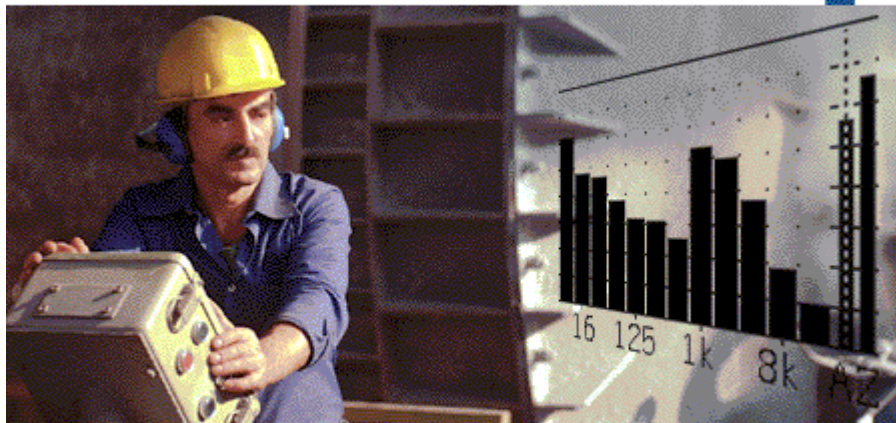
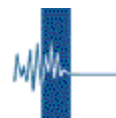


Nor - Protector Type 1025



norprotector
type 1025

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Introduction

General

The operational procedures of Nor-Protector such as printing, storing, using the clipboard, etc. follow the general principles of MS - Windows programs.

Support

Support for International Users:
Please contact either the Agent from whom you purchased Nor-Protector, or

Norsonic AS, Norway:

Tel.: +47 32858900

Fax.: +47 32852208

E-Mail: support@norsonic.com

Minimum System Requirements

- Operating System: Microsoft Windows 95/98/Me/NT/2000/XP/7/8
- Processor: Pentium recommended
- Memory: 32 MB or more
- Disk Space: 15 MB
- Other HW: CD-ROM, Mouse
- Software: Nor-Xfer Version 3.x or better (it will be installed automatically)

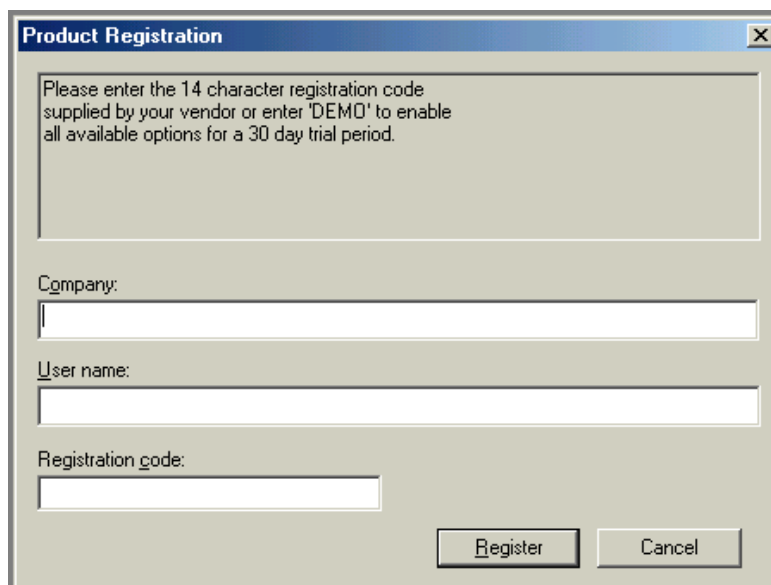
Installation

The Nor-Protector program is delivered on a CD and may be installed directly onto your computer.

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 Nor-Protector.

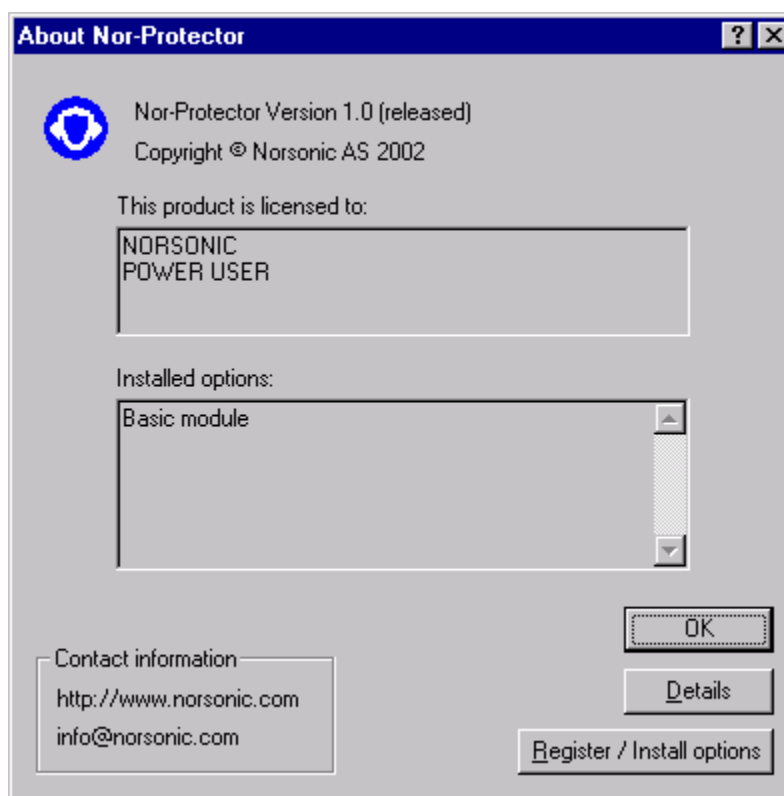
Product Registration

The first time the program is started it notifies you it requires registration. The registration code is on a label on the back of the CD cover. Type your registration code exactly as we supplied it to you.



A Windows-style dialog box titled "Product Registration" with a close button (X) in the top right corner. The main area contains a text box with the instruction: "Please enter the 14 character registration code supplied by your vendor or enter 'DEMO' to enable all available options for a 30 day trial period." Below this are three input fields: "Company:", "User name:", and "Registration code:". At the bottom right are two buttons: "Register" and "Cancel".

If the program accepts your registration code the *Help -> About* window shows up telling about the installed options as well as the software version.



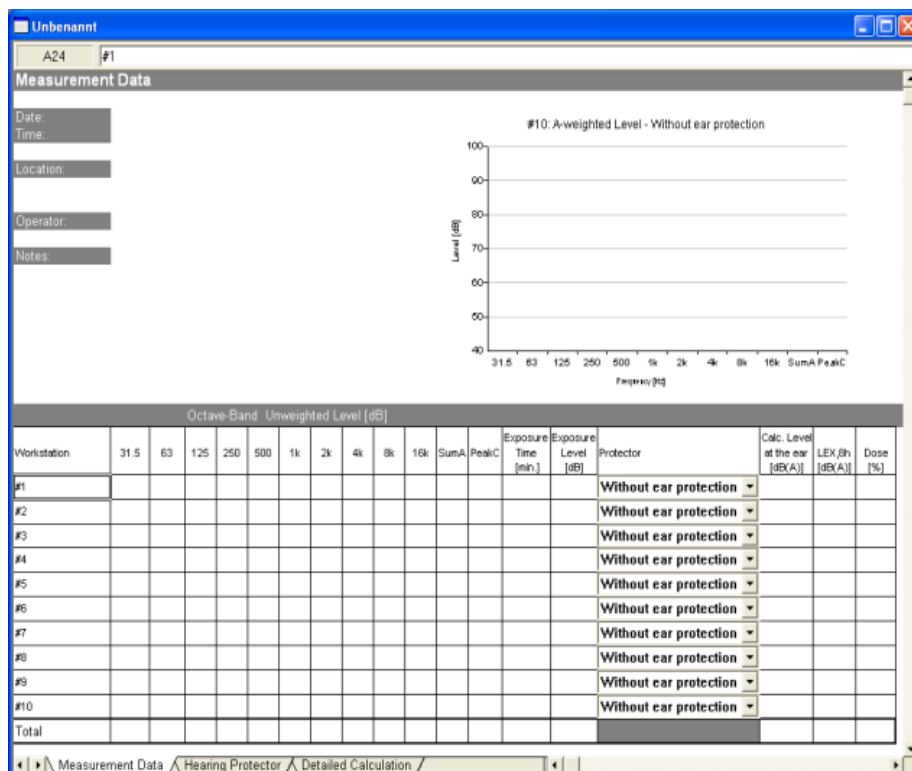
A Windows-style dialog box titled "About Nor-Protector" with help (?) and close (X) buttons in the top right corner. It features a blue shield icon with a white 'N'. The text reads: "Nor-Protector Version 1.0 (released)" and "Copyright © Norsonic AS 2002". Below is a section "This product is licensed to:" followed by a text box containing "NORSONIC POWER USER". Another section "Installed options:" is followed by a list box containing "Basic module". At the bottom left, a "Contact information" box contains the URL "http://www.norsonic.com" and email "info@norsonic.com". At the bottom right are three buttons: "OK", "Details", and "Register / Install options".

Administration Projects

New

Creates a new workbook in Nor-Protector. The workbook consists of three individual worksheets. These worksheets are useful for organizing information into separate groups. No measurement data is read in at this time. On how to read in measurement data see chapter *Read in of measurement data*

The following illustration shows the Nor-Protector workbook with its three worksheets:

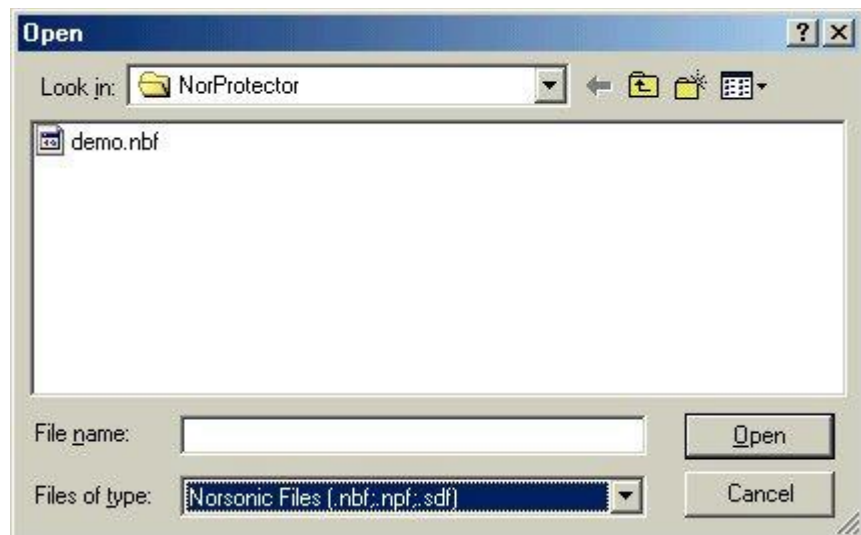


Open

The open dialogue box offers options to open two different file types.

Norsonic files are measurement files from the instrument with the extension nbf, npf or sdf. Nor-Protector will open these files and read all data needed for the calculation of hearing protector performance. The procedure is the same as the 'File -> New' process.

Protector files are MS-Excel compatible files created by Nor-Protector and contain the results of a previously worked project. These files may be opened directly.



Save

A project file can always be saved. The name will be requested when saving the first time.

1. Chose *File* -> *Save*
2. A Windows menu appears to save data.



3. Choose a path
4. Choose a file name. It is strongly recommended to use the extension .xls. If no extension is declared, xls is added automatically.
5. Choose **OK**

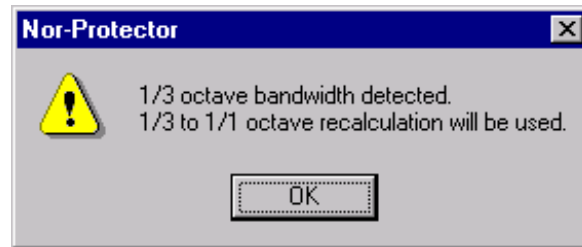
After a project has been saved the first time the same name will always be used for subsequent saves.

Read in of 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.

Nor-Protector requires 1/1 octave band measurements. If a 1/3 octave band measurement has been selected Nor-Protector will convert these to 1/1 octave bands. A window will give notification that this has been done.



Import from the hard disk:

Use the command *File > Open* to import files that are stored on the hard disk as Norsonic measurement files (*.nbf, *.npf, *.sdf). Alternatively you can drag and drop the desired file from the Windows Explorer (or use NorXfer as file Explorer) into Nor-Protector.

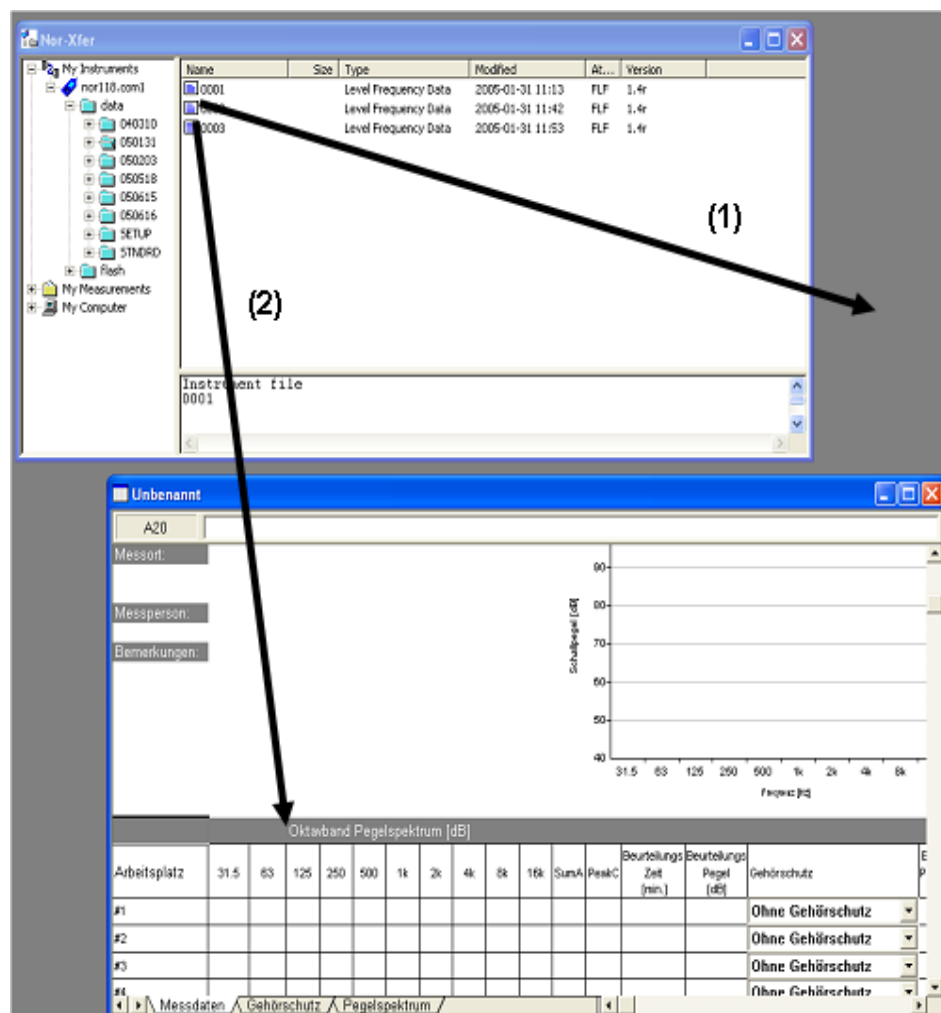
Import from the clipboard:

Numerical values can be imported from the clipboard into a measurement series.

Import from instrument with Nor-Xfer:

If there is a working installation of Norsonic's data transfer program Nor-Xfer available the '*Data -> Nor-Xfer*' command will launch it. Read the Nor-Xfer user's guide if you are not sure how to transfer files from your instrument to the PC.

Connect to your instrument and simply drag and drop your measurement from the instrument directly into the empty workspace (1) or an existing workbook (2) of Nor-Protector. Alternatively a file that has already been transferred to the PC may be selected from the directory tree and dropped into Nor-Protector. In this case the procedure is just the same as the '*File -> Open*' process.



Marking Values

Overview:

The Daily Personal Noise Exposure levels LEX,8h ($L_{EP,d}$) can be marked according to user defined rules. This feature of marking values can be switched on and off (*Data -> Mark unfavourable values*).

The *Data -> Marker Setup* function offers two predefined marker sets according to the EU Directive.

EU Noise levels:

The European Directive exposure levels in force from 1989 are still current in 2004, but the EU Directive requires a change in February 2006 to a more stringent set of requirements as the table below.

In use Years	European Directive exposure levels	
	1989 - 2005	2006 onward
Unit to use	LEP,d	LEX,8h
Action level 1	85 dBA	80 dBA
Action level 2	90 dBA	85 dBA
Limit value	N/a	87 dBA
1st Peak action level	N/a	135 dBC
2nd Peak action level	N/a	137 dBC
Peak limit value	140 dBC	140 dBC

The change from LEP,d to LEX,8h is simply a change of name of the unit. The basis of the unit is still Leq normalised to an 8hr period

Marker Set-up:

The Marker Setup dialog box is titled "Marker Setup" and contains two main sections for configuring marker sets. The first section is for "LEX, 8h (LEP, d)" and the second is for "LCpeak". Each section has three rows for "1st Action Level", "2nd Action Level", and "Max. Exposure Value". Each row has a numeric input field (with a dropdown arrow), a unit label (dB), and a color selection button (with a dropdown arrow). The "LEX, 8h (LEP, d)" section has values 80, 85, and 87 dB with blue, red, and yellow color buttons respectively. The "LCpeak" section has values 135, 137, and 140 dB with blue, red, and yellow color buttons respectively. On the right side of the dialog, there are two buttons: "Load Old Regulations" and "Load New Regulations". At the bottom right, there are "OK" and "Cancel" buttons.

Marker Set	1st Action Level (dB)	2nd Action Level (dB)	Max. Exposure Value (dB)
LEX, 8h (LEP, d)	80	85	87
LCpeak	135	137	140

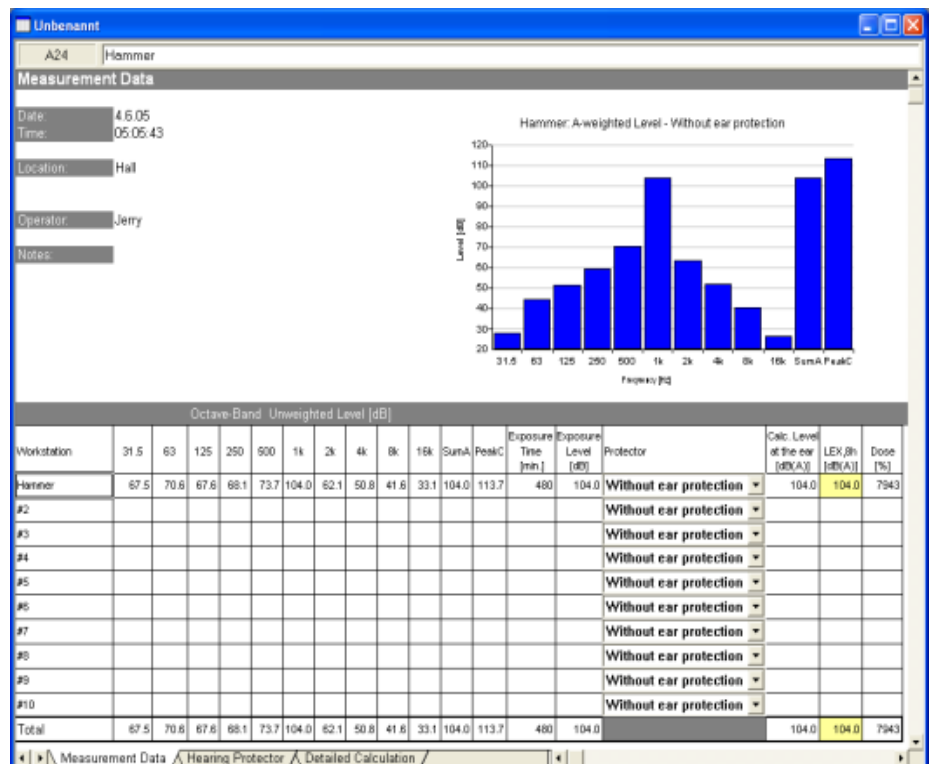
Workbook

General

When you open or create a new file in Nor-Protector, you are creating or opening a workbook. The workbook is where all your data is stored and it consists of three individual worksheets. These worksheets are useful for organizing information into separate groups.

The following illustration shows the Nor-Protector workbook with its three worksheets:

'Measurement Data', 'Hearing Protector' and 'Detailed Calculation'. The Nor-Protector workbook is based on a MS-Excel template file. This template file can be modified but with some restrictions. It is allowed to change text or insert a logo. But moving cell positions is prohibited. It's a good idea to make a backup of the file before editing it.

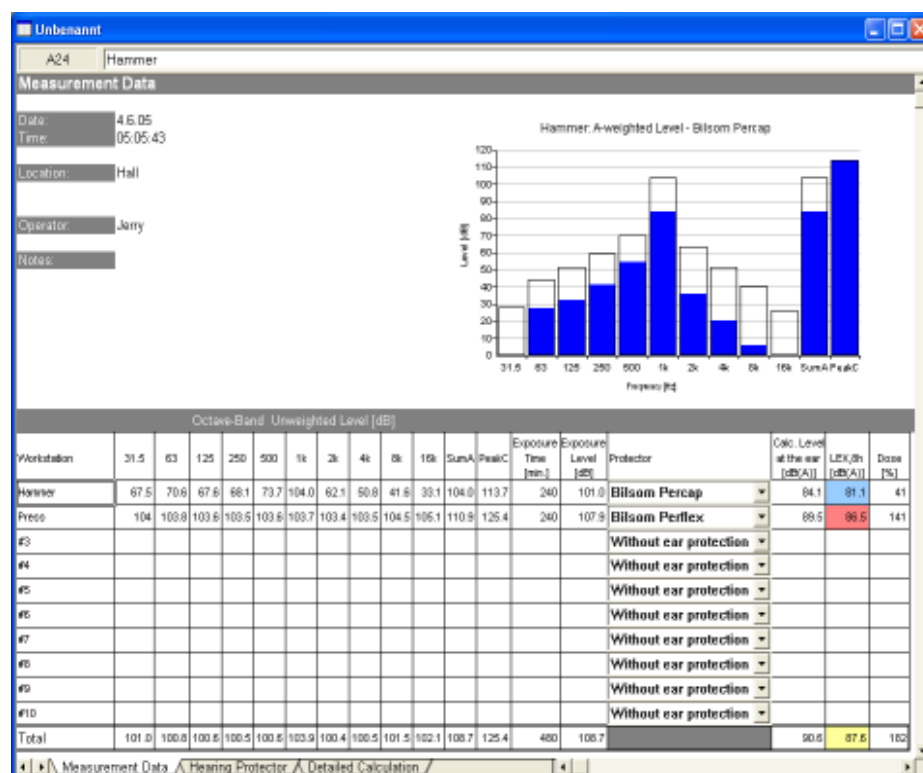


Sheet 'Measurement Data'

The first sheet holds up to 10 measurement data series and the calculated total values. The value SumA holds the postprocessed A-weighted sum of the measured spectrum. For each measurement an exposure time can be specified. Based on this and the Sum A level the exposure level is calculated (the reference time is taken from the 'Hearing Protector' sheet). For each measurement a hearing protection device can be selected from a list box. More details about the Nor-Protector database can be found in the next chapter. For each selected protector the sound pressure level at the ear, the Daily Personal Noise Exposure LEX,8h ($L_{EP,d}$) and the dose is calculated (see section 'Calculations'). The total values represent the energetic sum according to the exposure time and the total time.

Any additional user input is possible as long as there is not a restricted area. The measured values can be modified by simply typing the new value into the corresponding cell. The bar graph represents either the measured or calculated (with protection) octave band spectrum depending on the current cursor position. The spectrum can be weighted or unweighted. From the menu *View* the type of filter can be selected (A, C or Unweighted). The selection of a filter is a display feature only and has no effect on the results.

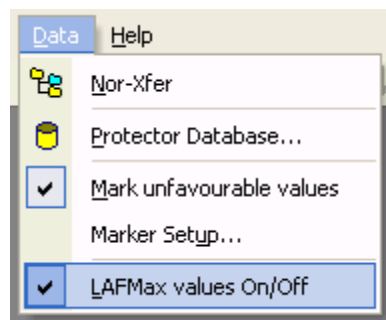
Daily Personal Noise Exposure values may be marked. This feature of marking values can be switched on and off (*Data -> Mark unfavourable values*). The rules for marking values is user defined (see *Marker Setup*)



LAFMax

To display LAFMax values (Fast Max A-weighted) on the sheet there is a menu to switch it on and off (*Data -> LAFMax values On/Off*). This feature is only available before a new project has been started.

The rules for marking LAFMax values is user defined (see *Marker Setup*)



B]										
8k	16k	SumA	PeakC	Exposure Time [min.]	Exposure Level [dB]	Protector	Calc. Level at the ear [dB(A)]	LEX,8h [dB(A)]	Dose [%]	LAFMax
						Without ear protection ▾				
						Without ear protection ▾				
						Without ear protection ▾				
						Without ear protection ▾				
						Without ear protection ▾				
						Without ear protection ▾				
						Without ear protection ▾				
						Without ear protection ▾				
						Without ear protection ▾				
						Without ear protection ▾				
						Without ear protection ▾				
						Without ear protection ▾				

LAFMax
dB
115 dB
115 dB

Sheet 'Hearing Protector'

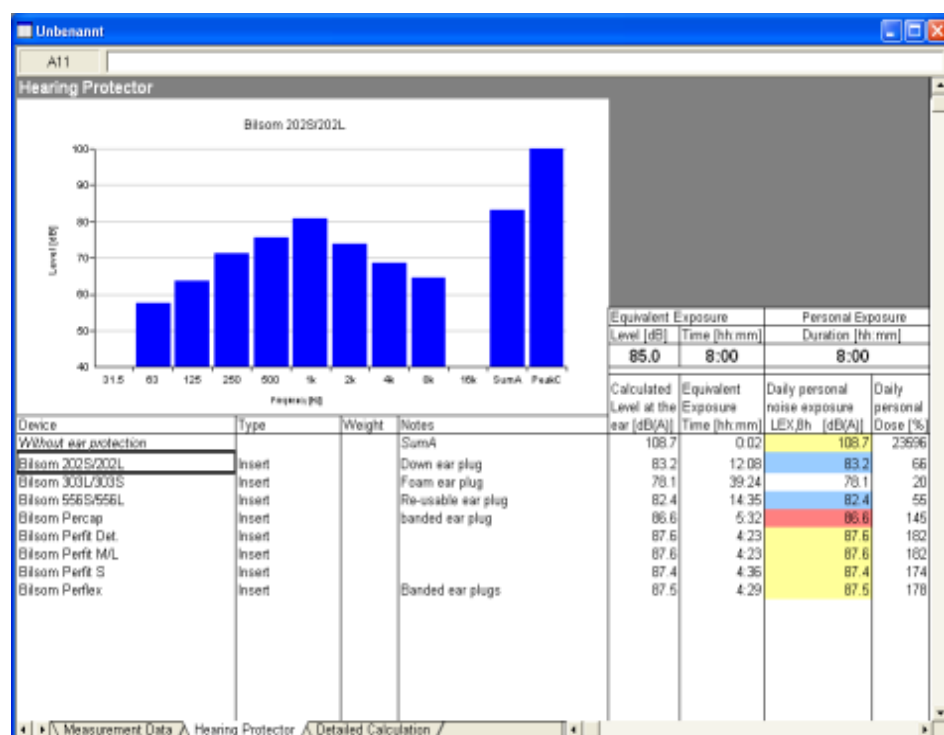
The second sheet lists all activated ear protection devices found in the Nor-Protector database. For all protectors the sound pressure level at the ear, the Equivalent Exposure Time, the Daily Personal Noise Exposure LEX,8h ($L_{EP,d}$) and the dose is calculated (see section 'Calculations'). The bar graph represents the result wearing the selected ear protector. To select a certain hearing protector simply click on its name in the list. The bar graph updates automatically according to the selection made.

The Equivalent Exposure Time calculation is based on the given Exposure Level and Exposure Time. Both values can be modified and all the corresponding values are re-calculated.

Daily Personal Noise Exposure values may be marked. This feature of marking values can be switched on and off (*Data -> Mark unfavourable values*). The rules for marking values is user defined (see *Marker Setup*).

The Daily Personal Noise Exposure LEX,8h ($L_{EP,d}$) is based on the Personal Exposure Duration. This value may also be modified and all the corresponding values are then re-calculated.

The result table can be sorted either by protector names or by the calculated levels (*'Data -> Sort by device'*, *'Data -> Sort by level'*).



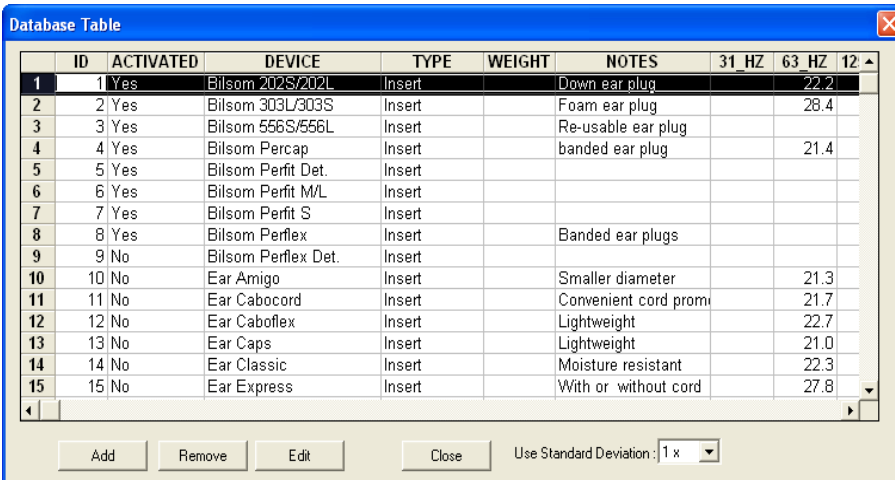
Sheet 'Detailed Calculation'

The third sheet shows the detailed calculation data for each ear protector. Nothing may be modified on this sheet.

Database

Protector Database

Nor-Protector organizes the ear protector data in a database. To make changes to these data open the database with '*Data -> Protector Database*'. A window with all protectors in the database shows up.



The screenshot shows a window titled "Database Table" with a table of ear protector data. The table has columns: ID, ACTIVATED, DEVICE, TYPE, WEIGHT, NOTES, 31_HZ, 63_HZ, and 125_HZ. The data is as follows:

	ID	ACTIVATED	DEVICE	TYPE	WEIGHT	NOTES	31_HZ	63_HZ	125_HZ
1	1	Yes	Bilsom 202S/202L	Insert		Down ear plug		22.2	
2	2	Yes	Bilsom 303L/303S	Insert		Foam ear plug		28.4	
3	3	Yes	Bilsom 556S/556L	Insert		Re-usable ear plug			
4	4	Yes	Bilsom Percap	Insert		banded ear plug		21.4	
5	5	Yes	Bilsom Perfit Det.	Insert					
6	6	Yes	Bilsom Perfit M/L	Insert					
7	7	Yes	Bilsom Perfit S	Insert					
8	8	Yes	Bilsom Perflex	Insert		Banded ear plugs			
9	9	No	Bilsom Perflex Det.	Insert					
10	10	No	Ear Amigo	Insert		Smaller diameter		21.3	
11	11	No	Ear Cabocord	Insert		Convenient cord prom		21.7	
12	12	No	Ear Caboflex	Insert		Lightweight		22.7	
13	13	No	Ear Caps	Insert		Lightweight		21.0	
14	14	No	Ear Classic	Insert		Moisture resistant		22.3	
15	15	No	Ear Express	Insert		With or without cord		27.8	

At the bottom of the window, there are buttons: Add, Remove, Edit, Close, and a dropdown menu for "Use Standard Deviation:" set to "1 x".

To quit the database window click the **Close** button. Changes made to the database will affect the current project. For the assumed noise protection values APV the mean attenuation minus standard deviation of the device must be taken into consideration. It can be selected how many times the standard deviation is included (0, 1, 1.5, 2).

Important note:

The ear protector data given is for information only and users are advised to check with the hearing protector manufacturers to confirm that they have the latest information.

Norsonic assumes no responsibility for the use of - nor for any consequential damage of the use of this information.

To add a new protector click the **Add** button. In the window which pops up key in the protector data. If an ear protector should be taken into account by Nor-Protector the 'Activated' field must be ticked. Otherwise it will be ignored. The fields 'Device' and 'Type' must not be empty. For the assumed noise protection values APV the mean attenuation minus standard deviation of the device must be taken into consideration. In which frequency bands the ear protector has defined protection values is given by the manufacturer.

Nor-Protector can handle a frequency range from 31.5 Hz to 16 kHz. If information is not available for any frequency then leave that entry blank, do not put 0.0 in for undefined levels.

Database Record

ID: ☒ Activated

Device: Type:

Notes: Weight:

Mean attenuation

31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz

Standard Deviation

--	--	--	--	--	--	--	--	--	--

OK Cancel

To modify an existing protector click the **Edit** button. A window shows up and gives access to the data.

Database Record

ID: ☒ Activated

Device: Type:

Notes: Weight:

Mean attenuation

31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
	22.2	26.1	26.7	28.1	29.4	32	37.6	39.8	

Standard Deviation

	5.3	5.3	5.9	6.2	6.4	4.4	4.7	3.9	
--	-----	-----	-----	-----	-----	-----	-----	-----	--

OK Cancel

To delete an existing protector click the **Remove** button. Removing a protector from the database must be confirmed. Instead of deleting, deactivating might be considered as an alternative.



Calculations

Formula

The Exposre Level is expressed in dB(A) and is calculated using the fomula:

$$L + 10 * \log \left(\frac{T_D}{T_0} \right)$$

where-

- T_D = Exposure time (can be modified)
- T_0 = 8 hours(can be modified)
- L = Calculated SumA level

The Equivalent Exposure Time calculation is expressed in hours and is obtained using the formula:

$$T = \frac{T_E}{2^{\left(\frac{L-L_E}{3}\right)}}$$

where-

- T_E = Exposure time (can be modified)
- L_E = Exposure level (can be modified)
- L = the calculated level at the ear

The Daily Personal Noise Exposure LEX,8h ($L_{EP,d}$) normalised to an 8 hour day is expressed in dB(A) and is given by the formula:

$$L_{EP,d} = L + 10 * \text{Log}_{10}\left(\frac{T_D}{T_0}\right)$$

where-

T_D = the duration of the person's personal exposure to sound (editable)

T_0 = 8 hours

L = the calculated level at the ear

Note:

The change from $L_{EP,d}$ to LEX,8h is simply a change of name of the unit. The basis of the unit is still Leq normalised to an 8hr period

The Dose is expressed in % and is given by the formula:

$$100 * \left(\frac{10^{\frac{L_{EP,d}}{10}}}{10^{\frac{L_E}{10}}} \right)$$













where-

LEX,8h ($L_{EP,d}$) = The Daily Personal Noise Exposure Level (normalised to an 8 hour day)

L_E = Exposure level (can be modified)

Toolbar

Toolbar

	Create a new document
	Open an existing document/measurement
	Save the active document
	Cut the selection and put it on the clipboard
	Copy the selection and put it on the clipboard
	Insert clipboard contents
	Print the active document
	Start the Nor-Xfer application
	Open the hearing protector database to edit
	Sort 'Hearing Protector' table by devices
	Sort 'Hearing Protector' table by levels
	Display the table of contents for the online documentation