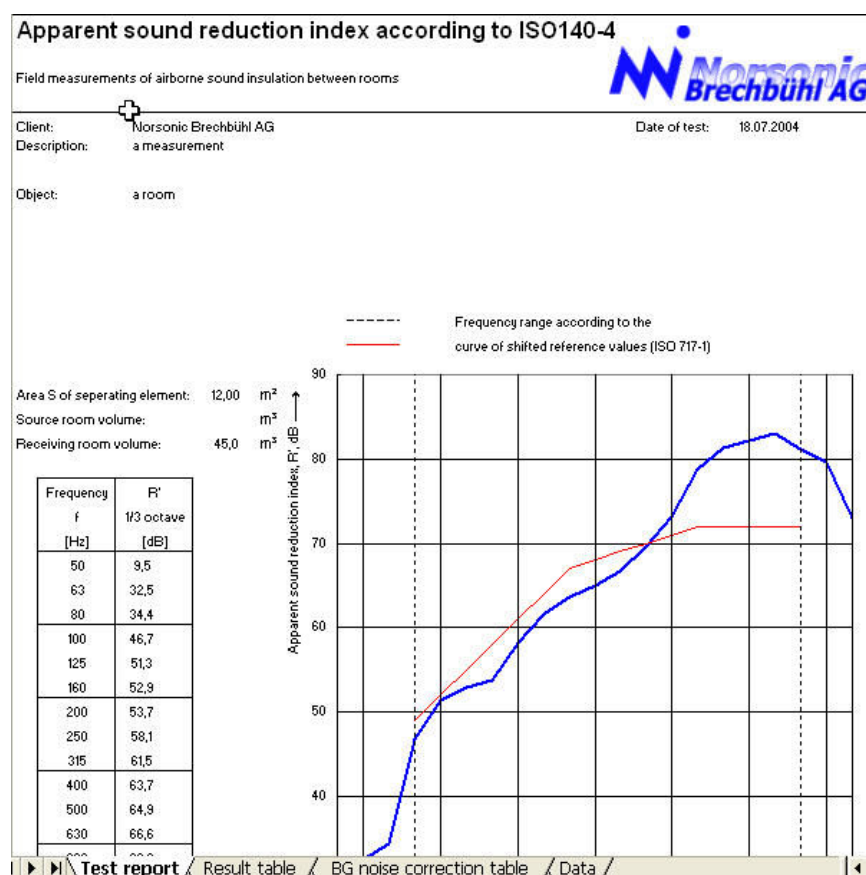
The entire NorBuild project, including the measurement data and all result sheets, are written into the Excel template. The templates can be edited and formatted according to your specific needs.

An Excel template contains three protocol sheets and one data sheet:

- *Test report*
- *Result table*
- *BG noise correction table*
- *Data*

The three protocols represent the forms that are stored in the "Results" folder in the NorBuild project tree. For more detailed information about the protocols in NorBuild, see chapter *Protocols*.

The 'Test report' sheet in the Excel template:



During export NorBuild writes all data into the coloured cells of the Excel spreadsheet *Data* of the template. The three protocol spreadsheets *Test report*, *Result table* and *BG noise correction table* are just used for data presentation. The cells and the diagram are just linked to the according cells in the *Data* spreadsheet.

Therefore the layout of the three protocol spreadsheets can be defined according to the specific needs of the user. For example, you can change the content of any cell, add descriptions, enlarge cells to fit more text, add a company logo, change the graph properties etc.

Working in Excel:

- In order to display the grid and the row and column titles in Excel, use the corresponding checkboxes under *Extras > Options > View*.
- In order to insert a line break within an Excel cell, for example for the description, use *Alt+Enter*.
- In order to change the settings of the graph (e.g. axis scaling or line colour) double-click on the desired item of the diagram (e.g. x-axis, y-axis or curve) to bring up the according Excel dialog box.

After having modified the Excel sheets in the 'Template' folder, you can still find the original template files in the sub-folder 'Backup' (see *Location and name of Excel files*).

Tip: It is strongly recommended to copy all your modified Excel templates (in the folder 'Template') and store them at a different location as a backup. These templates could be overwritten during a new installation of NorBuild at a later point in time, so that all your templates would be lost.

From Excel to Word

As described above NorBuild projects are exported directly to Excel in order to make use of the extensive functionality that Excel offers for user-specific formatting (e.g. of the diagram).

If you want to paste your individual Excel sheet into a Word document in order to use it as one page of your complete measurement report, do as follows:

1. Mark the desired area of the Excel worksheet.
2. Use the command *Edit > Copy* or *Ctrl+C* to copy the selection into the clipboard.
3. In the Word document, click on the position where the Excel sheet shall be inserted.
4. In Word, use the command *Edit > Paste special* and the option '*as Microsoft Excel-worksheet-object*'.
5. Click *OK*. The Excel sheet will then be pasted into Word retaining its original formatting and scaling.

Tip:

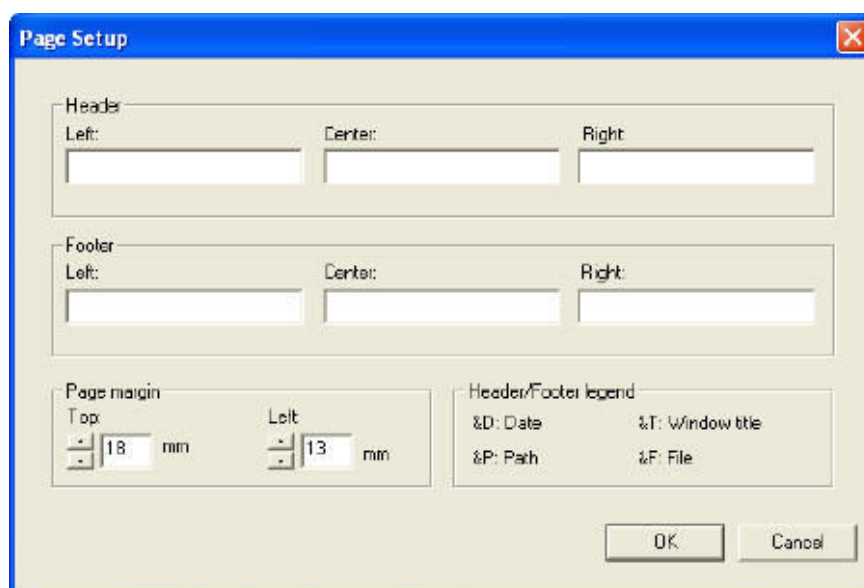
If you paste the Excel sheet into Word using the command *Edit > Paste* or *Ctrl+V*, the original formatting will be lost. If you paste the Excel sheet into Word using the command *Edit > Paste special* as '*Graphic*', the original scaling will be lost.

Printing

Page setup


Use the command *File > Page Setup* to define your page setup. This command is only available when the desired window to be printed is active. Click into the window to make it active for the Page Setup function.

The "Page Setup" dialog box:



In the dialog box you can define the page margins (Top and Left) and the header and footer. In the header and footer fields you can enter text via the keyboard and include the current date, the window title, the file path and the file name using the short commands "&D", "&T", "&P" or "&F", respectively.

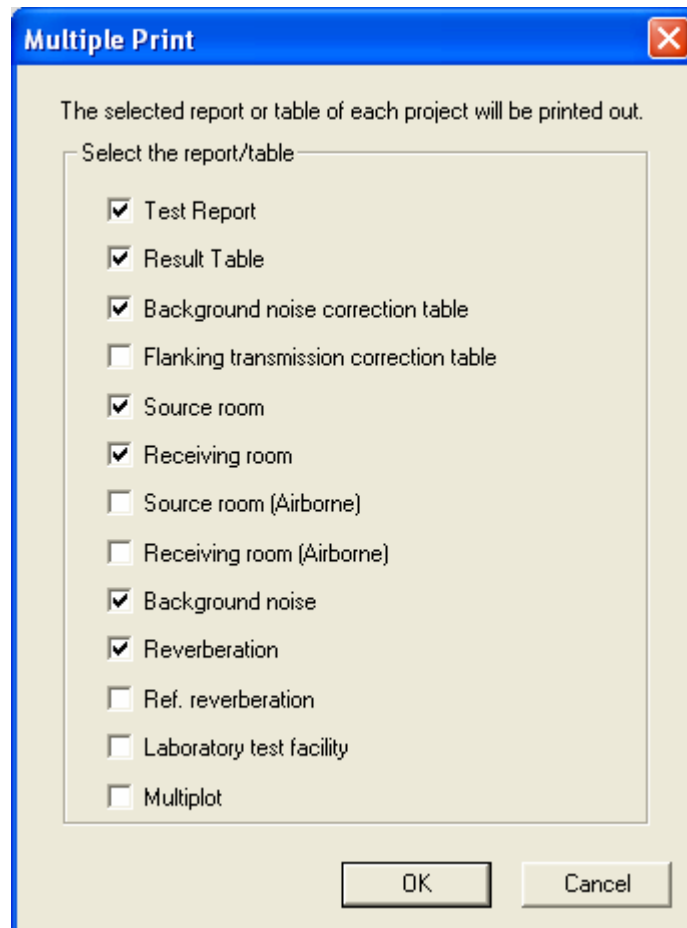
Print

After having defined the Page setup as described above, you can print the active window using the command *File > Print* or the symbol  on the toolbar.

Multiple Print

Use the command *File > Multiple Print...* to print out reports and tables of each project.

The "Multiple Print" dialog box:



In the dialog box you selected the reports and tables to be printed out.

Multiplots

Option Multiplot

NorBuild offers the option to plot multiple result curves (e.g. sound reduction index) or measurements within the same diagram. It is possible to display up to 10 calculated result curves or measurements within one diagram.

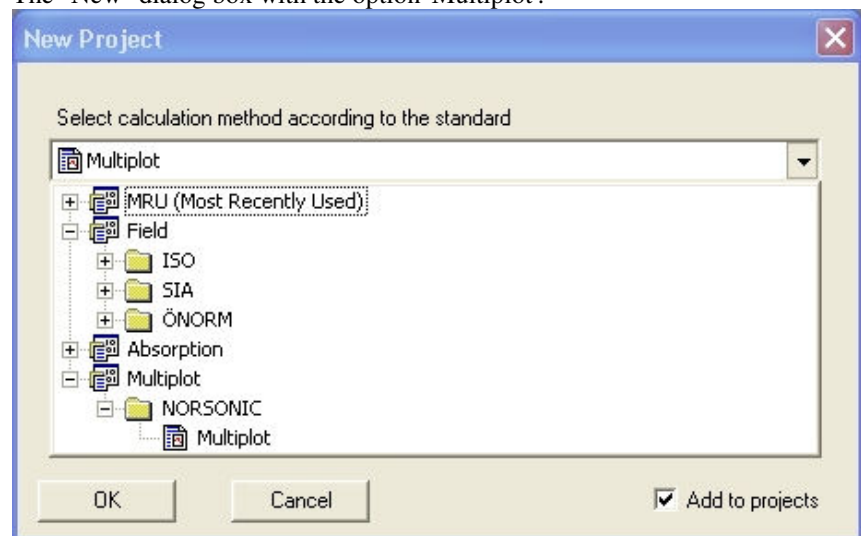
Please proceed as follows:

Creating a Multiplot project

A new project is created as explained in the chapter *Creating a project*. Within the tree structure please select the the directory "Multiplot", then the folder "Norsonic" and then the template 'Multiplot'.

A Multiplot project is then created. Within the project, functions like *Save*, *Open* etc. can be applied as in all other NorBuild projects.

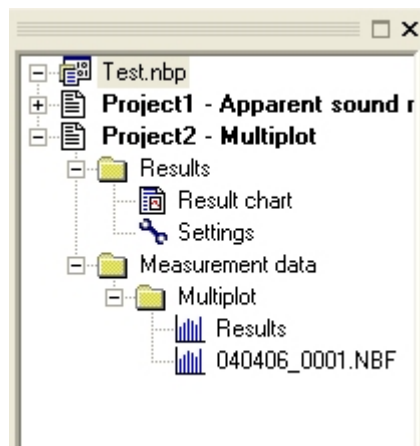
The "New" dialog box with the option 'Multiplot':



Working in the workspace with Multiplot

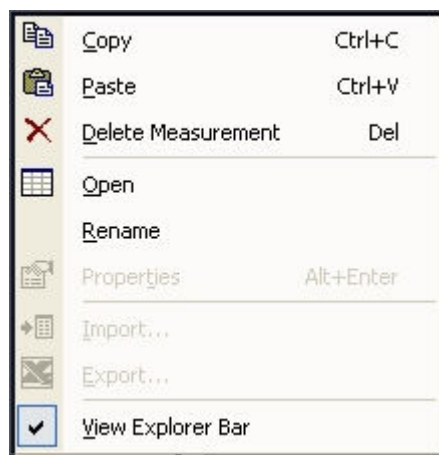
The workspace of a Multiplot project contains the main folders "Results" and "Measurement data". The folder "Results" contains the 'Result chart' and the according 'Settings'. The imported measurements can be found in the folder "Multiplot".

Workspace window of a Multiplot project:



Within the project tree it is possible to open, copy, paste, delete or rename the different items.

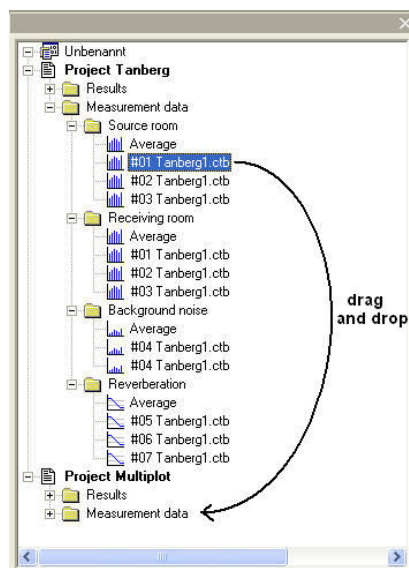
Context menu of the workspace:



Multiplot projects cannot be exported. The following chapter explains how data can be imported into a Multiplot project.

Data import in Multiplot project

Within Multiplot projects the menu item *Import* is inactive. Data can be imported from other NorBuild projects (which are opened in the same workspace) using the functions *Copy / Paste* or *drag & drop*.

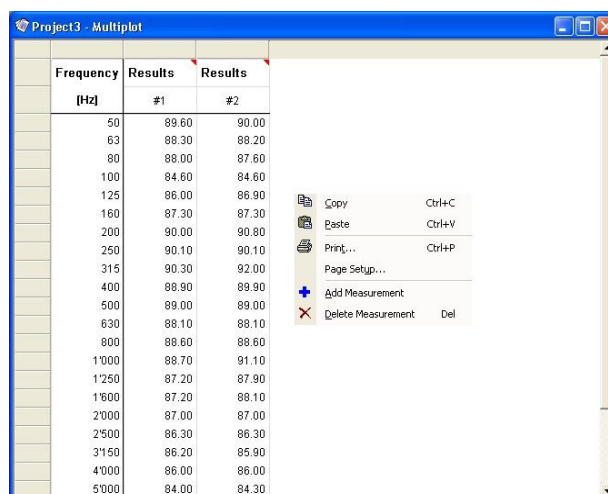


A maximum of 10 measurements can be inserted into the Multiplot project.

Table of measurement series for Multiplots

The measurement tables are stored in the folder "Measurement data". Within the table the data can be altered as usual. Single numerical values and the measurement title can be deleted, copied, pasted or altered. It is also possible to add, delete, copy or paste entire measurements. The entire table can be printed, as described in the chapter *Printing*.

Multiplot measurement table:



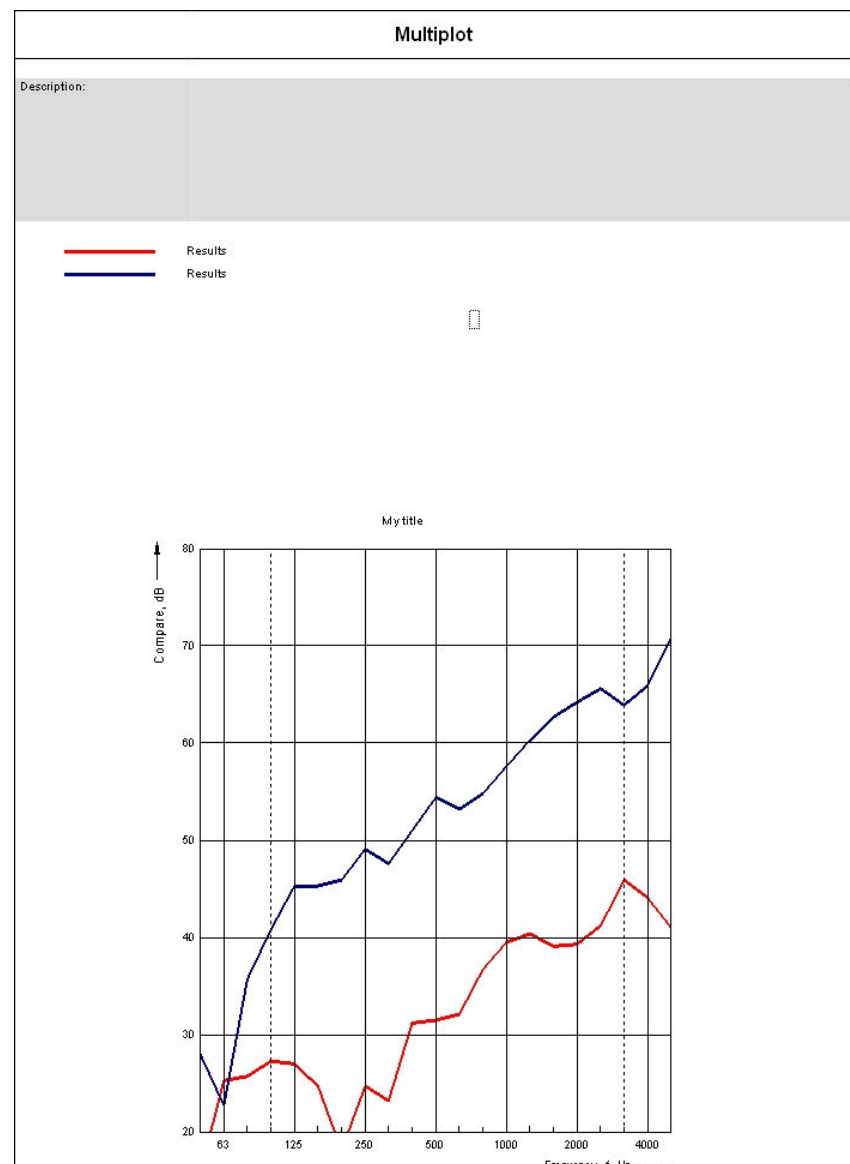
Frequency	Results	Results
[Hz]	#1	#2
50	89.60	90.00
63	88.30	89.20
80	88.00	87.60
100	84.60	84.60
125	86.00	86.90
160	87.30	87.30
200	90.00	90.80
250	90.10	90.10
315	90.30	92.00
400	88.90	89.90
500	89.00	89.00
630	88.10	88.10
800	88.60	88.60
1'000	88.70	91.10
1'250	87.20	87.90
1'600	87.20	88.10
2'000	87.00	87.00
2'500	86.30	86.30
3'150	86.20	85.90
4'000	86.00	86.00
5'000	84.00	84.30

Copy Ctrl+C
 Paste Ctrl+V
 Print... Ctrl+P
Page Setup...
 Add Measurement
 Delete Measurement Del

Result graph

All Multiplot spectra which are stored in the folder "Measurement data" are displayed in the Multiplot Result chart. A legend above the diagram shows the name, line type and line colour of the respective Multiplot spectrum.

The grey field "Description" can hold any input from the keypad. It is also possible to apply the functions *Copy / Paste* on this text field. The result graph can be printed, as described in the chapter *Printing*.



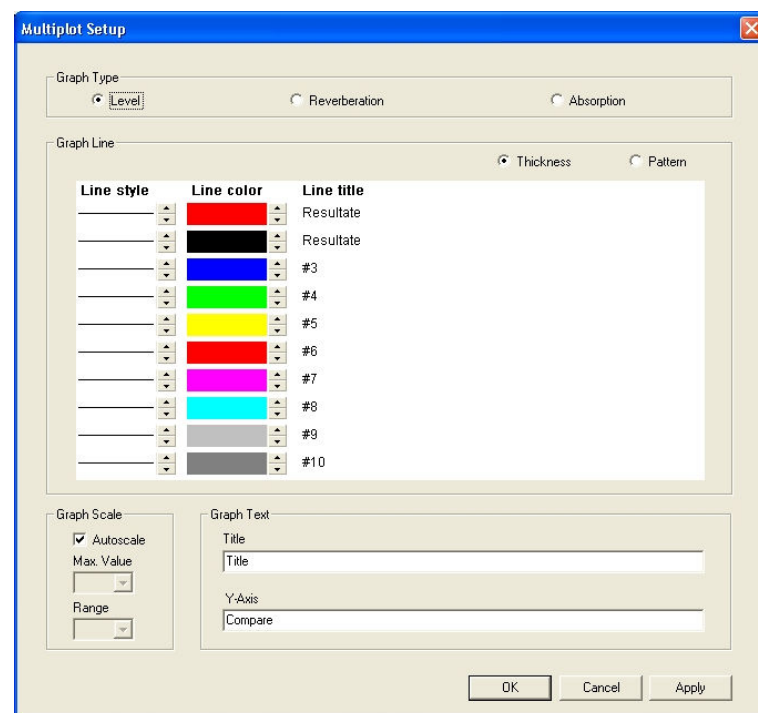
Graph modifications and settings can be made as described in the following section.

Multiplot set-up

The settings of the Multiplot graph can be opened from within the folder "Results". Within the dialog box "Multiplot settings" the following graph settings can be made:

- The graph type can be chosen between Level, Reverberation and Absorption. This setting affects the size, scaling and labeling of the graph.
- When setting the line style you can select between 'Thickness' and 'Pattern'. When selecting 'Thickness' there will be five lines of different thickness available. When selecting 'Pattern' there will be five lines of different type available (e.g. dashed line, dotted line etc.)
- A line colour can be chosen for each spectrum.
- The title of a line cannot be altered, it is only used for assigning the spectra. A title can only be changed within a measurement table.
- The graph scaling can be chosen by help of the settings 'max. value' and 'Range', unless 'Autoscale' is activated.
- The field 'Graph text' is an input field. Any graph titles and Y-axis labelings can be entered.

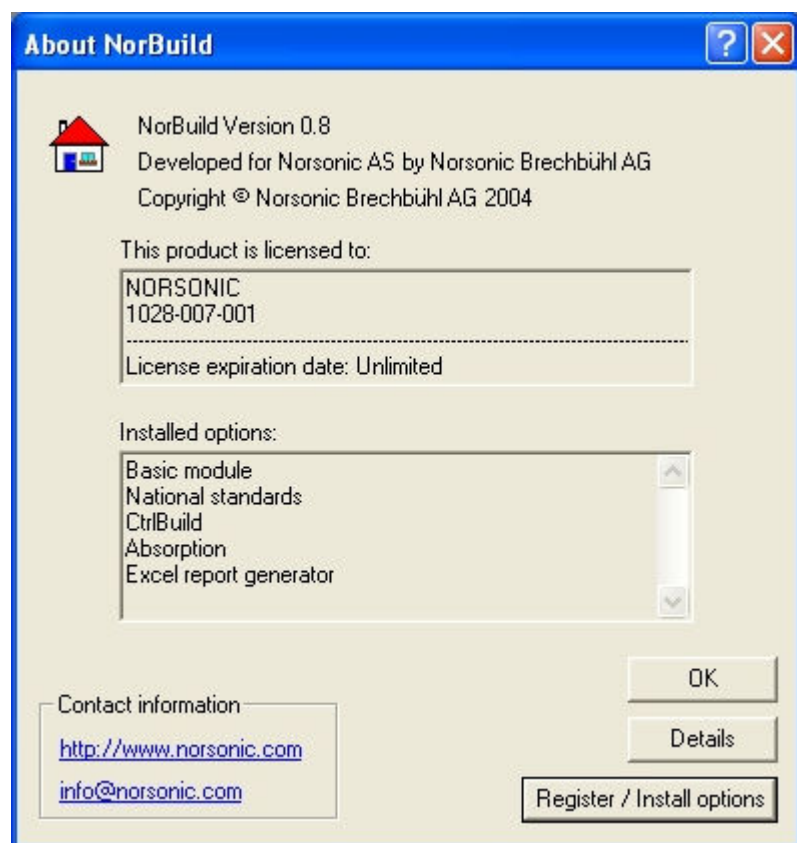
Multiplot settings of the chart:



Installing options

About command

Use the *About* command (*Help* menu) to display the dialog box:



The dialog box displays the program information, version number and copyright. License information and installed options are also displayed. This dialog box will open automatically when you run a copy of NorBuild that has not been registered.

Possible error messages

- If you try to start a program option that has not been installed (e.g. CtrlBuild) the following error message will appear: "Option 'CtrlBuild' is not present".
- If your license for NorBuild has expired the following error message will appear: "This license has expired x days ago".

In these cases please contact your local Norsonic representative to obtain a valid license key.

Details

Click this button to get detailed version information.

Register / Install options

Click this button to register your copy of NorBuild or to install new options. The "Product Registration" dialog box will open. Key in the Company, User name and the 32 character Registration code exactly as written in your license information. You may enter DEMO to enable all available options for a 60 day trial period.

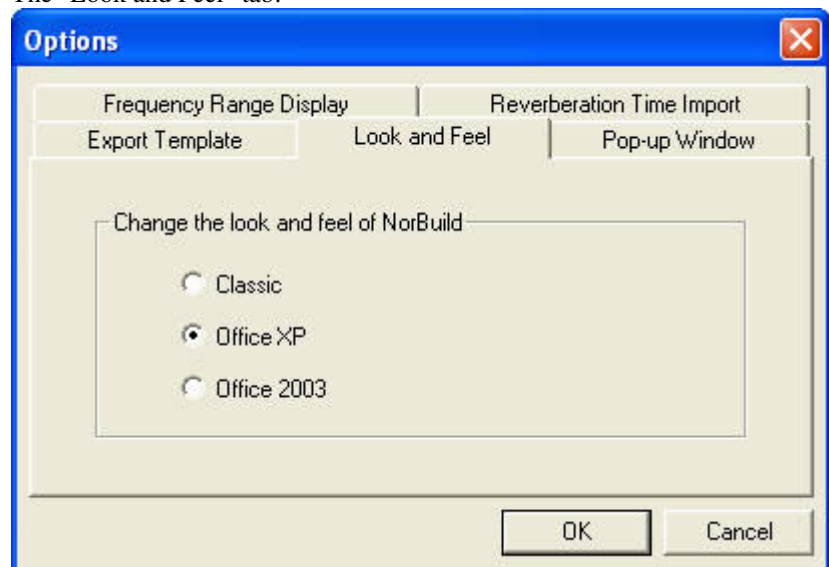
The image shows a "Product Registration" dialog box with a blue title bar and a standard Windows-style close button (X) in the top right corner. The main area of the dialog is light beige. At the top, there is a text box containing the instruction: "Please enter the 32 character registration code supplied by your vendor or enter 'DEMO' to enable all available options for a 60 day trial period." Below this, there are three labeled input fields: "Company:", "User name:", and "Registration code:". Each label is followed by a single-line text input box. At the bottom right of the dialog, there are two buttons: "Register" and "Cancel".

Additional features

Look and feel

The option 'Look and Feel' allows choosing the style in which NorBuild should appear. It can be set under *Extras > Options*.

The "Look and Feel" tab:



Choose either the 'Classic', 'Office XP' or 'Office 2003' style.

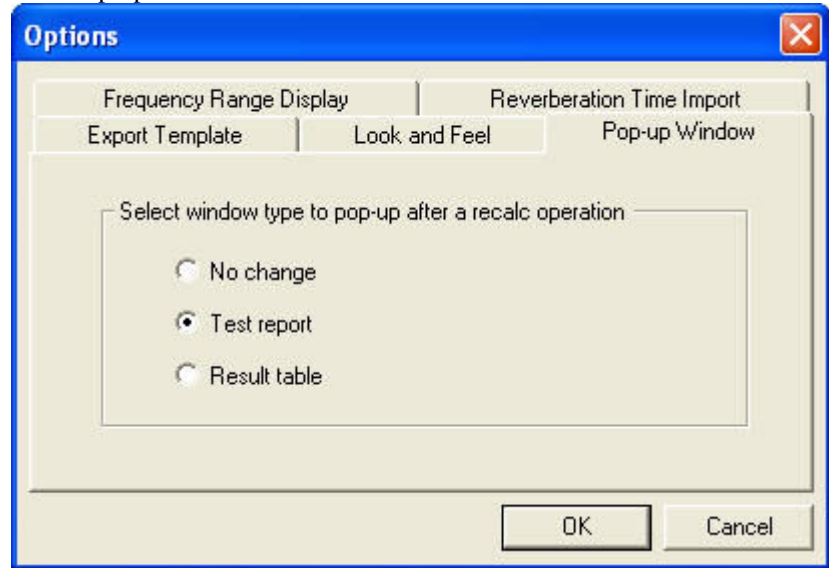
Pop-up window

This option allows defining which window should pop up after a recalculation operation.

The calculations in NorBuild are done automatically, a recalculation is done as soon as any input parameter is changed or when calculation options are enabled/disabled (e.g. *Extras > Background noise correction*).

By default the 'Test report' is selected to pop up immediately after a recalculation operation.

The "Pop-up Window" tab:



Choose either the 'Test report' or 'Result table' to pop up after a recalculation operation or choose 'No Change'.

1/10 dB accuracy

When activating *Extras > 1/10 dB Accuracy*, the single-number ratings (ISO 717) are calculated and presented to an accuracy of one tenth of a dB.

Shifted reference curve

The values of the reference curve shown on the *Test report* are taken from ISO 717-1. When activating *Extras > Shifted Reference Curve*, the reference curve is shifted according to the procedure described in ISO 717-1.

Arrange windows

The menu *Window* contains commands to arrange multiple opened windows in certain ways:

- *Cascade*: arranges all opened windows as overlapping tiles.
- *Tile*: arranges all opened windows as horizontal non-overlapping tiles.
- *Arrange Icons*: arranges the icons for minimized windows at the bottom of the main window. If there is an open window at the bottom of the main window, then some or all of the icons may not be visible because they will be underneath this open window.

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